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ENVIRONMENTAL REPORT

Fairbanks Rail Yard

FAIRBANKS, ALASKA

SHANNON & WILSON

December 2018

Shannon & Wilson No: 101525-003

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Alaska Railroad Corporation
327 West Ship Creek Avenue
Anchorage, Alaska 99501

Attn: Russell Grandel

RE: ENVIRONMENTAL REPORT , FAIRBANKS RAIL YARD, FAIRBANKS, ALASKA

Shannon & Wilson participated in this project as a subconsultant to Alaska Railroad Corporation. Our scope of services was specified in our ARRC contract (107724) under Task Number 002 dated September 12, 2018.

This report was prepared and reviewed by:

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ACRONYMS

ACRONYMS

°C	degrees Celsius
ADEC	Alaska Department of Environmental Conservation
ARRC	Alaska Railroad Corporation
AST	aboveground storage tank
bgs	below the ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
COC	chain of custody
CUL	cleanup level
DA	Design Alaska
DRO	diesel range organics
EPA	United States Environmental Protection Agency
FARs	Field Activity Reports
FES	Fairbanks Environmental Services
GRO	gasoline range organics
mg/kg	milligrams per kilograms
mg/L	milligrams per liter
PAH	polynuclear aromatic hydrocarbon
ppm	parts per million
QA	quality assurance
QC	quality control
RRO	Residual Range Organics
UST	underground storage tank
SGS	SGS North America, Inc.

1 INTRODUCTION

This report summarizes the characterization of current conditions at the Alaska Railroad Corporation (ARRC) Fairbanks Rail Yard located at Phillips Field Road and Jack Lindsey Lane, Fairbanks, Alaska (Figure 1). The Alaska Department of Environmental Conservation (ADEC) requested additional site characterization be conducted at this ADEC-listed contaminated site (File Number 102.38.050). Field activities in 2018 included collecting samples for laboratory analysis from the eight onsite monitoring wells. We performed our services consistent with our ARRC contract (107724) under Task Number 001, the September 24, 2018 Fairbanks Rail Yard Groundwater Monitoring Work Plan (Work Plan), appropriate guidance documents, and 18 Alaska Administrative Code (AAC) 75 regulations.

1.1 Project Objectives

Our objective was to characterize groundwater quality and create a groundwater contour map at the Fairbanks Rail Yard. This report was prepared for the exclusive use of the Alaska Railroad Corporation and their representatives for evaluating the Fairbanks Rail Yard site. This report should not be used for other purposes without our review, and it should not be used without our approval if any of the following occurs:

- Conditions change due to natural forces or human activity under, at, or adjacent to the site.
- Assumptions stated in this report have changed.
- Project details change or new information becomes available such that our conclusions may be affected.
- If the site ownership or land use has changed.
- Regulations, laws, or cleanup levels change.
- If the site's regulatory status has changed.

If any of these occur, we should be retained to review the applicability of our recommendations.

1.2 Scope of Services

Our scope of services included:

- Preparing a Work Plan for the Fairbanks Rail Yard Groundwater Monitoring.

- Checking monitoring wells for the presence of free product and measuring depth to groundwater for the purposes of creating a groundwater contour map.
- Collecting groundwater samples from the eight monitoring wells with no presence of free product.
- Preparing this summary report.

On October 10, 2018, we collected groundwater for analytical testing from the onsite monitoring wells.

If a service is not specifically indicated in this report, do not assume that it was performed.

2 SITE AND PROJECT DESCRIPTION

2.1 Site Description and Background

The Fairbanks Rail Yard is located at Jack Lindsey Lane and Phillips Field Road, ARRC Industrial Area (Section 9, Township 1 South, Range 1 West, Fairbanks Meridian) in Fairbanks, Alaska (Figure 1). The Fairbanks Rail Yard is a primary facility for northern ARRC operations. Site improvements include buried utilities, rail yard lighting, and multiple sets of railroad tracks, track crossings, and buildings.

Between 1949 and 1986, two 105,000-gallon aboveground storage tanks (ASTs) provided diesel for locomotives and heavy equipment. In 1986, a 7-foot test pit was excavated between the two ASTs. Petroleum contamination was discovered in the soil. In June 1988, on behalf of ARRC, Woodware-Clyde conducted a soil gas survey to determine the extent of soil and groundwater contamination. In October and November 2003, the two ASTs and associated piping were removed.

Between 2006 to 2016, the ARRC initiated long-term groundwater monitoring and completed limited site characterization.

2.2 Contaminants of Potential Concern and Cleanup Levels

Contaminants of potential concern (COPCs) associated with the site are diesel range organics (DRO), gasoline range organics (GRO), residual range organics (RRO), benzene, toluene, ethylbenzene, xylene (BTEX), and polynuclear aromatic hydrocarbons (PAHs).

To evaluate groundwater sample concentrations, we compared the analytical data to Table C of 18 AAC 75.345 Groundwater Cleanup Levels.

3 FIELD ACTIVITIES

The sampling was performed to evaluate groundwater conditions at the site. Our work was conducted in accordance with the Work Plan. Our observations are specific to the locations, depths, and times noted on the logs and may not be applicable to all areas of the site. No amount of sampling can precisely predict the characteristics, quality, or distribution of subsurface and site conditions. Potential sources of variation include, but are not limited to:

- The conditions between sampling locations may be different.
- The presence, distribution, and concentration of contaminants may vary at our sampling locations, and our tests may not represent the highest contaminant concentrations at the site.
- The passage of time or intervening causes (natural and manmade) may result in changes to site and subsurface conditions.
- Contaminant concentrations may change in response to natural conditions, chemical reactions, and/or other events.

If substantial time has elapsed between submission of this report and the start of activities or action based upon it, we recommend this report be reviewed to determine the applicability of the conclusions and recommendations considering the lapsed time or changed conditions.

3.1 October 2018 Monitoring Well Sampling Event

Exhibit 3-1: Resampling *MW-4* to collect a field duplicate (10/10/18).

Shannon & Wilson staff Kevin Chancey and Dana Fjare traveled to Fairbanks Rail Yard on October 10, 2018, to collect groundwater samples from the nine onsite monitoring wells in accordance with the Work Plan. During the October 2018 field visit, we collected six groundwater samples and one field duplicate from monitoring wells MW-4, MW-5, MW-6, MW-7, MW-8, and MW-9 and analyzed them for GRO (AK 101), DRO (AK 102), RRO (AK 103), BTEX (EPA 8021B), and PAH (EPA 8270). Free product was encountered in monitoring wells MW-1, MW-2, and WC-3, which we did not sample. Groundwater sampling field

measurements are presented in Table 1. Sample collection logs can be found in Appendix B.

3.2 Deviations from Work Plan

We conducted our field services in accordance with the Work Plan, with the following exception:

A field duplicate was to be collected from either monitoring well MW-1, MW-2, or WC-3. Due to free product in these wells we were unable to sample and collect a field duplicate. To collect a field duplicate we resampled monitoring well MW-4. The original sample from MW-4 was collected at 12:19. We resampled MW-4 and collected the field duplicate at 13:40. We resampled MW-4 without purging the well again due to the limited amount of time in-between the original sample and the resample.

3.3 Investigation-Derived Waste Management

Sampling equipment coming in contact with groundwater was decontaminated prior to use and reuse. We treated decontamination fluids and monitoring-well purge water using our GAC filter. There was no sheen observed emerging from the GAC treated groundwater disposed onsite. We transported the spent GAC to Fairbanks to be disposed with spent GAC from other Shannon & Wilson projects.

Other IDW consisted of disposable sampling equipment (nitrile gloves, plastic bags), which was disposed at the Fairbanks landfill.

3.4 Sample Custody, Storage, and Transport

After sample collection, we wrapped the sample bottles in bubble wrap and placed them in hard plastic coolers with adequate quantities of frozen ice-substitute to maintain sample temperatures between 0 degrees Centigrade (°C) and 6 °C until the samples reached the laboratory, using packing material as necessary to prevent bottle breakage and adhere to hazardous materials transportation regulations. A "temperature blank" was packed with the samples in each cooler. Shannon & Wilson maintained custody of the samples until submitting them to the laboratory for analysis.

The water samples were delivered to the SGS North America (SGS) receiving office in Fairbanks with a requested "standard turnaround" (14 calendar days, Work Order No. 1189855). Water samples were analyzed for GRO, DRO, RRO, BTEX, and PAHs.

4 ANALYTICAL RESULTS

We compared analytical results of groundwater samples to cleanup levels (CULs) listed in Alaska's 18 AAC 75.345 Table C – Groundwater Cleanup Levels.

Summaries of the analytical results of the water samples are presented in Table 2. Historical analytical results are presented in Table 3. The complete analytical laboratory reports and ADEC data-review checklists are included in Appendices C and D.

4.1 Groundwater

Analytical results above the ADEC groundwater CULs include:

- Ethylbenzene was detected in sample MW-6 with a reported concentration of 38.2 µg/L during the October sampling event.
- DRO was detected in the samples MW-4 and MW-104 (field duplicate pair) and samples MW-5, MW-6, and MW-7 during the October sampling event. The reported concentrations are 4.66, 4.73, 2.03, 4.84, and 12.0 mg/L respectively.
- RRO was detected in the sample MW-7 during the October sampling event. The estimated concentration is 1.34 mg/L.
- Naphthalene was detected in the samples MW-4 and MW-104 (field duplicate pair) and samples MW-5, MW-6, and MW-7 during the October sampling event. The reported concentrations are 64.9, 49.1, 1.96, 56.8, and 7.03 µg/L respectively.
- 1-methylnaphthalene was detected in the samples MW-4 and MW-104 (field duplicate pair) during the October sampling event. The estimated concentrations are 60.0 and 45.8 µg/L, respectively. In addition, it is important to note that we do not have historical data for PAHs. We therefore do not have comparable results for this analyte.
- 1-methylnaphthalene was detected in the sample MW-6 during the October sampling event. The reported concentration is 53.6 µg/L. In addition, it is important to note that we do not have historical data for PAHs. We therefore do not have comparable results for this analyte.
- 2-methylnaphthalene was detected in the samples MW-4 and MW-104 (field duplicate pair) during the October sampling event. The estimated concentrations are 65.1 and 49.5 µg/L, respectively. In addition, it is important to note that we do not have historical data for PAHs. We therefore do not have comparable results for this analyte.
- 2-methylnaphthalene was detected in the sample MW-6 during the October sampling event. The reported concentration is 49.1 µg/L. In addition, it is important to note that we do not have historical data for PAHs. We therefore do not have comparable results for this analyte.

Analytical results less than the ADEC groundwater CULs but greater than the laboratory's LOQ include:

- GRO was detected in the samples MW-4 and MW-104 (field duplicate pair) and samples MW-6 and MW-7 during the October sampling event.
- Ethylbenzene, o-xylene, and p & m–xylenes were detected in the samples MW-4 and MW-104 (field duplicate pair) and sample MW-7 during the October sampling event.
- P & m–xylene was detected in sample MW-5 during the October sampling event.
- O-xylene, and p & m–xylenes were detected in the sample MW-6 during the October sampling event.
- Benzene was detected in sample MW-7 during the October sampling event.
- Acenaphthene, anthracene, fluorene, and phenanthrene were detected in samples MW-4 and MW-104 (field duplicate pair) during the October sampling event.
- 1-methylnaphthalene, 2-methylnaphthalene, Acenaphthene, fluorene, and phenanthrene were detected in samples MW-5 and MW-7 during the October sampling event.
- Acenaphthene, fluorene, and phenanthrene were detected in sample MW-6 during the October sampling event.

Concentrations of the other analytes in the project groundwater samples were less than the laboratory's LOQ.

- DRO and RRO for samples MW-8 and MW-9 were flagged and considered not detected at the LOQ due to contamination identified in the method blank.
- RRO for samples MW-4, MW-104, MW-5, and MW-6 were flagged and considered not detected at the LOQ due to contamination identified in the method blank.

5 QUALITY ASSURANCE/QUALITY CONTROL

We reviewed the analytical results provided by SGS for laboratory Quality Control (QC) samples and also conducted our own Quality Assurance (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 °C and 6 °C) during shipping. Our QA-review procedures allow us to document accuracy and precision of the analytical data and check that the analyses were sufficiently sensitive to detect analytes at levels below regulatory standards.

For this report, we reviewed the water data reported in SGS work order 1189855. The SGS laboratory report contained the case narrative, sample-receipt forms, analytical results, and a copy of the COC. Details regarding the results of our QA analyses are presented in the

ADEC laboratory data-review checklist along with a copy of the original SGS laboratory report (Appendix C). Our review of the data reveals that some of the analytical samples experienced method and laboratory data-quality failures (surrogate recovery, method blank detections, field duplicate relative percent difference (RPD) failures, etc.). None of the data-quality failures caused the data to be considered unusable. Analytical results that are considered affected by method and laboratory data-quality failures are flagged in Table 1.

6 MANN-KENDALL TREND ANALYSIS

We performed an evaluation of concentration trends for GRO, DRO, RRO and BTEX in groundwater samples collected from MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, and MW-9 using a Mann-Kendall statistical analysis of groundwater analytical data and visual assessment of the concentration graphs. Monitoring and Remediation Optimization System (MAROS) software was developed by the Air Force Center for Engineering and the Environment to evaluate concentration trends.

The MAROS evaluation of concentration trends depends on the result of a Mann- Kendall trend analysis, coupled with information about the COV. A statistically significant increasing or decreasing trend will be identified by the Mann-Kendall analysis if the probability of a false-negative assessment is less than 5 percent (i.e., $p < 0.05$); MAROS refers to this condition as a "confidence in trend" above 95 percent.

MAROS discriminates between "no trend" and a "stable" contaminant concentration by evaluating the COV of a given well's data set. The COV is defined as the ratio of a data set's standard deviation to its mean. COV values less than or near one indicate that data form a relatively close group around the mean value; values larger than one indicate data exhibit a greater degree of scatter around the mean. The MAROS decision matrix is presented in the Exhibit below:

Exhibit 6-1: MAROS Decision Matrix

Mann-Kendall Statistic	Confidence in Trend	Concentration Trend
S > 0	> 95 percent	Increasing
S > 0	90 to 95 percent	Probably increasing
S > 0	< 90 percent	No trend
S ≤ 0	< 90 percent and COV ≥ 1	No trend
S ≤ 0	< 90 percent and COV < 1	Stable
S < 0	90 to 95 percent	Probably decreasing
S < 0	> 95 percent	Decreasing

Using the Environmental Protection Agency's ProUCL Version 5.1 statistics software, we conducted a Mann-Kendall Trend analysis on the GRO, DRO, RRO, and BTEX results with three or more results for Fairbanks Rail Yard. The monitoring well MW-1 has limited historical results reported. The observed MK results are based on the available data from 2006, 2011, and 2012. These results are not representative of current conditions. The ProUCL Input and Output files are presented in Appendix E and the results are presented in Table 4. Below is a summary of the trend analysis.

- GRO in MW-7 displayed a decreasing trend;
- Ethylbenzene and xylenes in MW-5 displayed a probably decreasing trend;
- DRO in MW-9 displayed an increasing trend;
- RRO in MW-5 displayed a probably increasing trend; and
- A stable trend was displayed for the following analyte/well pairs
  - GRO in MW-2 and MW-8;
  - DRO in MW-1, MW-3, MW-5, and MW-7;
  - RRO in MW-2, MW-3, MW-8, and MW-9;
  - Benzene in MW-1;

- Toluene in MW-2, MW-5, and MW-7;
- Ethylbenzene in MW-1, MW-2, MW-3, and MW-4; and
- Xylenes in MW-1, MW-2, MW-3, MW-4, MW-6, and MW-7

7 DISCUSSION & RECOMMENDATIONS

Below is a summary discussion and our recommendations for further action. Our recommendations are based on:

- The limitations of our approved scope, schedule, and budget described in our proposal dated August 21, 2018.
- Our understanding of the project and information provided by ARRC and ADEC's Grant Lidren.
- Conditions we observed during our site visit as they existed October 10, 2018.
- The results of testing performed on samples we collected during our site visits.
- The Work Plan developed with you to consider project-specific factors.
- The requirements of the regulatory and guidance documents cited in Section 8.0 (References).

7.1 Discussion of Results

The results of analytical water samples are consistent with historical results (Table 2) and indicate that DRO is present in the groundwater at concentrations exceeding the ADEC CULs. Samples from monitoring wells MW-4, MW-5, MW-6, and MW-7 indicate DRO concentrations greater than the CULs. A sample from monitoring well MW-7 indicated a RRO concentration greater than the CULs. Samples from monitoring wells MW-4 and MW-6 contained 1-methylnaphthalene and 2- methylnaphthalene in concentrations exceeding the ADEC CULs. Samples from monitoring wells MW-4, MW-5, MW-6, and MW-7 contained naphthalene in concentrations greater then ADEC CULs. A sample from monitoring well MW-6 contained ethylbenzene in concentrations greater then ADEC CULs. Free product was encountered in a monitoring wells MW-1, MW-2, and WC-3 during the October 10, 2018 sampling event. These monitoring wells are located to the east, west, and in between the former ASTs (Figure 2). According to the groundwater contour map (Figure 3) the flow of water is to the south-southwest.

The results from the Mann-Kendall Trend Analysis displayed over all a stable or decreasing trend. DRO in MW-9 displayed an increasing trend and RRO in MW-5 displayed a probably increasing trend. However, these two analytes are below ADEC CULs.

7.2 Recommendations

The results from the October 2018 sampling event are within trend from previous years and appear to be stable and slightly decreasing. Based on this year's results and the Mann-Kendall Trend Analysis, we recommend decreasing the sampling frequency to every two years.

8 REFERENCES

Alaska Administrative Code 18 AAC 75 Oil and Other Hazardous Substances Pollution Control, November 2017.

Alaska Department of Environmental Conservation (ADEC), 2003, 18 AAC 75.345 Table C – Groundwater Cleanup Levels.

Alaska Department of Environmental Conservation (ADEC), 2009, Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites

Alaska Department of Environmental Conservation (ADEC), 2016, Field Sampling Guidance for Contaminated Sites and Leaking Underground Storage Tank Sites, available: https://dec.alaska.gov/spar/csp/guidance_forms/docs/Field%20Sampling%20Guidance%20-%20%20Final%2003%2021%202016.pdf

2015 Groundwater Monitoring Report, Fairbanks Rail Yard, Fairbanks, Alaska. Fairbanks Environmental Services.

TABLE 1
GROUNDWATER FIELD MEASUREMENTS

Well	Depth to Water (feet)	Depth to Product (feet)	Product Thickness (feet)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS/cm)	pH	ORP (mV)
MW-1	12.31	12.18	0.13	Not sampled due to product in well				
MW-2	12.72	12.65	0.07	Not sampled due to product in well				
WC-3	12.81	12.78	0.03	Not sampled due to product in well				
MW-4	12.94	--	--	6.6	0.58	670	6.49	57.1
MW-5	12.25	--	--	5.8	0.6	623	6.37	71.8
MW-6	12.20	--	--	6.0	0.56	740	6.56	66.0
MW-7	11.98	--	--	6.4	0.56	675	6.45	56.8
MW-8	10.43	--	--	6.3	2.07	891	6.32	210.2
MW-9	10.85	--	--	5.4	0.67	762	6.43	105.4

Notes:

-- No product present
mg/L milligrams per liter
°C degrees celsius
mV millivolts
µS/cm microsiemens per centimeter

TABLE 2
SUMMARY OF GROUNDWATER-SAMPLE RESULTS

Analytical Method	Analyte	ADEC Groundwater-Cleanup Level	Units	MW-4	MW-104	MW-5	MW-6	MW-7	MW-8	MW-9
AK101	Gasoline Range Organics	2.2	mg/L	0.141	0.164	<0.0500	0.441	0.0428J	<0.0500	<0.0500
AK102	Diesel Range Organics	1.5	mg/L	**4.66**	**4.73**	**2.03**	**4.84**	**12.0**	<0.577B*	<0.577B*
AK103	Residual Range Organics	1.1	mg/L	<0.574B*	<0.706B*	<0.481B*	<0.777B*	**1.34JH***	<0.481B*	<0.481B*
SW8021B (BTEX)	Benzene	4.6	µg/L	<0.250	<0.250	<0.250	<0.250	1.86	<0.250	<0.250
	Ethylbenzene	15	µg/L	6.02	5.97	<0.500	**38.2**	1.07	<0.500	<0.500
	o-Xylene	190	µg/L	4.67	3.59	<0.500	0.510J	1.22	<0.500	<0.500
	P & M -Xylene	190	µg/L	12.4	12.3	0.740J	1.04J	2.35	<1.00	<1.00
	Toluene	1100	µg/L	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
8270D SIM (PAH)	1-Methylnaphthalene	11	µg/L	**60.0**	**45.8JL***	2.71JL*	**53.6**	1.44	<0.0240	<0.0245
	2-Methylnaphthalene	36	µg/L	**65.1**	**49.5JL***	0.826JL*	**49.1**	1.15	<0.0240	<0.0245
	Acenaphthene	530	µg/L	1.45	1.11JL*	0.229JL*	1.75	0.301	<0.0240	<0.0245
	Acenaphthylene	260	µg/L	<0.0236	<0.0236J*	<0.0240J*	<0.0240	<0.0240	<0.0240	<0.0245
	Anthracene	43	µg/L	0.0594J*	0.0315JL*	<0.0240J*	<0.0240	<0.0240	<0.0240	<0.0245
	Benzo(a)anthracene	0.3	µg/L	<0.0236	<0.0236	<0.0240	<0.0240	<0.0240	<0.0240	<0.0245
	Benzo(a)pyrene	0.25	µg/L	<0.00945	<0.00945	<0.00960	<0.00960	<0.00960	<0.00960	<0.00980
	Benzo(b)fluoranthene	2.5	µg/L	<0.0236	<0.0236	<0.0240	<0.0240	<0.0240	<0.0240	<0.0245
	Benzo(g,h,i)perylene	0.26	µg/L	<0.0236	<0.0236	<0.0240	<0.0240	<0.0240	<0.0240	<0.0245
	Benzo(k)fluoranthene	0.8	µg/L	<0.0236	<0.0236	<0.0240	<0.0240	<0.0240	<0.0240	<0.0245
	Chrysene	2	µg/L	<0.0236	<0.0236	<0.0240	<0.0240	<0.0240	<0.0240	<0.0245
	Dibenzo(a,h)anthracene	0.25	µg/L	<0.00945	<0.00945	<0.00960	<0.00960	<0.00960	<0.00960	<0.00980
	Fluoranthene	260	µg/L	<0.0236	<0.0236	<0.0240	<0.0240	<0.0240	<0.0240	<0.0245
	Fluorene	290	µg/L	3.55	2.73JL*	0.500JL*	3.68	0.201	<0.0240	<0.0245
	Indeno(1,2,3-cd)pyrene	0.19	µg/L	<0.0236	<0.0236	<0.0240	<0.0240	<0.0240	<0.0240	<0.0245
	Naphthalene	1.7	µg/L	**64.9**	**49.1JL***	**1.96JL***	**56.8**	**7.03**	<0.0481	<0.0490
	Phenanthrene	170	µg/L	1.94	1.59JL*	0.235JL*	1.45	0.133	<0.0240	<0.0245
	Pyrene	120	µg/L	<0.0236	0.0346J	<0.0240	<0.0240	<0.0240	<0.0240	<0.0245

Note: Sample MW-104 is a field-duplicate of sample *MW-4*.

ADEC Groundwater-Cleanup Levels from 18 AAC 75.345, Table C.

ADEC Alaska Department of Environmental Conservation

< Analyte not detected; listed as less than the limit of detection (LOD) unless otherwise flagged due to quality-control failures.

Bold Detected concentration exceeds ADEC Groundwater-Cleanup Level.

J Estimated concentration, detected greater than the detection limit (DL) and less than the limit of quantitation (LOQ). Flag applied by the laboratory.

JH* Estimated concentration is biased high due to an analytical precision failure for surrogate recovery. Flag applied by Shannon & Wilson.

B* Result is considered not detected at the LOQ due to contamination identified in the method blank. Flag applied by Shannon & Wilson.

JL* Estimated concentration is biased low due to an analytical precision failure for surrogate recovery. Flag applied by Shannon & Wilson.

TABLE 3
HISTORICAL GROUNDWATER RESULTS

Well Number	Sample Date	AK101	AK102	AK103	EPA SW8021B				EPA 8270D SIM				
		GRO (mg/L)	DRO (mg/L)	RRO (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)	Naphthalene (µg/L)	1-Methylnaphthalene (µg/L)	2-Methylnaphthalene (µg/L)	Flourene (µg/L)	Phenanthrene (µg/L)
ADEC Groundwater Cleanup Level		**2.2**	**1.5**	**1.1**	**0.0046**	**1.1**	**0.15**	**0.19**	**1.7**	**11**	**36**	**290**	**170**
MW-1	Nov-03	not sampled due to 0.05 feet of floating product											
	Sep-04	not sampled due to 0.02 feet of floating product											
	Sep-06	0.88	**123**	**4.23**	0.0049	0.0015	0.0087	**0.292**	—	—	—	—	—
	Sep-10	not sampled due to 0.05 feet of floating product											
	Sep-11	0.839	**99.5**	-	**0.00527**	0.00472	0.0107	**0.343**	—	—	—	—	—
	Sep-12	1.06	**69.5**	**4.38**	0.00423	0.00423	0.00815	**0.288**	—	—	—	—	—
	Jun-13	**not sampled after 2012 due to broken well casing**											
	Oct-18	not sampled due to 0.13 feet of feet of floating product											
MW-2	Nov-03	not sampled due to 0.14 feet of floating product											
	Sep-04	not sampled due to 0.08 feet of floating product											
	Sep-06	not sampled due to 0.08 feet of floating product											
	Sep-10	0.234 J	**187**	**6.81**	**0.0088**	0.00103 J	0.00603	0.0302 J	—	—	—	—	—
	Sep-11	not sampled due to floating product											
	Sep-12	0.377	**19.5**	**2.08**	**0.0187**	0.0004 J	0.0097	0.0449	—	—	—	—	—
	Jun-13	0.384	**19.9**	**2.11**	**0.0239**	0.0003 J	0.00559	0.02702	—	—	—	—	—
	Aug-14	not sampled due to 0.33 feet of floating product											
	Sep-15	0.373 B	**11.3**	**1.16**	**0.0263**	0.00037 J	0.0163	0.06333	—	—	—	—	—
	Oct-17	<0.164B*	**16.5**	**1.84**	**0.0138**	<0.000500	0.00582	0.02288	**26.1 J***	6.93 J*	5.71 J*	0.924 J*	0.427 J*
	Oct-18	not sampled due to 0.07 feet of floating product											
MW-201	Oct-17	<0.180B*	**14.8**	**1.63**	**0.0136**	<0.000500	0.00601	0.0236	**51.7 J***	**45.3 J***	**50.3 J***	3.38 J*	3.02 J*
MW-3	Nov-03	NA	**5.3**	NA	ND	ND	0.001	0.0071	—	—	—	—	—
	Sep-04	ND	**2.71**	0.992	ND	ND	ND	ND	—	—	—	—	—
	Sep-06	ND	0.94	0.43	ND	ND	ND	ND	—	—	—	—	—
	Sep-10	ND	ND	ND	ND	ND	ND	ND	—	—	—	—	—
	Sep-11	well could not be located in 2011, 2012, 2013, 2014, and 2015											
MW-4	Nov-03	not sampled due to 0.03 feet of floating product											
	Sep-04	0.354	**6.07 J**	ND	ND	ND	0.0073	0.0162	—	—	—	—	—
	Sep-06	0.17	**18.5**	0.58	ND	ND	0.0094	0.023	—	—	—	—	—
	Sep-10	1.48	**43**	0.484	ND	0.00434	0.0174	0.124 J	—	—	—	—	—
	Sep-11	0.0854 J	**3.37**	-	0.00018 J	0.0005 J	0.00928	0.0271	—	—	—	—	—
	Sep-12	0.278	**3.82**	0.4 J	0.00043 J	ND	0.0113	0.0339	—	—	—	—	—
	Jun-13	0.244	**9.39**	1	0.00025 J	ND	0.00822	0.0226	—	—	—	—	—
	Aug-14	0.251	**1.8 B**	ND	ND	ND	0.00635	0.0182	—	—	—	—	—
	Sep-15	0.263 B	**6.27**	0.488 J	0.0005 B	ND	0.0147	0.0445	—	—	—	—	—
	Oct-17	0.458	**7.55**	0.505 J	0.00018 JH*	<0.0005	0.00808 JH*	0.01973 JH*	—	—	—	—	—
	Oct-18	0.141	**4.66**	<0.574B*	<0.000250	<0.000500	0.00602	0.01707	**64.9**	**60**	**65.1**	3.55	1.94
MW-104	Oct-18	0.164	**4.73**	<0.706B*	<0.000250	<0.000500	0.00597	0.01589	**49.1JL***	**45.8JL***	**49.5JL***	2.73JL*	1.59JL*
MW-5	Sep-04	0.228	**4.21**	ND	ND	ND	0.0032	0.0039	—	—	—	—	—
	Sep-06	0.06	**3.44**	ND	ND	ND	0.0022	0.002	—	—	—	—	—
	Sep-10	Well could not be located in 2010 or 2011											
	Sep-11												
	Sep-12	0.0716	**3.14**	0.431 J	0.00111	ND	0.00229	0.00312	—	—	—	—	—
	Jun-13	0.0459 J	**1.61**	0.484 J	ND	ND	ND	ND	—	—	—	—	—

TABLE 3
HISTORICAL GROUNDWATER RESULTS

Well Number	Sample Date	AK101	AK102	AK103	EPA SW8021B				EPA 8270D SIM				
		GRO (mg/L)	DRO (mg/L)	RRO (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)	Naphthalene (µg/L)	1-Methylnaphthalene (µg/L)	2-Methylnaphthalene (µg/L)	Flourene (µg/L)	Phenanthrene (µg/L)
ADEC Groundwater Cleanup Level		**2.2**	**1.5**	**1.1**	**0.0046**	**1.1**	**0.15**	**0.19**	**1.7**	**11**	**36**	**290**	**170**
MW-5	Aug-14	ND	0.225 J,B	ND	ND	ND	ND	ND	—	—	—	—	—
	Sep-15	0.103 B	**2.6**	0.351 J	0.00057 B	0.00048 J	0.00096 J	0.00223	—	—	—	—	—
	Oct-17	<0.100 B*	**3.53**	0.568	0.00052	<0.0005	0.00113	0.00222	—	—	—	—	—
	Oct-18	<0.500	**2.03**	<0.481B*	<0.000250	<0.000500	<0.000500	0.000740J	**1.96JL***	2.71JL*	0.826JL*	0.5JL*	0.235JL*
MW-6	Sep-06	0.3	**11.2**	0.9	**0.0076**	ND	0.0155	0.059	—	—	—	—	—
	Sep-10	0.172 J	**12.7**	0.636	0.00367	0.000838 J	0.00926	0.0382 J	—	—	—	—	—
	Sep-11	0.105	**118**	-	0.00418	0.00034 J	0.00418	0.0185	—	—	—	—	—
	Sep-12	0.479	**8.36**	1.09	**0.00951**	0.00039 J	0.0233	0.105	—	—	—	—	—
	Jun-13	0.225	**5.46**	0.813	**0.00577**	ND	0.00486	0.0186	—	—	—	—	—
	Aug-14	ND	**6.94**	**1.41**	0.00434	ND	0.00403	0.0183	—	—	—	—	—
	Sep-15	0.305 B	**8.59**	1.06	**0.00823**	0.0004 J	0.0155	0.069	—	—	—	—	—
	Oct-17	0.2 JH*	**11.2**	**1.39**	**0.00924**	<0.0005	0.0084	0.0376	—	—	—	—	—
	Oct-18	0.441	**4.84**	<0.777B*	<0.000250	<0.000500	**0.0382**	0.00155J	**56.8**	**53.6**	**49.1**	3.68	1.45
MW-7	Sep-11	0.0854 J	**19.6**	-	0.00107	ND	0.00048 J	0.00352	—	—	—	—	—
	Sep-12	0.0937	**12.4**	**1.85**	0.0012	ND	0.0005 J	0.00139 J	—	—	—	—	—
	Jun-13	0.114	**10.5**	**1.46**	0.00126	0.00071 J	0.00039 J	0.0017 J	—	—	—	—	—
	Aug-14	0.0508 J	**6.73**	1.05 Q	0.00033 J	ND	ND	ND	—	—	—	—	—
	Sep-15	0.0696 J,B	**14.0**	**2.19 Q**	0.00243 B	ND	0.00052 J	0.000208 J	—	—	—	—	—
	Oct-17	<0.100 B*	**21.1**	**2.83**	0.0014	<0.0005	0.00039 J	0.0015 J	—	—	—	—	—
	Oct-18	0.0428J	**12.0**	**1.34JH***	0.00186	<0.000500	0.00107	0.00357	**7.03**	1.44	1.15	0.201	0.133
MW-8	Sep-12	ND	0.288 J	0.339 J	ND	0.00031 J	0.00035 J	ND	—	—	—	—	—
	Jun-13	ND	ND	0.267 J	ND	ND	ND	ND	—	—	—	—	—
	Aug-14	ND	ND	ND	ND	ND	ND	ND	—	—	—	—	—
	Sep-15	0.0443 J,B	0.312 J	ND	0.00032 J,B	ND	ND	ND	—	—	—	—	—
	Oct-17	<0.0500	0.239 J	0.195 J	<0.00025	<0.0005	<0.0005	<0.0015	—	—	—	—	—
	Oct-18	<0.0500	<0.577B*	<0.481B*	<0.000250	<0.000500	<0.000500	<0.00150	<0.0481	<0.024	<0.0240	<0.0240	<0.0240
MW-9	Sep-12	ND	0.189 J	0.199 J	ND	ND	ND	ND	—	—	—	—	—
	Jun-13	ND	ND	0.165 K	ND	ND	ND	ND	—	—	—	—	—
	Aug-14	ND	ND	ND	ND	ND	ND	ND	—	—	—	—	—
	Sep-15	0.0551 J,B	0.314 J	ND	ND	ND	ND	ND	—	—	—	—	—
	Oct-17	<0.100 B*	<0.303	0.157 J	<0.00025	<0.0005	<0.0005	<0.0015	—	—	—	—	—
	Oct-18	<0.0500	<0.577B*	<0.481B*	<0.0002510	<0.000500	<0.000500	<0.00150	<0.0490	<0.0245	<0.0245	<0.0245	<0.0245
WC-3	Nov-03	not sampled due to 0.03 feet of floating product											
	Sep-04	not sampled due to 0.04 feet of floating product											
	Sep-06	not sampled due to 0.02 feet of floating product											
	Sep-10	not sampled due to 0.04 feet of floating product											
	Sep-11	not sampled due to 0.01 feet of floating product											
	Sep-12	not sampled due to 0.01 feet of floating product											
	Jun-13	not sampled due to 0.01 feet of floating product											
	Aug-14	not sampled due to 0.01 feet of floating product											
	Sep-15	0.165 B	**16.4**	**1.56**	**0.00482**	0.00074 J	0.00308	0.305	—	—	—	—	—
	Oct-17	<0157 B*	7.67	1.17	**0.00654**	0.00033 J	0.00336	0.0316	—	—	—	—	—
	Oct-18	not sampled due to 0.03 feet of floating product											

TABLE 3
HISTORICAL GROUNDWATER RESULTS

Well Number	Sample Date	AK101	AK102	AK103	EPA SW8021B				EPA 8270D SIM				
		GRO (mg/L)	DRO (mg/L)	RRO (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)	Naphthalene (µg/L)	1-Methylnaphthalene (µg/L)	2-Methylnaphthalene (µg/L)	Flourene (µg/L)	Phenanthrene (µg/L)
ADEC Groundwater Cleanup Level		**2.2**	**1.5**	**1.1**	**0.0046**	**1.1**	**0.15**	**0.19**	**1.7**	**11**	**36**	**290**	**170**

Sources of historical data: Hart Crowser 2004, 2005, 2006; Clarus Technologies 2010; Restoration Science & Engineering 2011; FES 2012, 2013, 2014, 2015; and Shannon & Wilson, Inc. 2017.

Notes:
MW-201 is the field duplicate of *MW-2*
MW-104 is the field duplicate of *MW-4*
ADEC Groundwater-Cleanup Levels from 18 AAC 75.345, Table C.

EPA	Environmental Protection Agency
ADEC	Alaska Department of Environmental Conservation
<	Analyte not detected; listed as less than the limit of detection (LOD) unless otherwise flagged due to quality-control failures.
Bold	Detected concentration exceeds ADEC Groundwater-Cleanup Level.
J or Q	Estimated concentration, detected greater than the detection limit (DL) and less than the limit of quantitation (LOQ). Flag applied by the laboratory.
J*	Estimated concentration is biased high due an analytical precision failure for surrogate recovery. Flag applied by Shannon & Wilson.
B*	Result is considered not detected at the LOQ due to contamination identified in the method blank. Flag applied by Shannon & Wilson.
JL*	'Estimated concentration is biased low due to an analytical precision failure for surrogate recovery. Flag applied by Shannon & Wilson.
GRO	gasoline range organics
DRO	diesel range organics
RRO	residual range organics
NA	not analyzed
ND	analyte not detected

TABLE 4
MANN-KENDALL TREND RESULTS SUMMARY

Analyte	Location	MK Statistic (S)	Approximate p-value	Confidence in trend	COV	Concentration Trend	Notes
GRO	MW-1	1	0.500	50.0%	0.127	No trend	Only 3 reported historical results from 2006, 2011, and 2012.
DRO	MW-1	-3	0.148	85.2%	0.276	Stable	Only 3 reported historical results from 2006, 2011, and 2012.
RRO	MW-1	NA	NA	NA	NA	NA	Insufficient sample size; N < 3
Benzene	MW-1	-1	0.500	50.0%	0.110	Stable	Only 3 reported historical results from 2006, 2011, and 2012.
Toluene	MW-1	1	0.500	50.0%	0.498	No trend	Only 3 reported historical results from 2006, 2011, and 2012.
Ethylbenzene	MW-1	-1	0.500	50.0%	0.146	Stable	Only 3 reported historical results from 2006, 2011, and 2012.
Xylenes	MW-1	-1	0.500	50.0%	0.100	Stable	Only 3 reported historical results from 2006, 2011, and 2012.
GRO	MW-2	-2	0.403	59.7%	0.330	Stable	
DRO	MW-2	-6	0.110	89.0%	1.499	No trend	
RRO	MW-2	-6	0.110	89%	0.812	Stable	
Benzene	MW-2	4	0.231	76.9%	0.392	No trend	
Toluene	MW-2	-2	0.403	59.7%	0.565	Stable	
Ethylbenzene	MW-2	0	0.592*	40.8%	0.521	Stable	*Tabulated p-value used if approximate p-value not reported
Xylenes	MW-2	-2	0.403	59.7%	0.434	Stable	
GRO	MW-3	0	NA	NA	NA	No trend	
DRO	MW-3	-6	0.045	95.5%	0.967	Stable	
RRO	MW-3	-3	0.148	85%	0.694	Stable	
Benzene	MW-3	0	NA	NA	NA	No trend	
Toluene	MW-3	0	0.625	37.5%	NA	No trend	
Ethylbenzene	MW-3	-3	0.186	81.4%	0.400	Stable	
Xylenes	MW-3	-3	0.189	81.1%	0.966	Stable	
GRO	MW-4	-3	0.429	57.1%	1.072	No trend	
DRO	MW-4	-7	0.296	70.4%	1.182	No trend	
RRO	MW-4	11	0.147	85%	0.448	No trend	
Benzene	MW-4	1	0.500	50.0%	0.371	No trend	
Toluene	MW-4	-5	0.243	75.7%	1.374	No trend	
Ethylbenzene	MW-4	-13	0.142	85.8%	0.376	Stable	
Xylenes	MW-4	-7	0.296	70.4%	0.942	Stable	
GRO	MW-5	1	0.500	50.0%	0.618	No trend	
DRO	MW-5	-10	0.133	86.7%	0.491	Stable	
RRO	MW-5	13	0.063	94%	0.328	Probably increasing	
Benzene	MW-5	2	0.443	55.7%	0.708	No trend	
Toluene	MW-5	-3	0.331	66.9%	0.014	Stable	
Ethylbenzene	MW-5	-13	0.063	93.7%	0.728	Probably decreasing	
Xylenes	MW-5	-13	0.067	93.3%	0.461	Probably decreasing	
GRO	MW-6	4	0.377	62.3%	0.567	No trend	
DRO	MW-6	-13	0.104	89.6%	1.756	No trend	
RRO	MW-6	4	0.355	65%	0.280	No trend	
Benzene	MW-6	2	0.458	54.2%	0.521	No trend	
Toluene	MW-6	2	0.454	54.6%	0.286	No trend	
Ethylbenzene	MW-6	3	0.417	58.3%	0.820	No trend	
Xylenes	MW-6	-12	0.126	87.4%	0.793	Stable	
GRO	MW-7	-13	0.035	96.5%	0.366	Decreasing	
DRO	MW-7	-1	0.500	50.0%	0.367	Stable	
RRO	MW-7	1	0.500	50%	0.363	No trend	

TABLE 4
MANN-KENDALL TREND RESULTS SUMMARY

Analyte	Location	MK Statistic (S)	Approximate p-value	Confidence in trend	COV	Concentration Trend	Notes
Benzene	MW-7	7	0.184	81.6%	0.498	No trend	
Toluene	MW-7	-2	0.401	59.9%	0.150	Stable	
Ethylbenzene	MW-7	7	0.178	82.2%	0.428	No trend	
Xylenes	MW-7	0	0.500*	50.0%	0.637	Stable	*Tabulated p-value used if approximate p-value not reported
GRO	MW-8	-1	0.500	50.0%	0.047	Stable	
DRO	MW-8	6	0.169	83.1%	0.360	No trend	
RRO	MW-8	-4	0.283	72%	0.341	Stable	
Benzene	MW-8	1	0.500	50.0%	0.109	No trend	
Toluene	MW-8	5	0.121	87.9%	0.166	No trend	
Ethylbenzene	MW-8	5	0.121	87.9%	0.129	No trend	
Xylenes	MW-8	0	0.500*	50.0%	NA	No trend	*Tabulated p-value used if approximate p-value not reported
GRO	MW-9	5	0.184	81.6%	0.340	No trend	
DRO	MW-9	12	0.018	98.2%	0.391	Increasing	
RRO	MW-9	4	0.283	71.7%	0.479	No trend	
Benzene	MW-9	0	0.500*	50.0%	NA	No trend	*Tabulated p-value used if approximate p-value not reported
Toluene	MW-9	0	0.500	50.0%	NA	No trend	
Ethylbenzene	MW-9	0	0.500*	50.0%	NA	No trend	*Tabulated p-value used if approximate p-value not reported
Xylenes	MW-9	0	0.500*	50.0%	NA	No trend	*Tabulated p-value used if approximate p-value not reported
GRO	WC-3	NA	NA	NA	NA	NA	Insufficient sample size; N < 3
DRO	WC-3	NA	NA	NA	NA	NA	Insufficient sample size; N < 3
RRO	WC-3	NA	NA	NA	NA	NA	Insufficient sample size; N < 3
Benzene	WC-3	NA	NA	NA	NA	NA	Insufficient sample size; N < 3
Toluene	WC-3	NA	NA	NA	NA	NA	Insufficient sample size; N < 3
Ethylbenzene	WC-3	NA	NA	NA	NA	NA	Insufficient sample size; N < 3
Xylenes	WC-3	NA	NA	NA	NA	NA	Insufficient sample size; N < 3

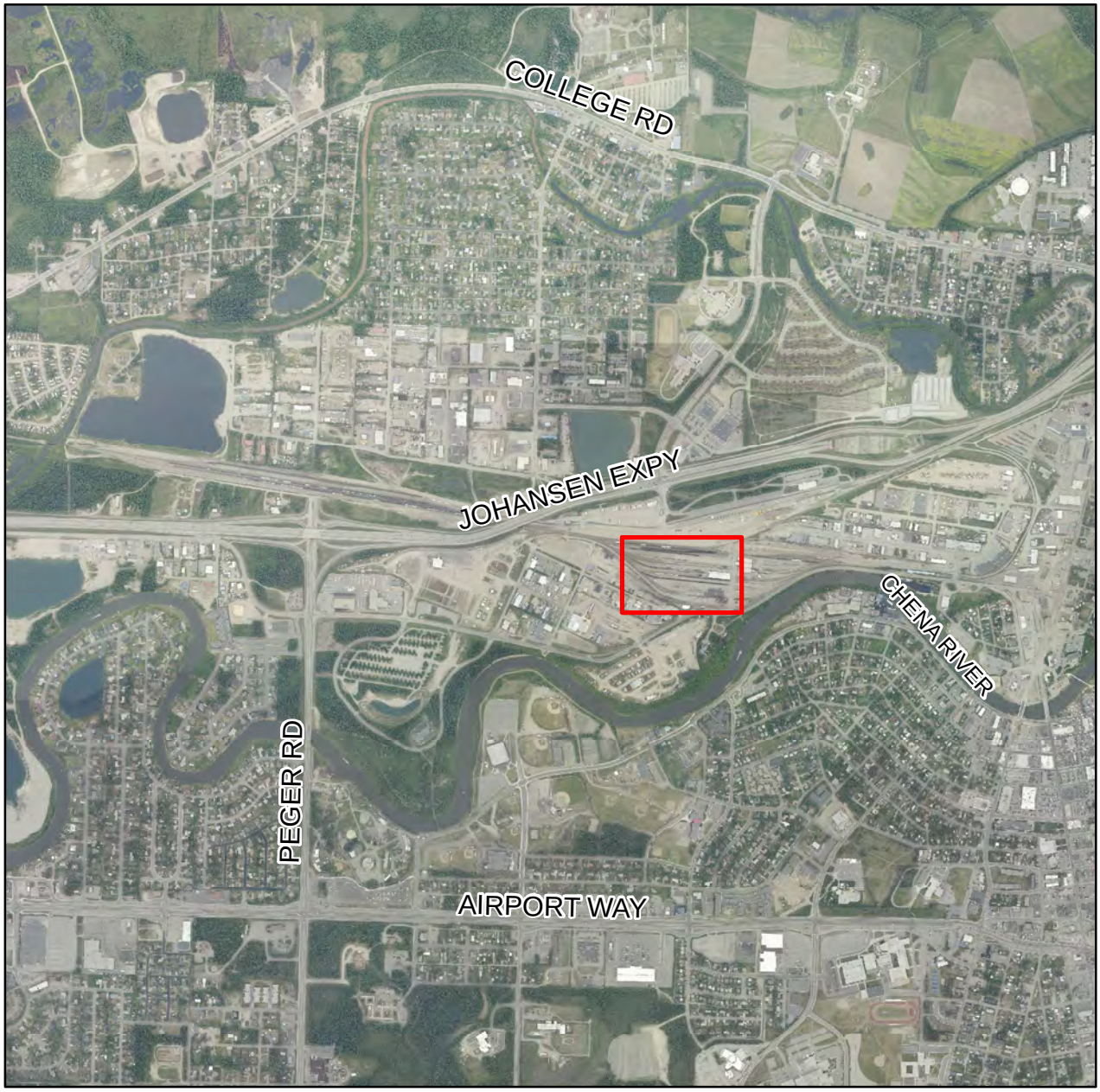


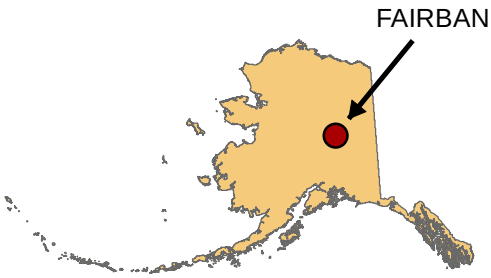
Image provided courtesy of Pictometry International 2012.

LEGEND

Project Area

0 0.5

Miles



N

Alaska Railroad Corporation
Fairbanks Rail Yard
Fairbanks, Alaska

SITE VICINITY MAP

December 2018 101525-003

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1

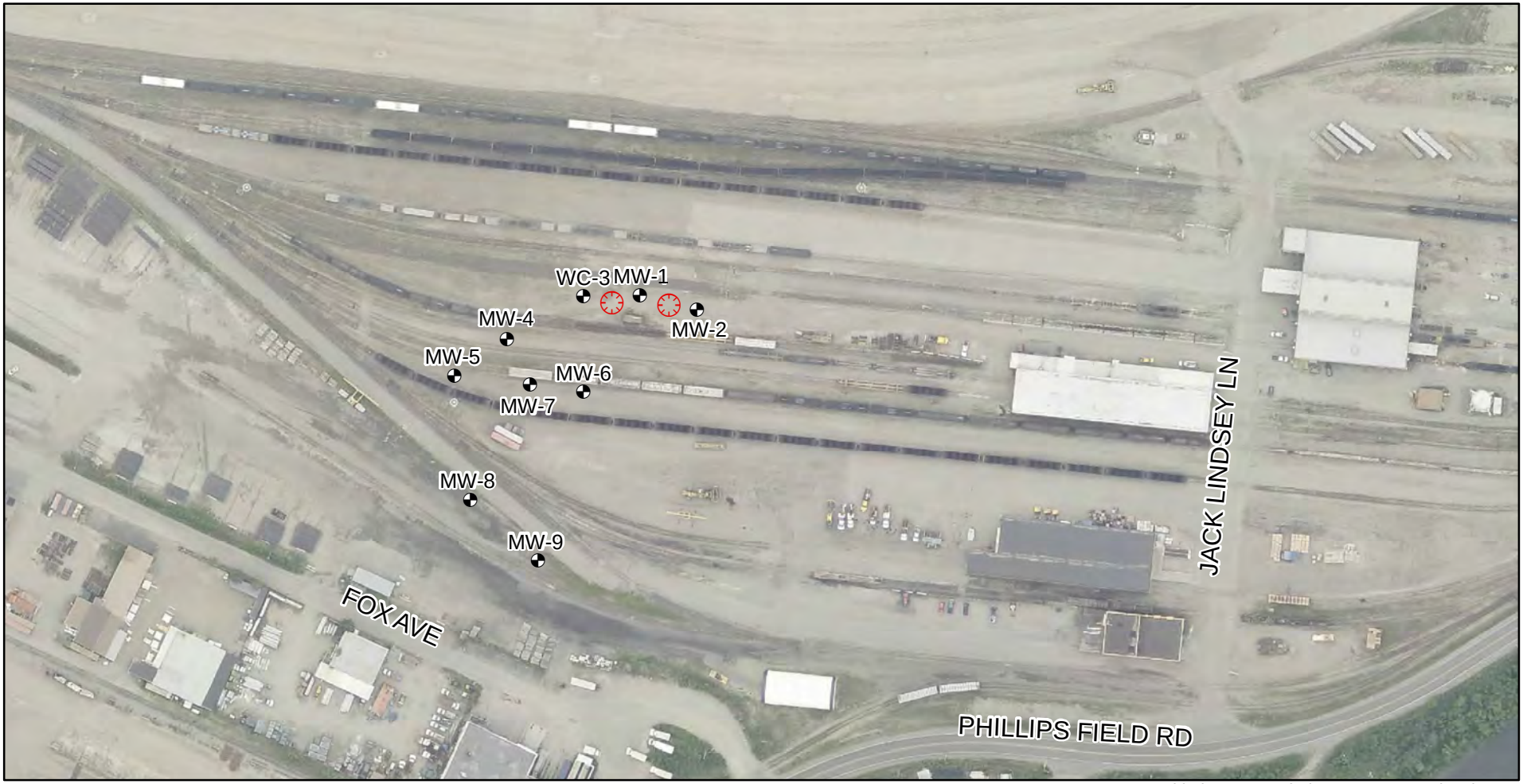


Image provided courtesy of Pictometry International 2012.

LEGEND

- MW
- Former Storage Tanks

0 250

Feet

N

Alaska Railroad Corporation
Fairbanks Rail Yard
Fairbanks, Alaska

SITE MAP

December 2018

101525-003

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 2

Image provided courtesy of Pictometry International 2012.

LEGEND

- Groundwater Elevation Contours based off October 9, 2018 depth-to-water measurements
- Analytes detected at concentrations above ADEC cleanup levels
- Analytes detected at concentrations above ADEC cleanup levels (Product present)
- Analytes detected at concentrations below ADEC cleanup levels

0 50 100

Feet

N

Alaska Railroad Corporation
Fairbanks Rail Yard
Fairbanks, Alaska

GROUNDWATER CONTOUR AND MONITORING WELL SAMPLING RESULTS

December 2018 101525-003

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 3

Appendix A

Field Activity Report

APPENDIX A: FIELD ACTIVITY REPORT

FIELD ACTIVITIES DAILY LOG

Date 10/10/18
Sheet 1 of 1
Project No. 101525-002

Project Name: Fairbanks Rail Yard
Field activity subject: Groundwater Sampling
Description of daily activities and events:

6:45 calibrate YSI, pack truck

7:15 leave office

7:20 arrive on site, KLC + DHF

7:25 Meet w/ Russ, setup on MW-8, purge water is treated w/ GAC + discharged on the ground onsite

13:30 MW-1, MW-2, + WC-3 all had measurable product. Duplicate sample has not been collected yet. MW-4 is going to be resampled so we can collect duplicate as well

14:20 Offsite, KLC, DHF, + Russell

14:30 ~~that~~ Back at office, unpack truck

Visitors on site:

Changes from plans/specifications and other special orders and important decisions:

Weather conditions: clear 30's

Important telephone calls:

Personnel on site: KLC, DHF

Signature: Date:

Appendix B

Sample Collection Logs and Field Notes

APPENDIX B: SAMPLE COLLECTION LOGS AND FIELD NOTES

MONITORING WELL SAMPLING LOG

Owner/Client *ARRC*
Location *Fairbanks Rail Yard*
Sampling Personnel KLC, DHF
Weather Conditions *cloudy* Air Temp. (°F) *40*

Project No. 101525-002
Date 10/9/2018
Well MW-1
Time started 1312
Time completed 1317

DTP 1218
DTW 1231

Sample No. – Time –
Duplicate – Time –
Equipment Blank – Time –

Pump –
Purging Method *portable / dedicated pump*
Pumping Start –
Purge Rate (gal./min.) –
Pumping End –

Pump Set Depth Below MP (ft.) –
KuriTec Tubing (ft.) –
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.) –
Depth to Water Below MP (ft.) 12.31
Depth to Ice (if frozen) Below MP (ft.) –
Feet of Water in Well –
Gallons per foot –
Gallons in Well –
Purge Water Volume (gal.) –
Purge Water Disposal –

Monument Condition Good
Casing Condition Good
Wiring Condition (dedicated pumps) –

Measuring Point (MP) *Top of Casing (TOC)*
Monument type: *Stickup / Flushmount*
Measurement method: *Rod & level / Tape measure*

Top-of-casing to monument (ft.) –
Monument to ground surface (ft.) –

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 NS

Notes – product present – no sample collected

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

MW-1
Well No.

MONITORING WELL SAMPLING LOG

Field Parameter Instrument – 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)

Not Sampled

Laboratory *SGS*

	Analysis	Sample Containers	Preservatives	Dup
☐				☐
☐				☐
☐				☐
☐				☐
☐				☐
☐				☐

MW-1

Well No.

MONITORING WELL SAMPLING LOG

Owner/Client: *ARRC*
Location: *Fairbanks Rail Yard*
Sampling Personnel: KLC, DHF
Weather Conditions: cloudy Air Temp. (°F): 40

Project No.: 101525-002
Date: 10/9/2018
Well: MW-2
Time started: 13:05
Time completed: 13:10

Sample No.: — Time: —
Duplicate: — Time: —
Equipment Blank: — Time: —

DTW 12.72
DTP 12.65

Pump: —
Purging Method: *portable / dedicated pump*
Pumping Start: —
Purge Rate (gal./min.): —
Pumping End: —

Pump Set Depth Below MP (ft.): —
KuriTec Tubing (ft.): —
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.): —
Depth to Water Below MP (ft.): 12.72
Depth to Ice (if frozen) Below MP (ft.): —
Feet of Water in Well: —
Gallons per foot: —
Gallons in Well: —
Purge Water Volume (gal.): —
Purge Water Disposal: —

Monument Condition: Good
Casing Condition: Good
Wiring Condition (dedicated pumps): —

Measuring Point (MP): *Top of Casing (TOC)*
Monument type: *Stickup / Flushmount*
Measurement method: *Rod & level / Tape measure*

Top-of-casing to monument (ft.): —
Monument to ground surface (ft.): —

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: No

Notes: Will not sample due to product

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

MW-2
Well No.

MONITORING WELL SAMPLING LOG

Field Parameter Instrument — 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)

Not Sampled

Laboratory *SGS*

	Analysis	Sample Containers	Preservatives	Dup
☐				☐
☐				☐
☐				☐
☐				☐
☐				☐
☐				☐

MW-1
Well No.

MONITORING WELL SAMPLING LOG

Owner/Client: *ARRC*
Location: *Fairbanks Rail Yard*
Sampling Personnel: KLC, DHF
Weather Conditions: Cloudy Air Temp. (°F): 40

Project No.: 101525-002
Date: 10/9/2018
Well: WC-3
Time started: 13:19
Time completed: 13:24

Sample No.: — Time: —
Duplicate: — Time: —
Equipment Blank: — Time: —

DTP 12.78
DTW 12.81

Pump: —
Purging Method: *portable / dedicated pump*
Pumping Start: —
Purge Rate (gal./min.): —
Pumping End: —

Pump Set Depth Below MP (ft.): —
KuriTec Tubing (ft.): —
TruPoly Tubing (ft.): —

Diameter and Type of Casing: 9" steel
Approximate Total Depth of Well Below MP (ft.): —
Measured Total Depth of Well Below MP (ft.):
Depth to Water Below MP (ft.): 12.81
Depth to Ice (if frozen) Below MP (ft.): —
Feet of Water in Well: —
Gallons per foot: —
Gallons in Well: —
Purge Water Volume (gal.): —
Purge Water Disposal:

Monument Condition: Good
Casing Condition: Good
Wiring Condition (dedicated pumps): —

Measuring Point (MP): *Top of Casing (TOC)*
Monument type: *Stickup / Flushmount*
Measurement method: *Rod & level / Tape measure*

Top-of-casing to monument (ft.): —
Monument to ground surface (ft.): —

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: No

Notes: Product visible - looking down well - Not Sampled

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

WC-3
Well No.

MONITORING WELL SAMPLING LOG

Field Parameter Instrument — 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)

Not Sampled

Laboratory *SGS*

	Analysis	Sample Containers	Preservatives	Dup
☐				☐
☐				☐
☐				☐
☐				☐
☐				☐
☐				☐

WC-3
Well No.

MONITORING WELL SAMPLING LOG

Owner/Client: *ARRC*
Location: *Fairbanks Rail Yard*
Sampling Personnel: KLC, DHF
Weather Conditions: cloudy Air Temp. (°F): 60

Project No.: 101525-002
Date: 10/9/2018
Well: MW-4
Time started: 11:50
Time completed: 12:30

Sample No.: MW-4 resampled Time: 12:19
Duplicate: - Time: -
Equipment Blank: - Time: -

Pump: Whale
Purging Method: *portable / dedicated pump*
Pumping Start: 11:59
Purge Rate (gal./min.): ~1
Pumping End: 12:19

Pump Set Depth Below MP (ft.): 17.60
KuriTec Tubing (ft.): 25
TruPoly Tubing (ft.): ~

Diameter and Type of Casing: 2"
Approximate Total Depth of Well Below MP (ft.): -
Measured Total Depth of Well Below MP (ft.): 18.60
Depth to Water Below MP (ft.): 12.94
Depth to Ice (if frozen) Below MP (ft.): -
Feet of Water in Well: 5.66
Gallons per foot: 0.17
Gallons in Well: 0.96
Purge Water Volume (gal.): 20
Purge Water Disposal: GAC then ground

Monument Condition: Good
Casing Condition: Good
Wiring Condition (dedicated pumps): -

Measuring Point (MP): *Top of Casing (TOC)*
Monument type: *Stickup / ~~Flushmount~~*
Measurement method: *Rod & level / Tape measure*

Top-of-casing to monument (ft.): 0.14
Monument to ground surface (ft.):

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: NS

Notes: MW-4 resampled to collected duplicate
MW-1, WC-3, +MW-2 all had measurable product - unable to sample

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

MW-4
Well No.

MONITORING WELL SAMPLING LOG

Field Parameter Instrument YSI

Circle one: ~~Parameters stabilized~~ or >3 well volumes purged

Sample Observations —

Notes fuel odor in water, ~~[illegible]~~ sheen visible

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)
11:59	pump	Start				gray, opaque
12:00	6.6	2.10	664	6.38	87.0	clear
12:03	6.6	1.09	666	6.39	78.0	
12:06	6.6	0.86	668	6.43	72.1	
12:09	6.6	0.72	669	6.46	68.2	
12:12	6.6	0.65	670	6.47	64.6	
12:15	6.6	0.61	670	6.48	60.7	
12:18	6.6	0.58	670	6.49	57.1	
12:19	Sample					

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
☑	DRO/RRO			☐
☑	PAH			☐
☑	GRO/BTEX			☐
☐				☐
☐				☐
☐				☐

Well No. MW-4

MONITORING WELL SAMPLING LOG

Owner/Client *ARRC*
Location *Fairbanks Rail Yard*
Sampling Personnel KLC, DHF
Weather Conditions _____ Air Temp. (°F) _____

Project No. 101525-002
Date 10/9/2018
Well MW-4
Time started 13:37
Time completed 14:03

Sample No. MW-4 Time 13:40
Duplicate MW-104 Time 13:30
Equipment Blank _____ Time —

Pump _____
Purging Method *portable / dedicated pump*
Pumping Start _____
Purge Rate (gal./min.) _____
Pumping End _____

Pump Set Depth Below MP (ft.) _____
KuriTec Tubing (ft.) _____
TruPoly Tubing (ft.) _____

Diameter and Type of Casing _____
Approximate Total Depth of Well Below MP (ft.) _____
Measured Total Depth of Well Below MP (ft.) _____
Depth to Water Below MP (ft.) _____
Depth to Ice (if frozen) Below MP (ft.) _____
Feet of Water in Well _____
Gallons per foot _____
Gallons in Well _____
Purge Water Volume (gal.) _____
Purge Water Disposal _____

Monument Condition _____

Casing Condition _____

Wiring Condition _____
(dedicated pumps) _____

Measuring Point (MP) *Top of Casing (TOC)*
Monument type: *Stickup / Flushmount*
Measurement method: *Rod & level / Tape measure*

Top-of-casing to monument (ft.) /
Monument to ground surface (ft.) _____

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 _____

Notes resampling to collect ~~equip~~ duplicate
~ ¼" of casing cut off to get plug to fit under cover

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

MW-4
Well No.

MONITORING WELL SAMPLING LOG

Field Parameter Instrument _____ 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)

Laboratory *SGS*

	Analysis	Sample Containers	Preservatives	Dup
☐				☐
☐				☐
☐				☐
☐				☐
☐				☐
☐				☐

Well No.

MONITORING WELL SAMPLING LOG

Owner/Client ARRC
Location Fairbanks Rail Yard
Sampling Personnel KLC, DHF
Weather Conditions Cloudy Air Temp. (°F) ~~60~~ 40

Project No. 101525-002
Date 10/9/2018
Well MW-5
Time started 10:51
Time completed 11:45

Sample No. MW-5 Time 11:36
Duplicate — Time —
Equipment Blank — Time —

Pump Whale
Purging Method portable / dedicated pump
Pumping Start
Purge Rate (gal./min.) ~1
Pumping End

Pump Set Depth Below MP (ft.) ~17.85
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.) 18.85
Depth to Water Below MP (ft.) 12.25
Depth to Ice (if frozen) Below MP (ft.) —
Feet of Water in Well 6.6
Gallons per foot 0.17
Gallons in Well 1.1
Purge Water Volume (gal.)
Purge Water Disposal GAC to ground

Monument Condition Good
Casing Condition Good
Wiring Condition (dedicated pumps) —

Measuring Point (MP) Top of Casing (TOC)
Monument type: Stickup / Flushmount
Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.) 0.18
Monument to ground surface (ft.)

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 No

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

MW-5
Well No.

MONITORING WELL SAMPLING LOG

Field Parameter Instrument _____ 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)
11:19	pump	Start				rust colored
11:20	5.9	1.39	612	6.35	78.4	clear
11:23	5.8	0.81	616	6.35	75.4	
11:26	5.8	0.71	617	6.36	74.3	
11:29	5.8	0.66	620	6.36	73.5	
11:32	5.8	0.64	621	6.37	72.9	
11:35	5.8	0.60	623	6.37	71.0	
11:36	Sample					

Laboratory *SGS*

	Analysis	Sample Containers	Preservatives	Dup
☐	DRO/RRO			☐
☐	PAH			☐
☐	GRO/BTEX			☐
☐				☐
☐				☐
☐				☐

Well No. MW-5

MONITORING WELL SAMPLING LOG

Owner/Client: *ARRC*
Location: *Fairbanks Rail Yard*
Sampling Personnel: KLC, DHF
Weather Conditions: cloudy Air Temp. (°F): 38

Project No.: 101525-002
Date: 10/9/2018
Well: MW-6
Time started: 1000
Time completed: 10:40

Sample No.: MW-6 Time: 10:30
Duplicate: – Time: –
Equipment Blank: – Time: –

Pump: Whale
Purging Method: ~~portable~~ / *dedicated pump*
Pumping Start: 10:08
Purge Rate (gal./min.): ~0.7
Pumping End: 10:30

Pump Set Depth Below MP (ft.): ~17.42
KuriTec Tubing (ft.): 35
TruPoly Tubing (ft.): –

Diameter and Type of Casing: 2"
Approximate Total Depth of Well Below MP (ft.): –
Measured Total Depth of Well Below MP (ft.): 18.42
Depth to Water Below MP (ft.): 12.20
Depth to Ice (if frozen) Below MP (ft.): –
Feet of Water in Well: 6.22
Gallons per foot: 0.17
Gallons in Well: 1.05
Purge Water Volume (gal.): 15.4
Purge Water Disposal: GAC then ground

Monument Condition: Good
Casing Condition: Good
Wiring Condition (dedicated pumps): –

Measuring Point (MP): *Top of Casing (TOC)*
Monument type: *Stickup* / *Flushmount*
Measurement method: *Rod & level* / *Tape measure*

Top-of-casing to monument (ft.): 0.20'
Monument to ground surface (ft.): –

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: No

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

MW-6
Well No.

MONITORING WELL SAMPLING LOG

Field Parameter Instrument VSI Circle one: *Parameters stabilized or >3 well volumes purged*

Sample Observations slight odor + sheen

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)
10:08	pump	started				clear
10:11	6.0	0.78	742	6.41	117.1	clear
10:14	6.0	0.67	742	6.49	100.7	clear
10:17	6.0	0.63	741	6.53	89.2	clear
10:20	6.0	0.59	740	6.54	81.3	clear
10:23	6.0	0.58	740	6.55	75.9	clear
10:26	6.0	0.55	740	6.55	69.4	clear
10:29	6.0	0.56	740	6.56	66.0	clear
10:30	sample	collected				

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
☐	PAH			☐
☐	DRO/RRO			☐
☐	GRO/BTEX			☐
☐				☐
☐				☐
☐				☐

Well No.
MW-6

MONITORING WELL SAMPLING LOG

Owner/Client: *ARRC*
Location: *Fairbanks Rail Yard*
Sampling Personnel: KLC, DHF
Weather Conditions: cloudy Air Temp. (°F): 40

Project No.: 101525-002
Date: 10/9/2018
Well: MW-7
Time started: 10:30
Time completed: 11:11

Sample No.: MW-7 Time: 11:01
Duplicate: - Time: -
Equipment Blank: Time:

Pump: Whale
Purging Method: *portable / dedicated pump*
Pumping Start: 10:45
Purge Rate (gal./min.): ~1
Pumping End: 11:01

Pump Set Depth Below MP (ft.): ~16.64
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.): 17.64
Depth to Water Below MP (ft.): 11.98
Depth to Ice (if frozen) Below MP (ft.): -
Feet of Water in Well: 5.66
Gallons per foot: 0.17
Gallons in Well: 0.96
Purge Water Volume (gal.): 16
Purge Water Disposal: GAC then ground

Monument Condition: Good
Casing Condition: Good
Wiring Condition (dedicated pumps): ~

Measuring Point (MP): *Top of Casing (TOC)*
Monument type: *Stickup / Flushmount*
Measurement method: *Rod & level / Tape measure*

Top-of-casing to monument (ft.): 0.44
Monument to ground surface (ft.): -

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: No

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

MW-7
Well No.

MONITORING WELL SAMPLING LOG

Field Parameter Instrument YSI Circle one: *Parameters stabilized* or *>3 well volumes purged*

Sample Observations clear

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)
10:45	pump	started				
10:48	6.3	0.76	670	6.55	72.6	clear
10:51	6.4	0.63	673	6.41	67.3	clear
10:54	6.4	0.59	673	6.42	63.7	clear
10:57	6.4	0.58	674	6.43	59.9	clear
11:00	6.4	0.56	675	6.45	56.8	clear
11:01	sample	collected				

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
☐	DRO/RRO			☐
☐	PAH			☐
☐	GRO/BTEX			☐
☐				☐
☐				☐
☐				☐

MW-7
Well No.

MONITORING WELL SAMPLING LOG

Owner/Client: *ARRC*
Location: *Fairbanks Rail Yard*
Sampling Personnel: KLC, DHF
Weather Conditions: clear Air Temp. (°F): 27

Project No.: 101525-002
Date: 10/9/2018
Well: MW-8
Time started: 7:30
Time completed: 8:35

Sample No.: MW-8 Time: 8:15
Duplicate: — Time: —
Equipment Blank: — Time: —

Pump: Whale Pump
Purging Method: ~~portable~~ / *dedicated pump*
Pumping Start: 7:30
Purge Rate (gal./min.): ~0.5
Pumping End: 8:15

Pump Set Depth Below MP (ft.): ~186
KuriTec Tubing (ft.): 50
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.): 19.6
Depth to Water Below MP (ft.): 10.43
Depth to Ice (if frozen) Below MP (ft.): —
Feet of Water in Well: 9.17
Gallons per foot: 0.17
Gallons in Well: 1.5
Purge Water Volume (gal.): 12.5
Purge Water Disposal: GAC to ground

Monument Condition: Good
Casing Condition: Good
Wiring Condition (dedicated pumps): —

Measuring Point (MP): *Top of Casing (TOC)*
Monument type: *Stickup* / *Flushmount*
Measurement method: *Rod & level* / *Tape measure*

Top-of-casing to monument (ft.): 0.44'
Monument to ground surface (ft.): —

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 — No

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

MW-8
Well No.

MONITORING WELL SAMPLING LOG

Field Parameter Instrument YSI Circle one: *Parameters stabilized or >3 well volumes purged*

Sample Observations clear

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)
7:50	pump	started				
7:53	6.3	2.84	914	6.10	229.6	clear
7:56	6.2	2.53	900	6.17	224.5	clear
7:59	6.3	2.34	893	6.23	220.5	clear
8:02	6.3	2.25	891	6.26	217.6	clear
8:05	6.3	2.20	890	6.27	215.3	clear
8:08	6.3	2.11	889	6.32	212.5	clear
8:11	6.3	2.09	889	6.31	211.3	clear
8:14	6.3	2.07	891	6.32	210.2	clear
8:15	sample	collected				

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
☑	PAH			☐
☑	DRO/RRO			☐
☑	GRO/BTEX			☐
☐				☐
☐				☐
☐				☐

Well No. MW-8

MONITORING WELL SAMPLING LOG

Owner/Client: *ARRC*
Location: *Fairbanks Rail Yard*
Sampling Personnel: KLC, DHF
Weather Conditions: Clear — Air Temp. (°F): 28

Project No.: 101525-002
Date: 10/9/2018
Well: MW-9
Time started: 840
Time completed: 920

Sample No.: MW-9 — Time: 9:05
Duplicate: — — Time: —
Equipment Blank: — — Time: —

Pump: whale
Purging Method: ~~portable~~ / *dedicated pump*
Pumping Start: 8:44
Purge Rate (gal./min.): ~0.5
Pumping End: 9:05

Pump Set Depth Below MP (ft.): ~18.89
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.): 19.89
Depth to Water Below MP (ft.): 10.85
Depth to Ice (if frozen) Below MP (ft.): —
Feet of Water in Well: 9.04
Gallons per foot: 0.17
Gallons in Well: 1.53
Purge Water Volume (gal.): 10.5
Purge Water Disposal: GAC to ground

Monument Condition: Good
Casing Condition: Good
Wiring Condition (dedicated pumps): —

Measuring Point (MP): *Top of Casing (TOC)*
Monument type: *Stickup* / *Flushmount*
Measurement method: *Rod & level* / *Tape measure*

Top-of-casing to monument (ft.): 0.42
Monument to ground surface (ft.): —

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: No

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

MW-9
Well No.

MONITORING WELL SAMPLING LOG

Field Parameter Instrument YSI Circle one: *Parameters stabilized or >3 well volumes purged*

Sample Observations clear

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)
8:44	pump starts					very turbid rusty color
8:47	5.4	1.18	773	6.30	133.4	clear
8:50	5.4	0.93	771	6.38	122.2	
8:53	5.4	0.81	766	6.40	116.9	
8:56	5.4	0.73	763	6.42	111.9	
8:59	5.4	0.70	762	6.43	108.4	
9:02	5.4	0.67	762	6.43	105.4	
9:05	Sample					

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
☑	PAH			☐
☑	DRO/RRO			☐
☑	GRO/BTEX			☐
☐				☐
☐				☐
☐				☐

MW-9
Well No.

1189855

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RE

Page 1 of 1

Laboratory SGS

Turn Around Time: [X] Normal [ ] Rush — Please Specify

Quote No:

J-Flags: [ ] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	DRO (AK 102)	RRO (AK 103)	GRO (AK101)	BTEX (8021)	PAH (8270)			Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
MW-4		13:40	10/10/18	X	X	X	X	X			7	groundwater
MW-104		13:30		X	X	X	X	X			7	
MW-5		11:36		X	X	X	X	X			7	
MW-6		10:30		X	X	X	X	X			7	
MW-7		11:01		X	X	X	X	X			7	
MW-8		8:15		X	X	X	X	X			7	
MW-9		9:05		X	X	X	X	X			7	
trip blank						20						

Project Information	
Number:	101525-002
Name:	Fairbanks Rail Yard
Contact:	Kevin Chaney
Ongoing Project?	Yes [X] No [ ]
Sampler:	KLC, DHF

Sample Receipt	
Total No. of Containers:	49
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	5.1, 0.7°C
Delivery Method:	hand

Notes:

trip blank remained in cooler with samples at all times.

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1235	Signature: Time:	Signature: Time:
Printed Name: Date: 10/11/18	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 1235	Signature: Time:	Signature: Time:
Printed Name: Date: 10/11/18	Printed Name: Date:	Printed Name: Date:
Company: SGS	Company:	Company:

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

No. 35578

Appendix C

SGS Analytical Report WO 1189855

APPENDIX C: SGS ANALYTICAL REPORT WO 1189855

Laboratory Report of Analysis

To: Shannon & Wilson-Fairbanks
2355 Hill Road
Fairbanks, AK 99709
(907)479-0600

Report Number: **1189855**

Client Project: **101525-002 Fairbanks Rail York**

Dear Kevin Chancey,

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.

_____

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: 1189855

Project Name/Site: 101525-002 Fairbanks Rail York

Refer to sample receipt form for information on sample condition.

MW-104 **1189855002 PS**
8270D SIM - PAH surrogate recovery for 2-Methylnaphthalene-d10 does not meet QC criteria. The sample was re-extracted outside of hold-time. Surrogate recovery is within QC criteria and results are comparable. The in-hold data is reported.

MW-5 **1189855003 PS**
8270D SIM - PAH surrogate recovery for 2-Methylnaphthalene-d10 does not meet QC criteria. The sample was re-extracted outside of hold-time. Surrogate recovery is within QC criteria and results are comparable. The in-hold data is reported.

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

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. 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, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). 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
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
MW-4	1189855001	10/10/2018	10/12/2018	Water (Surface, Eff., Ground)
MW-104	1189855002	10/10/2018	10/12/2018	Water (Surface, Eff., Ground)
MW-5	1189855003	10/10/2018	10/12/2018	Water (Surface, Eff., Ground)
MW-6	1189855004	10/10/2018	10/12/2018	Water (Surface, Eff., Ground)
MW-7	1189855005	10/10/2018	10/12/2018	Water (Surface, Eff., Ground)
MW-8	1189855006	10/10/2018	10/12/2018	Water (Surface, Eff., Ground)
MW-9	1189855007	10/10/2018	10/12/2018	Water (Surface, Eff., Ground)
Trip Blank	1189855008	10/10/2018	10/12/2018	Water (Surface, Eff., Ground)

Method	Method Description
8270D SIM LV (PAH)	8270 PAH SIM GC/MS Liq/Liq ext. LV
AK101	AK101/8021 Combo.
SW8021B	AK101/8021 Combo.
AK102	DRO/RRO Low Volume Water
AK103	DRO/RRO Low Volume Water

Detectable Results Summary

Client Sample ID: **MW-4**
Lab Sample ID: 1189855001

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	60.0	ug/L
	2-Methylnaphthalene	65.1	ug/L
	Acenaphthene	1.45	ug/L
	Anthracene	0.0594	ug/L
	Fluorene	3.55	ug/L
	Naphthalene	64.9	ug/L
	Phenanthrene	1.94	ug/L
Semivolatile Organic Fuels	Diesel Range Organics	4.66	mg/L
	Residual Range Organics	0.574	mg/L
Volatile Fuels	Ethylbenzene	6.02	ug/L
	Gasoline Range Organics	0.141	mg/L
	o-Xylene	4.67	ug/L
	P & M -Xylene	12.4	ug/L
	Xylenes (total)	17.0	ug/L

Client Sample ID: **MW-104**
Lab Sample ID: 1189855002

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	45.8	ug/L
	2-Methylnaphthalene	49.5	ug/L
	Acenaphthene	1.11	ug/L
	Anthracene	0.0315J	ug/L
	Fluorene	2.73	ug/L
	Naphthalene	49.1	ug/L
	Phenanthrene	1.59	ug/L
	Pyrene	0.0346J	ug/L
Semivolatile Organic Fuels	Diesel Range Organics	4.73	mg/L
	Residual Range Organics	0.706	mg/L
Volatile Fuels	Ethylbenzene	5.97	ug/L
	Gasoline Range Organics	0.164	mg/L
	o-Xylene	3.59	ug/L
	P & M -Xylene	12.3	ug/L
	Xylenes (total)	15.9	ug/L

Client Sample ID: **MW-5**
Lab Sample ID: 1189855003

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	2.71	ug/L
	2-Methylnaphthalene	0.826	ug/L
	Acenaphthene	0.229	ug/L
	Fluorene	0.500	ug/L
	Naphthalene	1.96	ug/L
	Phenanthrene	0.235	ug/L
Semivolatile Organic Fuels	Diesel Range Organics	2.03	mg/L
	Residual Range Organics	0.462J	mg/L
Volatile Fuels	P & M -Xylene	0.740J	ug/L

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Detectable Results Summary

Client Sample ID: **MW-6**
Lab Sample ID: 1189855004

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	53.6	ug/L
	2-Methylnaphthalene	49.1	ug/L
	Acenaphthene	1.75	ug/L
	Fluorene	3.68	ug/L
	Naphthalene	56.8	ug/L
	Phenanthrene	1.45	ug/L
Semivolatile Organic Fuels	Diesel Range Organics	4.84	mg/L
	Residual Range Organics	0.777	mg/L
Volatile Fuels	Ethylbenzene	38.2	ug/L
	Gasoline Range Organics	0.441	mg/L
	o-Xylene	0.510J	ug/L
	P & M -Xylene	1.04J	ug/L
	Xylenes (total)	1.55J	ug/L

Client Sample ID: **MW-7**
Lab Sample ID: 1189855005

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	1.44	ug/L
	2-Methylnaphthalene	1.15	ug/L
	Acenaphthene	0.301	ug/L
	Fluorene	0.201	ug/L
	Naphthalene	7.03	ug/L
	Phenanthrene	0.133	ug/L
Semivolatile Organic Fuels	Diesel Range Organics	12.0	mg/L
	Residual Range Organics	1.34	mg/L
Volatile Fuels	Benzene	1.86	ug/L
	Ethylbenzene	1.07	ug/L
	Gasoline Range Organics	0.0428J	mg/L
	o-Xylene	1.22	ug/L
	P & M -Xylene	2.35	ug/L
	Xylenes (total)	3.57	ug/L

Client Sample ID: **MW-8**
Lab Sample ID: 1189855006

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	0.518J	mg/L
	Residual Range Organics	0.324J	mg/L

Client Sample ID: **MW-9**
Lab Sample ID: 1189855007

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	0.353J	mg/L
	Residual Range Organics	0.243J	mg/L

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Results of **MW-4**

Client Sample ID: **MW-4**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855001
Lab Project ID: 1189855

Collection Date: 10/10/18 13:40
Received Date: 10/12/18 09:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	60.0		0.472	0.142	ug/L	10		10/19/18 13:14
2-Methylnaphthalene	65.1		0.472	0.142	ug/L	10		10/19/18 13:14
Acenaphthene	1.45		0.0472	0.0142	ug/L	1		10/18/18 20:17
Acenaphthylene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:17
Anthracene	0.0594		0.0472	0.0142	ug/L	1		10/18/18 20:17
Benzo(a)Anthracene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:17
Benzo[a]pyrene	0.00945	U	0.0189	0.00585	ug/L	1		10/18/18 20:17
Benzo[b]Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:17
Benzo[g,h,i]perylene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:17
Benzo[k]fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:17
Chrysene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:17
Dibenzo[a,h]anthracene	0.00945	U	0.0189	0.00585	ug/L	1		10/18/18 20:17
Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:17
Fluorene	3.55		0.0472	0.0142	ug/L	1		10/18/18 20:17
Indeno[1,2,3-c,d] pyrene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:17
Naphthalene	64.9		0.943	0.292	ug/L	10		10/19/18 13:14
Phenanthrene	1.94		0.0472	0.0142	ug/L	1		10/18/18 20:17
Pyrene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:17
Surrogates								
2-Methylnaphthalene-d10 (surr)	53.5		47-106		%	1		10/18/18 20:17
Fluoranthene-d10 (surr)	51.5		24-116		%	1		10/18/18 20:17

Batch Information

Analytical Batch: XMS11172
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 10/19/18 13:14
Container ID: 1189855001-F

Prep Batch: XXX40730
Prep Method: SW3520C
Prep Date/Time: 10/15/18 08:21
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11169
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 10/18/18 20:17
Container ID: 1189855001-F

Prep Batch: XXX40730
Prep Method: SW3520C
Prep Date/Time: 10/15/18 08:21
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Results of **MW-4**

Client Sample ID: **MW-4**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855001
Lab Project ID: 1189855

Collection Date: 10/10/18 13:40
Received Date: 10/12/18 09:43
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	4.66		0.588	0.176	mg/L	1		10/23/18 12:15
Surrogates								
5a Androstane (surr)	83.7		50-150		%	1		10/23/18 12:15

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/23/18 12:15
Container ID: 1189855001-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.574		0.490	0.147	mg/L	1		10/23/18 12:15
Surrogates								
n-Triacontane-d62 (surr)	87		50-150		%	1		10/23/18 12:15

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/23/18 12:15
Container ID: 1189855001-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Results of **MW-4**

Client Sample ID: **MW-4**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855001
Lab Project ID: 1189855

Collection Date: 10/10/18 13:40
Received Date: 10/12/18 09:43
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	0.141		0.100	0.0310	mg/L	1		10/18/18 08:06
Surrogates								
4-Bromofluorobenzene (surr)	121		50-150		%	1		10/18/18 08:06

Batch Information

Analytical Batch: VFC14513
Analytical Method: AK101
Analyst: ACL
Analytical Date/Time: 10/18/18 08:06
Container ID: 1189855001-A

Prep Batch: VXX33367
Prep Method: SW5030B
Prep Date/Time: 10/17/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U		0.500	0.150	ug/L	1		10/18/18 08:06
Ethylbenzene	6.02		1.00	0.310	ug/L	1		10/18/18 08:06
o-Xylene	4.67		1.00	0.310	ug/L	1		10/18/18 08:06
P & M -Xylene	12.4		2.00	0.620	ug/L	1		10/18/18 08:06
Toluene	0.500 U		1.00	0.310	ug/L	1		10/18/18 08:06
Xylenes (total)	17.0		3.00	0.930	ug/L	1		10/18/18 08:06
Surrogates								
1,4-Difluorobenzene (surr)	102		77-115		%	1		10/18/18 08:06

Batch Information

Analytical Batch: VFC14513
Analytical Method: SW8021B
Analyst: ACL
Analytical Date/Time: 10/18/18 08:06
Container ID: 1189855001-A

Prep Batch: VXX33367
Prep Method: SW5030B
Prep Date/Time: 10/17/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **MW-104**

Client Sample ID: **MW-104**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855002
Lab Project ID: 1189855

Collection Date: 10/10/18 13:30
Received Date: 10/12/18 09:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	45.8		0.472	0.142	ug/L	10		10/19/18 13:35
2-Methylnaphthalene	49.5		0.472	0.142	ug/L	10		10/19/18 13:35
Acenaphthene	1.11		0.0472	0.0142	ug/L	1		10/18/18 20:37
Acenaphthylene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:37
Anthracene	0.0315	J	0.0472	0.0142	ug/L	1		10/18/18 20:37
Benzo(a)Anthracene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:37
Benzo[a]pyrene	0.00945	U	0.0189	0.00585	ug/L	1		10/18/18 20:37
Benzo[b]Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:37
Benzo[g,h,i]perylene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:37
Benzo[k]fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:37
Chrysene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:37
Dibenzo[a,h]anthracene	0.00945	U	0.0189	0.00585	ug/L	1		10/18/18 20:37
Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:37
Fluorene	2.73		0.0472	0.0142	ug/L	1		10/18/18 20:37
Indeno[1,2,3-c,d] pyrene	0.0236	U	0.0472	0.0142	ug/L	1		10/18/18 20:37
Naphthalene	49.1		0.943	0.292	ug/L	10		10/19/18 13:35
Phenanthrene	1.59		0.0472	0.0142	ug/L	1		10/18/18 20:37
Pyrene	0.0346	J	0.0472	0.0142	ug/L	1		10/18/18 20:37
Surrogates								
2-Methylnaphthalene-d10 (surr)	40.4	*	47-106		%	1		10/18/18 20:37
Fluoranthene-d10 (surr)	38.5		24-116		%	1		10/18/18 20:37

Batch Information

Analytical Batch: XMS11172
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 10/19/18 13:35
Container ID: 1189855002-F

Prep Batch: XXX40730
Prep Method: SW3520C
Prep Date/Time: 10/15/18 08:21
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11169
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 10/18/18 20:37
Container ID: 1189855002-F

Prep Batch: XXX40730
Prep Method: SW3520C
Prep Date/Time: 10/15/18 08:21
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Print Date: 10/26/2018 11:09:13AM

J flagging is activated

Results of **MW-104**

Client Sample ID: **MW-104**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855002
Lab Project ID: 1189855

Collection Date: 10/10/18 13:30
Received Date: 10/12/18 09:43
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	4.73		0.588	0.176	mg/L	1		10/23/18 12:25
Surrogates								
5a Androstane (surr)	93.5		50-150		%	1		10/23/18 12:25

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/23/18 12:25
Container ID: 1189855002-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.706		0.490	0.147	mg/L	1		10/23/18 12:25
Surrogates								
n-Triacontane-d62 (surr)	101		50-150		%	1		10/23/18 12:25

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/23/18 12:25
Container ID: 1189855002-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Print Date: 10/26/2018 11:09:13AM

J flagging is activated

Results of **MW-104**

Client Sample ID: **MW-104**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855002
Lab Project ID: 1189855

Collection Date: 10/10/18 13:30
Received Date: 10/12/18 09:43
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	0.164		0.100	0.0310	mg/L	1		10/18/18 08:24
Surrogates								
4-Bromofluorobenzene (surr)	115		50-150		%	1		10/18/18 08:24

Batch Information

Analytical Batch: VFC14513
Analytical Method: AK101
Analyst: ACL
Analytical Date/Time: 10/18/18 08:24
Container ID: 1189855002-A

Prep Batch: VXX33367
Prep Method: SW5030B
Prep Date/Time: 10/17/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U		0.500	0.150	ug/L	1		10/18/18 08:24
Ethylbenzene	5.97		1.00	0.310	ug/L	1		10/18/18 08:24
o-Xylene	3.59		1.00	0.310	ug/L	1		10/18/18 08:24
P & M -Xylene	12.3		2.00	0.620	ug/L	1		10/18/18 08:24
Toluene	0.500 U		1.00	0.310	ug/L	1		10/18/18 08:24
Xylenes (total)	15.9		3.00	0.930	ug/L	1		10/18/18 08:24
Surrogates								
1,4-Difluorobenzene (surr)	100		77-115		%	1		10/18/18 08:24

Batch Information

Analytical Batch: VFC14513
Analytical Method: SW8021B
Analyst: ACL
Analytical Date/Time: 10/18/18 08:24
Container ID: 1189855002-A

Prep Batch: VXX33367
Prep Method: SW5030B
Prep Date/Time: 10/17/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/26/2018 11:09:13AM

J flagging is activated

Results of **MW-5**

Client Sample ID: **MW-5**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855003
Lab Project ID: 1189855

Collection Date: 10/10/18 11:36
Received Date: 10/12/18 09:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	2.71		0.0481	0.0144	ug/L	1		10/18/18 20:58
2-Methylnaphthalene	0.826		0.0481	0.0144	ug/L	1		10/18/18 20:58
Acenaphthene	0.229		0.0481	0.0144	ug/L	1		10/18/18 20:58
Acenaphthylene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 20:58
Anthracene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 20:58
Benzo(a)Anthracene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 20:58
Benzo[a]pyrene	0.00960 U		0.0192	0.00596	ug/L	1		10/18/18 20:58
Benzo[b]Fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 20:58
Benzo[g,h,i]perylene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 20:58
Benzo[k]fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 20:58
Chrysene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 20:58
Dibenzo[a,h]anthracene	0.00960 U		0.0192	0.00596	ug/L	1		10/18/18 20:58
Fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 20:58
Fluorene	0.500		0.0481	0.0144	ug/L	1		10/18/18 20:58
Indeno[1,2,3-c,d] pyrene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 20:58
Naphthalene	1.96		0.0962	0.0298	ug/L	1		10/18/18 20:58
Phenanthrene	0.235		0.0481	0.0144	ug/L	1		10/18/18 20:58
Pyrene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 20:58
Surrogates								
2-Methylnaphthalene-d10 (surr)	43.9	*	47-106		%	1		10/18/18 20:58
Fluoranthene-d10 (surr)	44.6		24-116		%	1		10/18/18 20:58

Batch Information

Analytical Batch: XMS11169
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 10/18/18 20:58
Container ID: 1189855003-F

Prep Batch: XXX40730
Prep Method: SW3520C
Prep Date/Time: 10/15/18 08:21
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 10/26/2018 11:09:13AM

J flagging is activated

Results of **MW-5**

Client Sample ID: **MW-5**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855003
Lab Project ID: 1189855

Collection Date: 10/10/18 11:36
Received Date: 10/12/18 09:43
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	2.03		0.577	0.173	mg/L	1		10/23/18 12:35
Surrogates								
5a Androstane (surr)	82.5		50-150		%	1		10/23/18 12:35

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/23/18 12:35
Container ID: 1189855003-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
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	0.462	J	0.481	0.144	mg/L	1		10/23/18 12:35
Surrogates								
n-Triacontane-d62 (surr)	85.5		50-150		%	1		10/23/18 12:35

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/23/18 12:35
Container ID: 1189855003-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 10/26/2018 11:09:13AM

J flagging is activated

Results of **MW-5**

Client Sample ID: **MW-5**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855003
Lab Project ID: 1189855

Collection Date: 10/10/18 11:36
Received Date: 10/12/18 09:43
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	0.0500 U		0.100	0.0310	mg/L	1		10/18/18 08:42
Surrogates								
4-Bromofluorobenzene (surr)	84		50-150		%	1		10/18/18 08:42

Batch Information

Analytical Batch: VFC14513
Analytical Method: AK101
Analyst: ACL
Analytical Date/Time: 10/18/18 08:42
Container ID: 1189855003-A

Prep Batch: VXX33367
Prep Method: SW5030B
Prep Date/Time: 10/17/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U		0.500	0.150	ug/L	1		10/18/18 08:42
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		10/18/18 08:42
o-Xylene	0.500 U		1.00	0.310	ug/L	1		10/18/18 08:42
P & M -Xylene	0.740 J		2.00	0.620	ug/L	1		10/18/18 08:42
Toluene	0.500 U		1.00	0.310	ug/L	1		10/18/18 08:42
Xylenes (total)	1.50 U		3.00	0.930	ug/L	1		10/18/18 08:42
Surrogates								
1,4-Difluorobenzene (surr)	97.7		77-115		%	1		10/18/18 08:42

Batch Information

Analytical Batch: VFC14513
Analytical Method: SW8021B
Analyst: ACL
Analytical Date/Time: 10/18/18 08:42
Container ID: 1189855003-A

Prep Batch: VXX33367
Prep Method: SW5030B
Prep Date/Time: 10/17/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **MW-6**

Client Sample ID: **MW-6**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855004
Lab Project ID: 1189855

Collection Date: 10/10/18 10:30
Received Date: 10/12/18 09:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	53.6		0.481	0.144	ug/L	10		10/19/18 14:16
2-Methylnaphthalene	49.1		0.481	0.144	ug/L	10		10/19/18 14:16
Acenaphthene	1.75		0.0481	0.0144	ug/L	1		10/18/18 17:13
Acenaphthylene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 17:13
Anthracene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 17:13
Benzo(a)Anthracene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 17:13
Benzo[a]pyrene	0.00960 U		0.0192	0.00596	ug/L	1		10/18/18 17:13
Benzo[b]Fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 17:13
Benzo[g,h,i]perylene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 17:13
Benzo[k]fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 17:13
Chrysene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 17:13
Dibenzo[a,h]anthracene	0.00960 U		0.0192	0.00596	ug/L	1		10/18/18 17:13
Fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 17:13
Fluorene	3.68		0.0481	0.0144	ug/L	1		10/18/18 17:13
Indeno[1,2,3-c,d] pyrene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 17:13
Naphthalene	56.8		0.962	0.298	ug/L	10		10/19/18 14:16
Phenanthrene	1.45		0.0481	0.0144	ug/L	1		10/18/18 17:13
Pyrene	0.0240 U		0.0481	0.0144	ug/L	1		10/18/18 17:13
Surrogates								
2-Methylnaphthalene-d10 (surr)	66.3		47-106		%	1		10/18/18 17:13
Fluoranthene-d10 (surr)	60.8		24-116		%	1		10/18/18 17:13

Batch Information

Analytical Batch: XMS11172
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 10/19/18 14:16
Container ID: 1189855004-F

Prep Batch: XXX40730
Prep Method: SW3520C
Prep Date/Time: 10/15/18 08:21
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11169
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 10/18/18 17:13
Container ID: 1189855004-F

Prep Batch: XXX40730
Prep Method: SW3520C
Prep Date/Time: 10/15/18 08:21
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Results of **MW-6**

Client Sample ID: **MW-6**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855004
Lab Project ID: 1189855

Collection Date: 10/10/18 10:30
Received Date: 10/12/18 09:43
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	4.84		0.566	0.170	mg/L	1		10/23/18 12:46
Surrogates								
5a Androstane (surr)	85.1		50-150		%	1		10/23/18 12:46

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/23/18 12:46
Container ID: 1189855004-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
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	0.777		0.472	0.142	mg/L	1		10/23/18 12:46
Surrogates								
n-Triacontane-d62 (surr)	88.2		50-150		%	1		10/23/18 12:46

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/23/18 12:46
Container ID: 1189855004-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Print Date: 10/26/2018 11:09:13AM

J flagging is activated

Results of **MW-6**

Client Sample ID: **MW-6**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855004
Lab Project ID: 1189855

Collection Date: 10/10/18 10:30
Received Date: 10/12/18 09:43
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	0.441		0.100	0.0310	mg/L	1		10/18/18 09:00
Surrogates								
4-Bromofluorobenzene (surr)	103		50-150		%	1		10/18/18 09:00

Batch Information

Analytical Batch: VFC14513
Analytical Method: AK101
Analyst: ACL
Analytical Date/Time: 10/18/18 09:00
Container ID: 1189855004-A

Prep Batch: VXX33367
Prep Method: SW5030B
Prep Date/Time: 10/17/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U		0.500	0.150	ug/L	1		10/18/18 09:00
Ethylbenzene	38.2		1.00	0.310	ug/L	1		10/18/18 09:00
o-Xylene	0.510 J		1.00	0.310	ug/L	1		10/18/18 09:00
P & M -Xylene	1.04 J		2.00	0.620	ug/L	1		10/18/18 09:00
Toluene	0.500 U		1.00	0.310	ug/L	1		10/18/18 09:00
Xylenes (total)	1.55 J		3.00	0.930	ug/L	1		10/18/18 09:00
Surrogates								
1,4-Difluorobenzene (surr)	93.2		77-115		%	1		10/18/18 09:00

Batch Information

Analytical Batch: VFC14513
Analytical Method: SW8021B
Analyst: ACL
Analytical Date/Time: 10/18/18 09:00
Container ID: 1189855004-A

Prep Batch: VXX33367
Prep Method: SW5030B
Prep Date/Time: 10/17/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **MW-7**

Client Sample ID: **MW-7**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855005
Lab Project ID: 1189855

Collection Date: 10/10/18 11:01
Received Date: 10/12/18 09:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	1.44		0.0481	0.0144	ug/L	1		10/18/18 17:33
2-Methylnaphthalene	1.15		0.0481	0.0144	ug/L	1		10/18/18 17:33
Acenaphthene	0.301		0.0481	0.0144	ug/L	1		10/18/18 17:33
Acenaphthylene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:33
Anthracene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:33
Benzo(a)Anthracene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:33
Benzo[a]pyrene	0.00960	U	0.0192	0.00596	ug/L	1		10/18/18 17:33
Benzo[b]Fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:33
Benzo[g,h,i]perylene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:33
Benzo[k]fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:33
Chrysene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:33
Dibenzo[a,h]anthracene	0.00960	U	0.0192	0.00596	ug/L	1		10/18/18 17:33
Fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:33
Fluorene	0.201		0.0481	0.0144	ug/L	1		10/18/18 17:33
Indeno[1,2,3-c,d] pyrene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:33
Naphthalene	7.03		0.0962	0.0298	ug/L	1		10/18/18 17:33
Phenanthrene	0.133		0.0481	0.0144	ug/L	1		10/18/18 17:33
Pyrene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:33
Surrogates								
2-Methylnaphthalene-d10 (surr)	53		47-106		%	1		10/18/18 17:33
Fluoranthene-d10 (surr)	45.8		24-116		%	1		10/18/18 17:33

Batch Information

Analytical Batch: XMS11169
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 10/18/18 17:33
Container ID: 1189855005-F

Prep Batch: XXX40730
Prep Method: SW3520C
Prep Date/Time: 10/15/18 08:21
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Results of **MW-7**

Client Sample ID: **MW-7**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855005
Lab Project ID: 1189855

Collection Date: 10/10/18 11:01
Received Date: 10/12/18 09:43
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	12.0		0.577	0.173	mg/L	1		10/23/18 12:57
Surrogates								
5a Androstane (surr)	93.9		50-150		%	1		10/23/18 12:57

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/23/18 12:57
Container ID: 1189855005-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
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	1.34		0.481	0.144	mg/L	1		10/23/18 12:57
Surrogates								
n-Triacontane-d62 (surr)	96		50-150		%	1		10/23/18 12:57

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/23/18 12:57
Container ID: 1189855005-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Results of **MW-7**

Client Sample ID: **MW-7**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855005
Lab Project ID: 1189855

Collection Date: 10/10/18 11:01
Received Date: 10/12/18 09:43
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	0.0428	J	0.100	0.0310	mg/L	1		10/18/18 09:18
Surrogates								
4-Bromofluorobenzene (surr)	86.8		50-150		%	1		10/18/18 09:18

Batch Information

Analytical Batch: VFC14513
Analytical Method: AK101
Analyst: ACL
Analytical Date/Time: 10/18/18 09:18
Container ID: 1189855005-A

Prep Batch: VXX33367
Prep Method: SW5030B
Prep Date/Time: 10/17/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	1.86		0.500	0.150	ug/L	1		10/18/18 09:18
Ethylbenzene	1.07		1.00	0.310	ug/L	1		10/18/18 09:18
o-Xylene	1.22		1.00	0.310	ug/L	1		10/18/18 09:18
P & M -Xylene	2.35		2.00	0.620	ug/L	1		10/18/18 09:18
Toluene	0.500	U	1.00	0.310	ug/L	1		10/18/18 09:18
Xylenes (total)	3.57		3.00	0.930	ug/L	1		10/18/18 09:18
Surrogates								
1,4-Difluorobenzene (surr)	94.1		77-115		%	1		10/18/18 09:18

Batch Information

Analytical Batch: VFC14513
Analytical Method: SW8021B
Analyst: ACL
Analytical Date/Time: 10/18/18 09:18
Container ID: 1189855005-A

Prep Batch: VXX33367
Prep Method: SW5030B
Prep Date/Time: 10/17/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **MW-8**

Client Sample ID: **MW-8**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855006
Lab Project ID: 1189855

Collection Date: 10/10/18 08:15
Received Date: 10/12/18 09:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
2-Methylnaphthalene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Acenaphthene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Acenaphthylene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Anthracene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Benzo(a)Anthracene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Benzo[a]pyrene	0.00960	U	0.0192	0.00596	ug/L	1		10/18/18 17:54
Benzo[b]Fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Benzo[g,h,i]perylene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Benzo[k]fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Chrysene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Dibenzo[a,h]anthracene	0.00960	U	0.0192	0.00596	ug/L	1		10/18/18 17:54
Fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Fluorene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Indeno[1,2,3-c,d] pyrene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Naphthalene	0.0481	U	0.0962	0.0298	ug/L	1		10/18/18 17:54
Phenanthrene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Pyrene	0.0240	U	0.0481	0.0144	ug/L	1		10/18/18 17:54
Surrogates								
2-Methylnaphthalene-d10 (surr)	67.7		47-106		%	1		10/18/18 17:54
Fluoranthene-d10 (surr)	69.6		24-116		%	1		10/18/18 17:54

Batch Information

Analytical Batch: XMS11169
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 10/18/18 17:54
Container ID: 1189855006-F

Prep Batch: XXX40730
Prep Method: SW3520C
Prep Date/Time: 10/15/18 08:21
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Results of **MW-8**

Client Sample ID: **MW-8**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855006
Lab Project ID: 1189855

Collection Date: 10/10/18 08:15
Received Date: 10/12/18 09:43
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	0.518	J	0.577	0.173	mg/L	1		10/23/18 13:07
Surrogates								
5a Androstane (surr)	87.4		50-150		%	1		10/23/18 13:07

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/23/18 13:07
Container ID: 1189855006-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
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	0.324	J	0.481	0.144	mg/L	1		10/23/18 13:07
Surrogates								
n-Triacontane-d62 (surr)	94.6		50-150		%	1		10/23/18 13:07

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/23/18 13:07
Container ID: 1189855006-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 10/26/2018 11:09:13AM

J flagging is activated

Results of **MW-8**

Client Sample ID: **MW-8**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855006
Lab Project ID: 1189855

Collection Date: 10/10/18 08:15
Received Date: 10/12/18 09:43
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	0.0500 U		0.100	0.0310	mg/L	1		10/20/18 09:42
Surrogates								
4-Bromofluorobenzene (surr)	76.9		50-150		%	1		10/20/18 09:42

Batch Information

Analytical Batch: VFC14518
Analytical Method: AK101
Analyst: ACL
Analytical Date/Time: 10/20/18 09:42
Container ID: 1189855006-A

Prep Batch: VXX33386
Prep Method: SW5030B
Prep Date/Time: 10/19/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U		0.500	0.150	ug/L	1		10/20/18 09:42
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		10/20/18 09:42
o-Xylene	0.500 U		1.00	0.310	ug/L	1		10/20/18 09:42
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		10/20/18 09:42
Toluene	0.500 U		1.00	0.310	ug/L	1		10/20/18 09:42
Xylenes (total)	1.50 U		3.00	0.930	ug/L	1		10/20/18 09:42
Surrogates								
1,4-Difluorobenzene (surr)	97.5		77-115		%	1		10/20/18 09:42

Batch Information

Analytical Batch: VFC14518
Analytical Method: SW8021B
Analyst: ACL
Analytical Date/Time: 10/20/18 09:42
Container ID: 1189855006-A

Prep Batch: VXX33386
Prep Method: SW5030B
Prep Date/Time: 10/19/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/26/2018 11:09:13AM

J flagging is activated

Results of **MW-9**

Client Sample ID: **MW-9**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855007
Lab Project ID: 1189855

Collection Date: 10/10/18 09:05
Received Date: 10/12/18 09:43
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
2-Methylnaphthalene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Acenaphthene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Acenaphthylene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Anthracene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Benzo(a)Anthracene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Benzo[a]pyrene	0.00980	U	0.0196	0.00608	ug/L	1		10/18/18 18:14
Benzo[b]Fluoranthene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Benzo[g,h,i]perylene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Benzo[k]fluoranthene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Chrysene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Dibenzo[a,h]anthracene	0.00980	U	0.0196	0.00608	ug/L	1		10/18/18 18:14
Fluoranthene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Fluorene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Indeno[1,2,3-c,d] pyrene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Naphthalene	0.0490	U	0.0980	0.0304	ug/L	1		10/18/18 18:14
Phenanthrene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Pyrene	0.0245	U	0.0490	0.0147	ug/L	1		10/18/18 18:14
Surrogates								
2-Methylnaphthalene-d10 (surr)	66.8		47-106		%	1		10/18/18 18:14
Fluoranthene-d10 (surr)	64.6		24-116		%	1		10/18/18 18:14

Batch Information

Analytical Batch: XMS11169
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 10/18/18 18:14
Container ID: 1189855007-F

Prep Batch: XXX40730
Prep Method: SW3520C
Prep Date/Time: 10/15/18 08:21
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Results of **MW-9**

Client Sample ID: **MW-9**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855007
Lab Project ID: 1189855

Collection Date: 10/10/18 09:05
Received Date: 10/12/18 09:43
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	0.353	J	0.577	0.173	mg/L	1		10/23/18 13:18
Surrogates								
5a Androstane (surr)	83.5		50-150		%	1		10/23/18 13:18

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/23/18 13:18
Container ID: 1189855007-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
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	0.243	J	0.481	0.144	mg/L	1		10/23/18 13:18
Surrogates								
n-Triacontane-d62 (surr)	87.7		50-150		%	1		10/23/18 13:18

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/23/18 13:18
Container ID: 1189855007-D

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/18 08:00
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 10/26/2018 11:09:13AM

J flagging is activated

Results of **MW-9**

Client Sample ID: **MW-9**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855007
Lab Project ID: 1189855

Collection Date: 10/10/18 09:05
Received Date: 10/12/18 09:43
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	0.0500 U		0.100	0.0310	mg/L	1		10/20/18 10:00
Surrogates								
4-Bromofluorobenzene (surr)	77.7		50-150		%	1		10/20/18 10:00

Batch Information

Analytical Batch: VFC14518
Analytical Method: AK101
Analyst: ACL
Analytical Date/Time: 10/20/18 10:00
Container ID: 1189855007-A

Prep Batch: VXX33386
Prep Method: SW5030B
Prep Date/Time: 10/19/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U		0.500	0.150	ug/L	1		10/20/18 10:00
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		10/20/18 10:00
o-Xylene	0.500 U		1.00	0.310	ug/L	1		10/20/18 10:00
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		10/20/18 10:00
Toluene	0.500 U		1.00	0.310	ug/L	1		10/20/18 10:00
Xylenes (total)	1.50 U		3.00	0.930	ug/L	1		10/20/18 10:00
Surrogates								
1,4-Difluorobenzene (surr)	98.8		77-115		%	1		10/20/18 10:00

Batch Information

Analytical Batch: VFC14518
Analytical Method: SW8021B
Analyst: ACL
Analytical Date/Time: 10/20/18 10:00
Container ID: 1189855007-A

Prep Batch: VXX33386
Prep Method: SW5030B
Prep Date/Time: 10/19/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **Trip Blank**

Client Sample ID: **Trip Blank**
Client Project ID: **101525-002 Fairbanks Rail York**
Lab Sample ID: 1189855008
Lab Project ID: 1189855

Collection Date: 10/10/18 09:05
Received Date: 10/12/18 09:43
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	0.0500 U		0.100	0.0310	mg/L	1		10/19/18 08:56
Surrogates								
4-Bromofluorobenzene (surr)	85.4		50-150		%	1		10/19/18 08:56

Batch Information

Analytical Batch: VFC14514
Analytical Method: AK101
Analyst: ACL
Analytical Date/Time: 10/19/18 08:56
Container ID: 1189855008-A

Prep Batch: VXX33371
Prep Method: SW5030B
Prep Date/Time: 10/18/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U		0.500	0.150	ug/L	1		10/19/18 08:56
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		10/19/18 08:56
o-Xylene	0.500 U		1.00	0.310	ug/L	1		10/19/18 08:56
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		10/19/18 08:56
Toluene	0.500 U		1.00	0.310	ug/L	1		10/19/18 08:56
Xylenes (total)	1.50 U		3.00	0.930	ug/L	1		10/19/18 08:56
Surrogates								
1,4-Difluorobenzene (surr)	89.1		77-115		%	1		10/19/18 08:56

Batch Information

Analytical Batch: VFC14514
Analytical Method: SW8021B
Analyst: ACL
Analytical Date/Time: 10/19/18 08:56
Container ID: 1189855008-A

Prep Batch: VXX33371
Prep Method: SW5030B
Prep Date/Time: 10/18/18 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1787912 [VXX/33367]
Blank Lab ID: 1483527

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1189855001, 1189855002, 1189855003, 1189855004, 1189855005

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.0500U	0.100	0.0310	mg/L
Surrogates				
4-Bromofluorobenzene (surr)	78.1	50-150		%

Batch Information

Analytical Batch: VFC14513
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ACL
Analytical Date/Time: 10/17/2018 10:22:00AM

Prep Batch: VXX33367
Prep Method: SW5030B
Prep Date/Time: 10/17/2018 8:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1189855 [VXX33367]
Blank Spike Lab ID: 1483530
Date Analyzed: 10/17/2018 11:16

Spike Duplicate ID: LCSD for HBN 1189855 [VXX33367]
Spike Duplicate Lab ID: 1483531
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189855001, 1189855002, 1189855003, 1189855004, 1189855005

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	0.941	94	1.00	0.918	92	(60-120)	2.50	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	0.0500	90.3	90	0.0500	93.3	93	(50-150)	3.20	

Batch Information

Analytical Batch: **VFC14513**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ACL**

Prep Batch: **VXX33367**
Prep Method: **SW5030B**
Prep Date/Time: **10/17/2018 08:00**
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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t 907.562.2343 f 907.561.5301 www.us.sgs.com

Method Blank

Blank ID: MB for HBN 1787912 [VXX/33367]
Blank Lab ID: 1483527

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1189855001, 1189855002, 1189855003, 1189855004, 1189855005

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	0.250U	0.500	0.150	ug/L
Ethylbenzene	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
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	0.930	ug/L
Surrogates				
1,4-Difluorobenzene (surr)	101	77-115		%

Batch Information

Analytical Batch: VFC14513
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ACL
Analytical Date/Time: 10/17/2018 10:22:00AM

Prep Batch: VXX33367
Prep Method: SW5030B
Prep Date/Time: 10/17/2018 8:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1189855 [VXX33367]
Blank Spike Lab ID: 1483528
Date Analyzed: 10/17/2018 10:58

Spike Duplicate ID: LCSD for HBN 1189855 [VXX33367]
Spike Duplicate Lab ID: 1483529
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189855001, 1189855002, 1189855003, 1189855004, 1189855005

Results by **SW8021B**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	100	98.3	98	100	102	102	(80-120)	3.50	(< 20)
Ethylbenzene	100	97.8	98	100	101	101	(75-125)	3.20	(< 20)
o-Xylene	100	96.1	96	100	99.7	100	(80-120)	3.60	(< 20)
P & M -Xylene	200	194	97	200	200	100	(75-130)	3.10	(< 20)
Toluene	100	97.9	98	100	101	101	(75-120)	3.00	(< 20)
Xylenes (total)	300	290	97	300	300	100	(79-121)	3.30	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	50	102	102	50	105	105	(77-115)	2.60	

Batch Information

Analytical Batch: **VFC14513**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ACL**

Prep Batch: **VXX33367**
Prep Method: **SW5030B**
Prep Date/Time: **10/17/2018 08:00**
Spike Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1787967 [VXX/33371]
Blank Lab ID: 1483798

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1189855008

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.0500U	0.100	0.0310	mg/L
Surrogates				
4-Bromofluorobenzene (surr)	77.4	50-150		%

Batch Information

Analytical Batch: VFC14514
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ACL
Analytical Date/Time: 10/18/2018 12:11:00PM

Prep Batch: VXX33371
Prep Method: SW5030B
Prep Date/Time: 10/18/2018 8:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1189855 [VXX33371]
Blank Spike Lab ID: 1483801
Date Analyzed: 10/18/2018 13:05

Spike Duplicate ID: LCSD for HBN 1189855 [VXX33371]
Spike Duplicate Lab ID: 1483802
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189855008

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	0.928	93	1.00	0.951	95	(60-120)	2.50	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	0.0500	84.8	85	0.0500	89.7	90	(50-150)	5.60	

Batch Information

Analytical Batch: **VFC14514**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ACL**

Prep Batch: **VXX33371**
Prep Method: **SW5030B**
Prep Date/Time: **10/18/2018 08:00**
Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1787967 [VXX/33371]
Blank Lab ID: 1483798

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1189855008

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	0.250U	0.500	0.150	ug/L
Ethylbenzene	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
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	0.930	ug/L
Surrogates				
1,4-Difluorobenzene (surr)	97.7	77-115		%

Batch Information

Analytical Batch: VFC14514
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ACL
Analytical Date/Time: 10/18/2018 12:11:00PM

Prep Batch: VXX33371
Prep Method: SW5030B
Prep Date/Time: 10/18/2018 8:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1189855 [VXX33371]
Blank Spike Lab ID: 1483799
Date Analyzed: 10/18/2018 12:47

Spike Duplicate ID: LCSD for HBN 1189855 [VXX33371]
Spike Duplicate Lab ID: 1483800
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189855008

Results by **SW8021B**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	100	102	102	100	103	103	(80-120)	0.87	(< 20)
Ethylbenzene	100	101	101	100	106	106	(75-125)	5.20	(< 20)
o-Xylene	100	99.3	99	100	104	104	(80-120)	4.30	(< 20)
P & M -Xylene	200	198	99	200	209	104	(75-130)	5.00	(< 20)
Toluene	100	101	101	100	101	101	(75-120)	0.46	(< 20)
Xylenes (total)	300	298	99	300	312	104	(79-121)	4.80	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	50	105	105	50	105	105	(77-115)	0.36	

Batch Information

Analytical Batch: **VFC14514**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ACL**

Prep Batch: **VXX33371**
Prep Method: **SW5030B**
Prep Date/Time: **10/18/2018 08:00**
Spike Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1788029 [VXX/33386]
Blank Lab ID: 1484105

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1189855006, 1189855007

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.0500U	0.100	0.0310	mg/L
Surrogates				
4-Bromofluorobenzene (surr)	80.2	50-150		%

Batch Information

Analytical Batch: VFC14518
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ACL
Analytical Date/Time: 10/19/2018 11:41:00AM

Prep Batch: VXX33386
Prep Method: SW5030B
Prep Date/Time: 10/19/2018 8:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1189855 [VXX33386]
Blank Spike Lab ID: 1484108
Date Analyzed: 10/19/2018 12:36

Spike Duplicate ID: LCSD for HBN 1189855 [VXX33386]
Spike Duplicate Lab ID: 1484109
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189855006, 1189855007

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	0.956	96	1.00	0.954	95	(60-120)	0.15	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	0.0500	89.7	90	0.0500	87	87	(50-150)	3.00	

Batch Information

Analytical Batch: **VFC14518**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ACL**

Prep Batch: **VXX33386**
Prep Method: **SW5030B**
Prep Date/Time: **10/19/2018 08:00**
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 1788029 [VXX/33386]
Blank Lab ID: 1484105

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1189855006, 1189855007

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	0.250U	0.500	0.150	ug/L
Ethylbenzene	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
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	0.930	ug/L
Surrogates				
1,4-Difluorobenzene (surr)	95.1	77-115		%

Batch Information

Analytical Batch: VFC14518
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ACL
Analytical Date/Time: 10/19/2018 11:41:00AM

Prep Batch: VXX33386
Prep Method: SW5030B
Prep Date/Time: 10/19/2018 8:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1189855 [VXX33386]
Blank Spike Lab ID: 1484106
Date Analyzed: 10/19/2018 12:17

Spike Duplicate ID: LCSD for HBN 1189855 [VXX33386]
Spike Duplicate Lab ID: 1484107
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189855006, 1189855007

Results by **SW8021B**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	100	107	107	100	100	100	(80-120)	6.50	(< 20)
Ethylbenzene	100	100	100	100	102	102	(75-125)	1.30	(< 20)
o-Xylene	100	97.0	97	100	99.3	99	(80-120)	2.30	(< 20)
P & M -Xylene	200	197	99	200	200	100	(75-130)	1.40	(< 20)
Toluene	100	103	103	100	100	100	(75-120)	2.20	(< 20)
Xylenes (total)	300	294	98	300	299	100	(79-121)	1.70	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	50	106	106	50	104	104	(77-115)	2.00	

Batch Information

Analytical Batch: **VFC14518**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ACL**

Prep Batch: **VXX33386**
Prep Method: **SW5030B**
Prep Date/Time: **10/19/2018 08:00**
Spike Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1787706 [XXX/40730]
Blank Lab ID: 1482678

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1189855001, 1189855002, 1189855003, 1189855004, 1189855005, 1189855006, 1189855007

Results by **8270D SIM LV (PAH)**

Parameter	Results	LOQ/CL	DL	Units
1-Methylnaphthalene	0.0250U	0.0500	0.0150	ug/L
2-Methylnaphthalene	0.0250U	0.0500	0.0150	ug/L
Acenaphthene	0.0250U	0.0500	0.0150	ug/L
Acenaphthylene	0.0250U	0.0500	0.0150	ug/L
Anthracene	0.0250U	0.0500	0.0150	ug/L
Benzo(a)Anthracene	0.0250U	0.0500	0.0150	ug/L
Benzo[a]pyrene	0.0100U	0.0200	0.00620	ug/L
Benzo[b]Fluoranthene	0.0250U	0.0500	0.0150	ug/L
Benzo[g,h,i]perylene	0.0250U	0.0500	0.0150	ug/L
Benzo[k]fluoranthene	0.0250U	0.0500	0.0150	ug/L
Chrysene	0.0250U	0.0500	0.0150	ug/L
Dibenzo[a,h]anthracene	0.0100U	0.0200	0.00620	ug/L
Fluoranthene	0.0250U	0.0500	0.0150	ug/L
Fluorene	0.0250U	0.0500	0.0150	ug/L
Indeno[1,2,3-c,d] pyrene	0.0250U	0.0500	0.0150	ug/L
Naphthalene	0.0500U	0.100	0.0310	ug/L
Phenanthrene	0.0250U	0.0500	0.0150	ug/L
Pyrene	0.0250U	0.0500	0.0150	ug/L
Surrogates				
2-Methylnaphthalene-d10 (surr)	77.1	47-106		%
Fluoranthene-d10 (surr)	75.8	24-116		%

Batch Information

Analytical Batch: XMS11169
Analytical Method: 8270D SIM LV (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 10/18/2018 3:10:00PM

Prep Batch: XXX40730
Prep Method: SW3520C
Prep Date/Time: 10/15/2018 8:21:35AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1189855 [XXX40730]
Blank Spike Lab ID: 1482679
Date Analyzed: 10/18/2018 15:31

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189855001, 1189855002, 1189855003, 1189855004, 1189855005, 1189855006, 1189855007

Results by **8270D SIM LV (PAH)**

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	2	1.31	65	(41-115)
2-Methylnaphthalene	2	1.39	69	(39-114)
Acenaphthene	2	1.28	64	(48-114)
Acenaphthylene	2	1.34	67	(35-121)
Anthracene	2	1.34	67	(53-119)
Benzo(a)Anthracene	2	1.38	69	(59-120)
Benzo[a]pyrene	2	1.36	68	(53-120)
Benzo[b]Fluoranthene	2	1.47	74	(53-126)
Benzo[g,h,i]perylene	2	1.26	63	(44-128)
Benzo[k]fluoranthene	2	1.34	67	(54-125)
Chrysene	2	1.44	72	(57-120)
Dibenzo[a,h]anthracene	2	1.17	59	(44-131)
Fluoranthene	2	1.43	71	(58-120)
Fluorene	2	1.34	67	(50-118)
Indeno[1,2,3-c,d] pyrene	2	1.38	69	(48-130)
Naphthalene	2	1.38	69	(43-114)
Phenanthrene	2	1.23	62	(53-115)
Pyrene	2	1.46	73	(53-121)
Surrogates				
2-Methylnaphthalene-d10 (surr)	2	69.1	69	(47-106)
Fluoranthene-d10 (surr)	2	71	71	(24-116)

Batch Information

Analytical Batch: **XMS11169**
Analytical Method: **8270D SIM LV (PAH)**
Instrument: **SVA Agilent 780/5975 GC/MS**
Analyst: **BMZ**

Prep Batch: **XXX40730**
Prep Method: **SW3520C**
Prep Date/Time: **10/15/2018 08:21**
Spike Init Wt./Vol.: 2 ug/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1189865003
MS Sample ID: 1482680 MS
MSD Sample ID: 1482681 MSD

Analysis Date: 10/18/2018 21:18
Analysis Date: 10/18/2018 21:39
Analysis Date: 10/18/2018 21:59
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189855001, 1189855002, 1189855003, 1189855004, 1189855005, 1189855006, 1189855007

Results by **8270D SIM LV (PAH)**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1-Methylnaphthalene	0.0254U	2.07	1.53	74	2.02	1.45	72	41-115	5.40	(< 20)
2-Methylnaphthalene	0.0254U	2.07	1.61	78	2.02	1.50	74	39-114	7.20	(< 20)
Acenaphthene	0.0254U	2.07	1.48	71	2.02	1.39	69	48-114	6.20	(< 20)
Acenaphthylene	0.0254U	2.07	1.59	77	2.02	1.48	74	35-121	7.10	(< 20)
Anthracene	0.0254U	2.07	1.4	68	2.02	1.31	65	53-119	6.60	(< 20)
Benzo(a)Anthracene	0.0254U	2.07	1.49	72	2.02	1.39	69	59-120	7.10	(< 20)
Benzo[a]pyrene	0.0101U	2.07	1.47	71	2.02	1.37	68	53-120	7.00	(< 20)
Benzo[b]Fluoranthene	0.0254U	2.07	1.48	72	2.02	1.39	69	53-126	6.30	(< 20)
Benzo[g,h,i]perylene	0.0254U	2.07	1.28	62	2.02	1.21	60	44-128	6.10	(< 20)
Benzo[k]fluoranthene	0.0254U	2.07	1.37	66	2.02	1.30	65	54-125	4.90	(< 20)
Chrysene	0.0254U	2.07	1.45	70	2.02	1.37	68	57-120	6.30	(< 20)
Dibenzo[a,h]anthracene	0.0101U	2.07	1.13	55	2.02	1.05	52	44-131	7.70	(< 20)
Fluoranthene	0.0254U	2.07	1.52	73	2.02	1.43	71	58-120	5.60	(< 20)
Fluorene	0.0254U	2.07	1.54	75	2.02	1.42	70	50-118	8.60	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0254U	2.07	1.38	67	2.02	1.29	64	48-130	6.50	(< 20)
Naphthalene	0.0510U	2.07	1.59	77	2.02	1.50	74	43-114	5.90	(< 20)
Phenanthrene	0.0254U	2.07	1.44	70	2.02	1.35	67	53-115	6.40	(< 20)
Pyrene	0.0254U	2.07	1.57	76	2.02	1.46	73	53-121	7.40	(< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		2.07	1.52	74	2.02	1.47	73	47-106	3.20	
Fluoranthene-d10 (surr)		2.07	1.56	76	2.02	1.45	72	24-116	7.10	

Batch Information

Analytical Batch: XMS11169
Analytical Method: 8270D SIM LV (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 10/18/2018 9:39:00PM

Prep Batch: XXX40730
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 10/15/2018 8:21:35AM
Prep Initial Wt./Vol.: 242.00mL
Prep Extract Vol: 1.00mL

Print Date: 10/26/2018 11:09:39AM

Method Blank

Blank ID: MB for HBN 1788016 [XXX/40764]
Blank Lab ID: 1484046

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1189855001, 1189855002, 1189855003, 1189855004, 1189855005, 1189855006, 1189855007

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	0.181J	0.600	0.180	mg/L
Surrogates				
5a Androstane (surr)	84.9	60-120		%

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: CMS
Analytical Date/Time: 10/23/2018 9:31:00AM

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/2018 8:00:18AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1189855 [XXX40764]
Blank Spike Lab ID: 1484047
Date Analyzed: 10/23/2018 09:42

Spike Duplicate ID: LCSD for HBN 1189855 [XXX40764]
Spike Duplicate Lab ID: 1484048
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189855001, 1189855002, 1189855003, 1189855004, 1189855005, 1189855006, 1189855007

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	19.2	96	20	18.6	93	(75-125)	3.40	(< 20)
Surrogates									
5a Androstane (surr)	0.4	106	106	0.4	102	102	(60-120)	3.50	

Batch Information

Analytical Batch: **XFC14743**
Analytical Method: **AK102**
Instrument: **Agilent 7890B R**
Analyst: **CMS**

Prep Batch: **XXX40764**
Prep Method: **SW3520C**
Prep Date/Time: **10/20/2018 08:00**
Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

Print Date: 10/26/2018 11:09:42AM

Method Blank

Blank ID: MB for HBN 1788016 [XXX/40764]
Blank Lab ID: 1484046

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1189855001, 1189855002, 1189855003, 1189855004, 1189855005, 1189855006, 1189855007

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	0.206J	0.500	0.150	mg/L
Surrogates				
n-Triacontane-d62 (surr)	89.4	60-120		%

Batch Information

Analytical Batch: XFC14743
Analytical Method: AK103
Instrument: Agilent 7890B R
Analyst: CMS
Analytical Date/Time: 10/23/2018 9:31:00AM

Prep Batch: XXX40764
Prep Method: SW3520C
Prep Date/Time: 10/20/2018 8:00:18AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1189855 [XXX40764]
Blank Spike Lab ID: 1484047
Date Analyzed: 10/23/2018 09:42

Spike Duplicate ID: LCSD for HBN 1189855 [XXX40764]
Spike Duplicate Lab ID: 1484048
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1189855001, 1189855002, 1189855003, 1189855004, 1189855005, 1189855006, 1189855007

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	19.8	99	20	19.1	96	(60-120)	3.50	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	0.4	98.2	98	0.4	97	97	(60-120)	1.20	

Batch Information

Analytical Batch: **XFC14743**
Analytical Method: **AK103**
Instrument: **Agilent 7890B R**
Analyst: **CMS**

Prep Batch: **XXX40764**
Prep Method: **SW3520C**
Prep Date/Time: **10/20/2018 08:00**
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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1189855

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Attn:

Turn Around Time: [X] Normal [ ] Rush

Please Specify

Quote No:

J-Flags: [ ] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	DRO (AK 102)	RRO (AK 103)	GRO (AK101)	BTEX (8021)	PAH (8270)			Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
MW-4	(1) A-G	13:40	10/10/18	X	X	X	X	X			7	groundwater
MW-104	(2) A-G	13:30		X	X	X	X	X			7	
MW-5	(3) A-G	11:36		X	X	X	X	X			7	
MW-6	(4) A-G	10:30		X	X	X	X	X			7	
MW-7	(5) A-G	11:01		X	X	X	X	X			7	
MW-8	(6) A-G	8:15		X	X	X	X	X			7	
MW-9	(7) A-G	9:05		X	X	X	X	X			7	
trip blank	(8) A-C											

Project Information	
Number:	101525-002
Name:	Fairbanks Rail Yard
Contact:	Kevin Chaney
Ongoing Project?	Yes [X] No [ ]
Sampler:	KLC, DHF

Sample Receipt	
Total No. of Containers:	49
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	1.6, 0.7°C
Delivery Method:	hand

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1035	Signature: Time: 1600	Signature: Time:
Printed Name: Dana Fore Date: 10/11/18	Printed Name: David Warner Date: 10/11/18	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company: SGS	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 1035	Signature: Time:	Signature: Time: 0945
Printed Name: David Warner Date: 10/11/18	Printed Name: Date:	Printed Name: J. Shamaney Date: 10/12/18
Company: SGS	Company:	Company: SGS

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

CS: IFIB 1.9 012

No. 35578

SGS

1189855

FAIRBANKS SAMPLE RECEIPT FORM

Note: This form is to be completed by Fairbanks Receiving Staff for all samples

Review Criteria:	Condition:	Comments/Actions Taken
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	Yes No (N/A) (Yes) No N/A	X *Exemption permitted if sampler hand carries/delivers.*
Temperature blank compliant* (i.e., 0-6°C) *If >6°C, were samples collected <8 hours ago?* *If <0°C, were all sample containers ice free?* Cooler ID: ____ @ 1.6 w/Therm. ID: D30 Cooler ID: ____ @ 0.7 w/Therm. ID: ↓ Cooler ID: ____ @ ____ w/Therm. ID: ____ Cooler ID: ____ @ ____ w/Therm. ID: ____ Cooler ID: ____ @ ____ w/Therm. ID: ____ If samples are received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank and "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note ambient ( ) or chilled ( ). Please check one.	(Yes) No Yes No (N/A) Yes No (N/A)	□*Exemption permitted if chilled & collected <8hrs ago* ***Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.***
Delivery Method: (Client) (hand carried) Other: ____	Tracking/AB# : Or see attached Or (N/A)	
→For samples received with payment, note amount ($) and whether cash / check / CC (**circle one**) was received.		
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): Bubble Wrap Separate plastic bags Vermiculite Other: Box	(Yes) No N/A	***Note: some samples are sent to Anchorage without inspection by SGS Fairbanks personnel.***
Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples?	(Yes) No N/A	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No (N/A) Yes No (N/A)	

Additional notes (if applicable):

Profile #: 358979

Note to Client: any "no" circled above indicates non-compliance with standard procedures and may impact data quality.

e-Sample Receipt Form

SGS Workorder #: **1189855**

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	1 front, 1 back
COC accompanied samples?	yes	
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 @ 1.9 °C Therm. ID: D12
	yes	Cooler ID: 2 @ 0.6 °C Therm. ID: D25
		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	
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
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.		
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	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)?	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
1189855001-A	HCL to pH < 2	OK
1189855001-B	HCL to pH < 2	OK
1189855001-C	HCL to pH < 2	OK
1189855001-D	HCL to pH < 2	OK
1189855001-E	HCL to pH < 2	OK
1189855001-F	No Preservative Required	OK
1189855001-G	No Preservative Required	OK
1189855002-A	HCL to pH < 2	OK
1189855002-B	HCL to pH < 2	OK
1189855002-C	HCL to pH < 2	OK
1189855002-D	HCL to pH < 2	OK
1189855002-E	HCL to pH < 2	OK
1189855002-F	No Preservative Required	OK
1189855002-G	No Preservative Required	OK
1189855003-A	HCL to pH < 2	OK
1189855003-B	HCL to pH < 2	OK
1189855003-C	HCL to pH < 2	OK
1189855003-D	HCL to pH < 2	OK
1189855003-E	HCL to pH < 2	OK
1189855003-F	No Preservative Required	OK
1189855003-G	No Preservative Required	OK
1189855004-A	HCL to pH < 2	OK
1189855004-B	HCL to pH < 2	OK
1189855004-C	HCL to pH < 2	OK
1189855004-D	HCL to pH < 2	OK
1189855004-E	HCL to pH < 2	OK
1189855004-F	No Preservative Required	OK
1189855004-G	No Preservative Required	OK
1189855005-A	HCL to pH < 2	OK
1189855005-B	HCL to pH < 2	OK
1189855005-C	HCL to pH < 2	OK
1189855005-D	HCL to pH < 2	OK
1189855005-E	HCL to pH < 2	OK
1189855005-F	No Preservative Required	OK
1189855005-G	No Preservative Required	OK
1189855006-A	HCL to pH < 2	OK
1189855006-B	HCL to pH < 2	OK
1189855006-C	HCL to pH < 2	OK
1189855006-D	HCL to pH < 2	OK
1189855006-E	HCL to pH < 2	OK
1189855006-F	No Preservative Required	OK
1189855006-G	No Preservative Required	OK
1189855007-A	HCL to pH < 2	OK
1189855007-B	HCL to pH < 2	OK
1189855007-C	HCL to pH < 2	OK
1189855007-D	HCL to pH < 2	OK
1189855007-E	HCL to pH < 2	OK
1189855007-F	No Preservative Required	OK
1189855007-G	No Preservative Required	OK
1189855008-A	HCL to pH < 2	OK
1189855008-B	HCL to pH < 2	OK
1189855008-C	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.
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.

Appendix D

ADEC Laboratory Data Review Checklist for Analytical Results

APPENDIX D: ADEC LDRC FOR ANALYTICAL RESULTS

Laboratory Data Review Checklist

Completed By:

Kevin Chancey, EIT

Title:

Environmental Engineering Staff

Date:

November 2, 2018

CS Report Name:

101525-002 Fairbanks Rail Yard

Report Date:

October 26, 2018

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

SGS North America, Inc. (SGS)

Laboratory Report Number:

1189855

ADEC File Number:

102.38.050

Hazard Identification Number:

1189855

1. Laboratory

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

   (•) Yes ( ) No Comments:

SGS laboratories in Anchorage, Alaska.

   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 Comments:

NA; the requested analyses were performed by SGS laboratories in Anchorage, Alaska.

2. Chain of Custody (CoC)

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

   (•) Yes ( ) No Comments:

   b. Correct Analyses requested?

   (•) Yes ( ) No Comments:

3. Laboratory Sample Receipt Documentation

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

   (•) Yes ( ) No Comments:

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

   (•) Yes ( ) No Comments:

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

   ( ) Yes ( ) No Comments:

Samples were received in good 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 Comments:

There were not discrepancies documented.

e. Data quality or usability affected?

Comments:

The data quality or usability not affected.

4. Case Narrative

a. Present and understandable?

◉ Yes ○ No Comments:

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

◉ Yes ○ No Comments:

The project sample *MW-104* had a PAH surrogate recovery for 2-Methylnaphthalene that does not meet QC criteria. The sample was re-extracted outside of hold-time. Surrogate recovery is within QC criteria results and results are comparable. The in-hold data is reported.

The project sample *MW-5* had a PAH surrogate recovery for 2-Methylnaphthalene that does not meet QC criteria. The sample was re-extracted outside of hold-time. Surrogate recovery is within QC criteria results and results are comparable. The in-hold data is reported.

c. Were all corrective actions documented?

○ Yes ○ No 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 the data quality and usability; refer to Section 6.b. and Section 6.c. for further assessment.

5. Samples Results

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

◉ Yes ○ No Comments:

b. All applicable holding times met?

(•) Yes ( ) No Comments:

c. All soils reported on a dry weight basis?

( ) Yes (•) No Comments:

NA; soil samples were not submitted for this work order.

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

(•) Yes ( ) No Comments:

The reported limit of detections (LODs) were below the ADEC Groundwater Cleanup Levels for non-detect results.

e. Data quality or usability affected?

( ) Yes (•) No Comments:

The data quality or usability not affected.

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

(•) Yes ( ) No Comments:

However, DRO and RRO were detected in the method blank at an estimated concentration below the LOQ.

iii. If above LOQ, what samples are affected?

Comments:

Project samples are affected by the method blank detection if the analyte is detected in the sample at a concentration within ten times the method blank detection.

The project samples *MW-8* and *MW-9* had detections for DRO at concentrations less than five times the method blank detection. The sample results are considered non-detect and are flagged 'UB' in the analytical tables at the detected concentration or the LOQ, whichever value is greater.

The project samples *MW-4*, *MW-104*, *MW-5*, *MW-6*, *MW-8*, and *MW-9* had detections for RRO at a concentration less than five times the method blank detection. The sample results are considered non-detect and are flagged 'UB' in the analytical tables at the detected concentration or the LOQ, whichever value is greater.

The project sample *MW-7* was detected at a concentration less than ten times but greater than five times the method blank detection. The sample result is considered estimated, biased high, and is flagged 'JH' in the analytical tables.

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

◉ Yes ○ No Comments:

Refer to Section 6.a.iii. for applied data qualifiers.

v. Data quality or usability affected?

Comments:

Yes; 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 Comments:

LCS/LCSD samples were reported for GRO, DRO, RRO, and BTEX analysis.

LCS and MS/MSD samples were reported for PAH analysis.

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

○ Yes ◉ No Comments:

NA; metals/inorganic analyses were not requested for this work order.

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

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

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

Comments:

NA; all %R and RPD reported within method or laboratory limits.

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

( ) Yes (•) No Comments:

NA; all %R and RPD reported within method or laboratory limits.

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

Comments:

No; see above.

c. Surrogates – Organics Only

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

(•) Yes ( ) No Comments:

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

( ) Yes (•) No Comments:

The project sample *MW-104* and *MW-5* had a surrogate recovery for 2-methylnaphthalene-d10 that does not meet QC criteria (biased low) for PAH analysis.

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

(•) Yes ( ) No Comments:

The analytes associated surrogate 2-methylnaphthalene-d10 are considered estimated, biased low. Detected results are flagged 'JL' and non-detect results are flagged 'J' in the analytical tables.

iv. Data quality or usability affected?

Comments:

No; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

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

(•) Yes ( ) No 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 Comments:

iii. All results less than LOQ?

(•) Yes ( ) No Comments:

iv. If above LOQ, what samples are affected?

Comments:

NA; all results less than LOQ.

v. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

e. Field Duplicate

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

(•) Yes ( ) No Comments:

ii. Submitted blind to lab?

(•) Yes ( ) No Comments:

The sample *MW-104* is the field-duplicate for sample *MW-4*.

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (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 Comments:

The field duplicate RDPs were within the project specified DQO of 30%, where calculable, except for anthracene. The sample results are considered estimated (no direction of bias) and are flagged 'J' in the analytical tables.

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

Comments:

Yes; see above.

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

( ) Yes ( ) No (•) Not Applicable

An equipment blank was not required for the project.

i. All results less than LOQ?

( ) Yes ( ) No Comments:

NA; an equipment blank was not required for this project.

ii. If above LOQ, what samples are affected?

Comments:

NA; an equipment blank was not required for this project.

iii. Data quality or usability affected?

Comments:

NA; an equipment blank was not required for this project.

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

a. Defined and appropriate?

○ Yes ○ No Comments:

NA; additional data flags/qualifiers were not required for this project.

Appendix E

Mann-Kendell Trend Analysis

APPENDIX E: MANN-KENDALL TREND ANALYSIS

CONTENTS

	Mann-Kendall Trend Test Analysis
User Selected Options	
Date/Time of Computation	ProUCL 5.112/13/2018 12:55:40 PM
From File	Historical GW Results - ProUCL Input.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

GRO-mw-1	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	3
Number Values Reported (n)	3
Minimum	0.839
Maximum	1.06
Mean	0.926
Geometric Mean	0.922
Median	0.88
Standard Deviation	0.118
Coefficient of Variation	0.127
Mann-Kendall Test	
M-K Test Value (S)	1
Tabulated p-value	N/A
Standard Deviation of S	1.915
Standardized Value of S	0
Approximate p-value	0.5
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

GRO-mw-2	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	5
Number Values Reported (n)	5
Minimum	0.164
Maximum	0.384
Mean	0.306
Geometric Mean	0.291
Median	0.373
Standard Deviation	0.101
Coefficient of Variation	0.33
Mann-Kendall Test	
M-K Test Value (S)	-2
Tabulated p-value	0.408
Standard Deviation of S	4.082
Standardized Value of S	-0.245
Approximate p-value	0.403
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

GRO-mw-3	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	3
Number Values Reported (n)	4
Number Values Missing	1
Number Values Used	3
Minimum	0.05
Maximum	0.05
Mean	0.05
Geometric Mean	0.05
Median	0.05
Standard Deviation	8.498E-18
Coefficient of Variation	N/A
Mann-Kendall Test	
M-K Test Value (S)	0
Tabulated p-value	N/A
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

GRO-mw-4	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	0.0854
Maximum	1.48
Mean	0.375
Geometric Mean	0.276
Median	0.257
Standard Deviation	0.402
Coefficient of Variation	1.072
Mann-Kendall Test	
M-K Test Value (S)	-3
Tabulated p-value	0.431
Standard Deviation of S	11.18
Standardized Value of S	-0.179
Approximate p-value	0.429
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
GRO-mw-5	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	8
Number Values Reported (n)	8
Minimum	0.0459
Maximum	0.228
Mean	0.0948
Geometric Mean	0.0833
Median	0.0858
Standard Deviation	0.0586
Coefficient of Variation	0.618
Mann-Kendall Test	
M-K Test Value (S)	1
Tabulated p-value	0.548
Standard Deviation of S	8.021
Standardized Value of S	0
Approximate p-value	0.5
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

GRO-mw-6	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	9
Number Values Reported (n)	9
Minimum	0.05
Maximum	0.479
Mean	0.253
Geometric Mean	0.21
Median	0.225
Standard Deviation	0.143
Coefficient of Variation	0.567
Mann-Kendall Test	
M-K Test Value (S)	4
Tabulated p-value	0.381
Standard Deviation of S	9.592
Standardized Value of S	0.313
Approximate p-value	0.377
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
GRO-mw-7	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	7
Number Values Reported (n)	7
Minimum	0.0428
Maximum	0.114
Mean	0.0723
Geometric Mean	0.0683
Median	0.0696
Standard Deviation	0.0265
Coefficient of Variation	0.366
Mann-Kendall Test	
M-K Test Value (S)	-13
Tabulated p-value	0.035
Standard Deviation of S	6.658
Standardized Value of S	-1.802
Approximate p-value	0.0358
Statistically significant evidence of a decreasing	
trend at the specified level of significance.	

GRO-mw-8	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	0.0443
Maximum	0.05
Mean	0.0491
Geometric Mean	0.049
Median	0.05
Standard Deviation	0.00233
Coefficient of Variation	0.0474
Mann-Kendall Test	
M-K Test Value (S)	-1
Tabulated p-value	0.5
Standard Deviation of S	3.416
Standardized Value of S	0
Approximate p-value	0.5
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

GRO-mw-9	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	0.05
Maximum	0.1
Mean	0.0592
Geometric Mean	0.057
Median	0.05
Standard Deviation	0.0201
Coefficient of Variation	0.34
Mann-Kendall Test	
M-K Test Value (S)	5
Tabulated p-value	0.235
Standard Deviation of S	4.435
Standardized Value of S	0.902
Approximate p-value	0.184
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

GRO-wc-3							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	2						
Number Values Reported (n)	2						
Minimum	0.157						
Maximum	0.165						
Mean	0.161						
Geometric Mean	0.161						
Median	0.161						
Standard Deviation	0.00566						
Coefficient of Variation	0.0351						
Not enough reported values (n) to provide Mann-Kendall Statistics!							

	Mann-Kendall Trend Test Analysis
User Selected Options	
Date/Time of Computation	ProUCL 5.112/18/2018 10:55:05 AM
From File	Historical GW Results - ProUCL Input_Reviewed.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

DRO-mw-1	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	3
Number Values Reported (n)	3
Minimum	69.5
Maximum	123
Mean	97.33
Geometric Mean	94.75
Median	99.5
Standard Deviation	26.82
Coefficient of Variation	0.276
Mann-Kendall Test	
M-K Test Value (S)	-3
Tabulated p-value	N/A
Standard Deviation of S	1.915
Standardized Value of S	-1.044
Approximate p-value	0.148
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

DRO-mw-2	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	5
Number Values Reported (n)	5
Minimum	11.3
Maximum	187
Mean	50.84
Geometric Mean	26.68
Median	19.5
Standard Deviation	76.19
Coefficient of Variation	1.499
Mann-Kendall Test	
M-K Test Value (S)	-6
Tabulated p-value	0.117
Standard Deviation of S	4.082
Standardized Value of S	-1.225
Approximate p-value	0.11
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
DRO-mw-3	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	4
Number Values Reported (n)	4
Minimum	0.3
Maximum	5.3
Mean	2.313
Geometric Mean	1.419
Median	1.825
Standard Deviation	2.237
Coefficient of Variation	0.967
Mann-Kendall Test	
M-K Test Value (S)	-6
Tabulated p-value	0.042
Standard Deviation of S	2.944
Standardized Value of S	-1.698
Approximate p-value	0.0447
Statistically significant evidence of a decreasing	
trend at the specified level of significance.	

DRO-mw-4	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	1.8
Maximum	43
Mean	10.45
Geometric Mean	6.873
Median	6.17
Standard Deviation	12.35
Coefficient of Variation	1.182
Mann-Kendall Test	
M-K Test Value (S)	-7
Tabulated p-value	0.3
Standard Deviation of S	11.18
Standardized Value of S	-0.537
Approximate p-value	0.296
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
DRO-mw-5	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	8
Number Values Reported (n)	8
Minimum	0.225
Maximum	4.21
Mean	2.598
Geometric Mean	2.046
Median	2.87
Standard Deviation	1.276
Coefficient of Variation	0.491
Mann-Kendall Test	
M-K Test Value (S)	-10
Tabulated p-value	0.138
Standard Deviation of S	8.083
Standardized Value of S	-1.113
Approximate p-value	0.133
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

DRO-mw-6					
General Statistics					
Number or Reported Events Not Used	0				
Number of Generated Events	9				
Number Values Reported (n)	9				
Minimum	4.84				
Maximum	118				
Mean	20.81				
Geometric Mean	11.06				
Median	8.59				
Standard Deviation	36.54				
Coefficient of Variation	1.756				
Mann-Kendall Test					
M-K Test Value (S)	-13				
Tabulated p-value	0.13				
Standard Deviation of S	9.539				
Standardized Value of S	-1.258				
Approximate p-value	0.104				
Insufficient evidence to identify a significant					
trend at the specified level of significance.					
DRO-mw-7					
General Statistics					
Number or Reported Events Not Used	0				
Number of Generated Events	7				
Number Values Reported (n)	7				
Minimum	6.73				
Maximum	21.1				
Mean	13.76				
Geometric Mean	12.94				
Median	12.4				
Standard Deviation	5.05				
Coefficient of Variation	0.367				
Mann-Kendall Test					
M-K Test Value (S)	-1				
Tabulated p-value	0.5				
Standard Deviation of S	6.658				
Standardized Value of S	0				
Approximate p-value	0.5				
Insufficient evidence to identify a significant					
trend at the specified level of significance.					

DRO-mw-8	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	0.239
Maximum	0.577
Mean	0.336
Geometric Mean	0.322
Median	0.3
Standard Deviation	0.121
Coefficient of Variation	0.36
Mann-Kendall Test	
M-K Test Value (S)	6
Tabulated p-value	0.136
Standard Deviation of S	5.228
Standardized Value of S	0.956
Approximate p-value	0.169
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
DRO-mw-9	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	0.189
Maximum	0.577
Mean	0.331
Geometric Mean	0.313
Median	0.302
Standard Deviation	0.129
Coefficient of Variation	0.391
Mann-Kendall Test	
M-K Test Value (S)	12
Tabulated p-value	0.008
Standard Deviation of S	5.228
Standardized Value of S	2.104
Approximate p-value	0.0177
Statistically significant evidence of an increasing	
trend at the specified level of significance.	

DRO-wc-3					
General Statistics					
Number or Reported Events Not Used	0				
Number of Generated Events	2				
Number Values Reported (n)	2				
Minimum	7.67				
Maximum	16.4				
Mean	12.04				
Geometric Mean	11.22				
Median	12.04				
Standard Deviation	6.173				
Coefficient of Variation	0.513				
Not enough reported values (n) to provide Mann-Kendall Statistics!					

	Mann-Kendall Trend Test Analysis
User Selected Options	
Date/Time of Computation	ProUCL 5.112/18/2018 10:55:47 AM
From File	Historical GW Results - ProUCL Input_Reviewed.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

RRO-mw-1	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	2
Number Values Reported (n)	3
Number Values Missing	1
Number Values Used	2
Minimum	4.23
Maximum	4.38
Mean	4.305
Geometric Mean	4.304
Median	4.305
Standard Deviation	0.106
Coefficient of Variation	0.0246

Not enough reported values (n) to provide Mann-Kendall Statistics!

RRO-mw-2	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	5
Number Values Reported (n)	5
Minimum	1.16
Maximum	6.81
Mean	2.8
Geometric Mean	2.296
Median	2.08
Standard Deviation	2.274
Coefficient of Variation	0.812
Mann-Kendall Test	
M-K Test Value (S)	-6
Tabulated p-value	0.117
Standard Deviation of S	4.082
Standardized Value of S	-1.225
Approximate p-value	0.11

Insufficient evidence to identify a significant trend at the specified level of significance.

RRO-mw-3	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	3
Number Values Reported (n)	4
Number Values Missing	1
Number Values Used	3
Minimum	0.25
Maximum	0.992
Mean	0.557
Geometric Mean	0.474
Median	0.43
Standard Deviation	0.387
Coefficient of Variation	0.694
Mann-Kendall Test	
M-K Test Value (S)	-3
Tabulated p-value	N/A
Standard Deviation of S	1.915
Standardized Value of S	-1.044
Approximate p-value	0.148
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

RRO-mw-4	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	9
Number Values Reported (n)	10
Number Values Missing	1
Number Values Used	9
Minimum	0.25
Maximum	1
Mean	0.518
Geometric Mean	0.475
Median	0.488
Standard Deviation	0.232
Coefficient of Variation	0.448
Mann-Kendall Test	
M-K Test Value (S)	11
Tabulated p-value	0.179
Standard Deviation of S	9.539
Standardized Value of S	1.048
Approximate p-value	0.147
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

RRO-mw-5					
General Statistics					
Number or Reported Events Not Used	0				
Number of Generated Events	8				
Number Values Reported (n)	8				
Minimum	0.25				
Maximum	0.568				
Mean	0.383				
Geometric Mean	0.365				
Median	0.391				
Standard Deviation	0.126				
Coefficient of Variation	0.328				
Mann-Kendall Test					
M-K Test Value (S)	13				
Tabulated p-value	0.089				
Standard Deviation of S	7.853				
Standardized Value of S	1.528				
Approximate p-value	0.0632				
Insufficient evidence to identify a significant					
trend at the specified level of significance.					
RRO-mw-6					
General Statistics					
Number or Reported Events Not Used	0				
Number of Generated Events	8				
Number Values Reported (n)	9				
Number Values Missing	1				
Number Values Used	8				
Minimum	0.636				
Maximum	1.41				
Mean	1.01				
Geometric Mean	0.975				
Median	0.98				
Standard Deviation	0.282				
Coefficient of Variation	0.28				
Mann-Kendall Test					
M-K Test Value (S)	4				
Tabulated p-value	0.36				
Standard Deviation of S	8.083				
Standardized Value of S	0.371				
Approximate p-value	0.355				
Insufficient evidence to identify a significant					
trend at the specified level of significance.					

RRO-mw-7	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	7
Number Values Missing	1
Number Values Used	6
Minimum	1.05
Maximum	2.83
Mean	1.787
Geometric Mean	1.693
Median	1.655
Standard Deviation	0.649
Coefficient of Variation	0.363
Mann-Kendall Test	
M-K Test Value (S)	1
Tabulated p-value	0.5
Standard Deviation of S	5.323
Standardized Value of S	0
Approximate p-value	0.5
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
RRO-mw-8	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	0.195
Maximum	0.481
Mean	0.297
Geometric Mean	0.285
Median	0.259
Standard Deviation	0.101
Coefficient of Variation	0.341
Mann-Kendall Test	
M-K Test Value (S)	-4
Tabulated p-value	0.235
Standard Deviation of S	5.228
Standardized Value of S	-0.574
Approximate p-value	0.283
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

RRO-mw-9					
General Statistics					
Number or Reported Events Not Used	0				
Number of Generated Events	6				
Number Values Reported (n)	6				
Minimum	0.157				
Maximum	0.481				
Mean	0.25				
Geometric Mean	0.232				
Median	0.225				
Standard Deviation	0.12				
Coefficient of Variation	0.479				
Mann-Kendall Test					
M-K Test Value (S)	4				
Tabulated p-value	0.235				
Standard Deviation of S	5.228				
Standardized Value of S	0.574				
Approximate p-value	0.283				
Insufficient evidence to identify a significant					
trend at the specified level of significance.					
RRO-wc-3					
General Statistics					
Number or Reported Events Not Used	0				
Number of Generated Events	2				
Number Values Reported (n)	2				
Minimum	1.17				
Maximum	1.56				
Mean	1.365				
Geometric Mean	1.351				
Median	1.365				
Standard Deviation	0.276				
Coefficient of Variation	0.202				
Not enough reported values (n) to provide Mann-Kendall Statistics!					

	Mann-Kendall Trend Test Analysis
User Selected Options	
Date/Time of Computation	ProUCL 5.112/18/2018 10:01:37 AM
From File	Historical GW Results - ProUCL Input_a.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Benzene-mw-1	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	3
Number Values Reported (n)	3
Minimum	0.00423
Maximum	0.00527
Mean	0.0048
Geometric Mean	0.00478
Median	0.0049
Standard Deviation	5.2716E-4
Coefficient of Variation	0.11
Mann-Kendall Test	
M-K Test Value (S)	-1
Tabulated p-value	N/A
Standard Deviation of S	1.915
Standardized Value of S	0
Approximate p-value	0.5
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Benzene-mw-2	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	5
Number Values Reported (n)	5
Minimum	0.0088
Maximum	0.0263
Mean	0.0183
Geometric Mean	0.017
Median	0.0187
Standard Deviation	0.00718
Coefficient of Variation	0.392
Mann-Kendall Test	
M-K Test Value (S)	4
Tabulated p-value	0.242
Standard Deviation of S	4.082
Standardized Value of S	0.735
Approximate p-value	0.231
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Benzene-mw-3	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	4
Number Values Reported (n)	4
Minimum	2.5000E-4
Maximum	2.5000E-4
Mean	2.5000E-4
Geometric Mean	2.5000E-4
Median	2.5000E-4
Standard Deviation	0
Coefficient of Variation	N/A
Mann-Kendall Test	
M-K Test Value (S)	0
Tabulated p-value	0.625
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Benzene-mw-4	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	1.8000E-4
Maximum	5.0000E-4
Mean	2.7900E-4
Geometric Mean	2.6489E-4
Median	2.5000E-4
Standard Deviation	1.0344E-4
Coefficient of Variation	0.371
Mann-Kendall Test	
M-K Test Value (S)	1
Tabulated p-value	0.5
Standard Deviation of S	9.781
Standardized Value of S	0
Approximate p-value	0.5
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Benzene-mw-5	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	8
Number Values Reported (n)	8
Minimum	2.5000E-4
Maximum	0.00111
Mean	4.3125E-4
Geometric Mean	3.6590E-4
Median	2.5000E-4
Standard Deviation	3.0521E-4
Coefficient of Variation	0.708
Mann-Kendall Test	
M-K Test Value (S)	2
Tabulated p-value	0.452
Standard Deviation of S	6.976
Standardized Value of S	0.143
Approximate p-value	0.443
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Benzene-mw-6	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	9
Number Values Reported (n)	9
Minimum	2.5000E-4
Maximum	0.00951
Mean	0.00587
Geometric Mean	0.00432
Median	0.00577
Standard Deviation	0.00306
Coefficient of Variation	0.521
Mann-Kendall Test	
M-K Test Value (S)	2
Tabulated p-value	0.46
Standard Deviation of S	9.592
Standardized Value of S	0.104
Approximate p-value	0.458
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Benzene-mw-7	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	7
Number Values Reported (n)	7
Minimum	3.3000E-4
Maximum	0.00243
Mean	0.00133
Geometric Mean	0.00116
Median	0.0012
Standard Deviation	6.6035E-4
Coefficient of Variation	0.498
Mann-Kendall Test	
M-K Test Value (S)	7
Tabulated p-value	0.191
Standard Deviation of S	6.658
Standardized Value of S	0.901
Approximate p-value	0.184
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Benzene-mw-8	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	2.5000E-4
Maximum	3.2000E-4
Mean	2.6167E-4
Geometric Mean	2.6050E-4
Median	2.5000E-4
Standard Deviation	2.8577E-5
Coefficient of Variation	0.109
Mann-Kendall Test	
M-K Test Value (S)	1
Tabulated p-value	0.5
Standard Deviation of S	3.416
Standardized Value of S	0
Approximate p-value	0.5
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Benzene-mw-9	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	2.5000E-4
Maximum	2.5000E-4
Mean	2.5000E-4
Geometric Mean	2.5000E-4
Median	2.5000E-4
Standard Deviation	0
Coefficient of Variation	N/A
Mann-Kendall Test	
M-K Test Value (S)	0
Tabulated p-value	0.5
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Benzene-wc-3					
General Statistics					
Number or Reported Events Not Used	0				
Number of Generated Events	2				
Number Values Reported (n)	2				
Minimum	0.00482				
Maximum	0.00654				
Mean	0.00568				
Geometric Mean	0.00561				
Median	0.00568				
Standard Deviation	0.00122				
Coefficient of Variation	0.214				
Not enough reported values (n) to provide Mann-Kendall Statistics!					

	Mann-Kendall Trend Test Analysis
User Selected Options	
Date/Time of Computation	ProUCL 5.112/13/2018 12:58:09 PM
From File	Historical GW Results - ProUCL Input.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Toluene-mw-1	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	3
Number Values Reported (n)	3
Minimum	0.0015
Maximum	0.00472
Mean	0.00348
Geometric Mean	0.00311
Median	0.00423
Standard Deviation	0.00174
Coefficient of Variation	0.498
Mann-Kendall Test	
M-K Test Value (S)	1
Tabulated p-value	N/A
Standard Deviation of S	1.915
Standardized Value of S	0
Approximate p-value	0.5
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Toluene-mw-2	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	5
Number Values Reported (n)	5
Minimum	3.0000E-4
Maximum	0.00103
Mean	5.2000E-4
Geometric Mean	4.6972E-4
Median	4.0000E-4
Standard Deviation	2.9402E-4
Coefficient of Variation	0.565
Mann-Kendall Test	
M-K Test Value (S)	-2
Tabulated p-value	0.408
Standard Deviation of S	4.082
Standardized Value of S	-0.245
Approximate p-value	0.403
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Toluene-mw-3	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	4
Number Values Reported (n)	4
Minimum	5.0000E-4
Maximum	5.0000E-4
Mean	5.0000E-4
Geometric Mean	5.0000E-4
Median	5.0000E-4
Standard Deviation	0
Coefficient of Variation	N/A
Mann-Kendall Test	
M-K Test Value (S)	0
Tabulated p-value	0.625
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Toluene-mw-4	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	5.0000E-4
Maximum	0.00434
Mean	8.8400E-4
Geometric Mean	6.2061E-4
Median	5.0000E-4
Standard Deviation	0.00121
Coefficient of Variation	1.374
Mann-Kendall Test	
M-K Test Value (S)	-5
Tabulated p-value	0.364
Standard Deviation of S	5.745
Standardized Value of S	-0.696
Approximate p-value	0.243
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Toluene-mw-5	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	8
Number Values Reported (n)	8
Minimum	4.8000E-4
Maximum	5.0000E-4
Mean	4.9750E-4
Geometric Mean	4.9746E-4
Median	5.0000E-4
Standard Deviation	7.0711E-6
Coefficient of Variation	0.0142
Mann-Kendall Test	
M-K Test Value (S)	-3
Tabulated p-value	0.452
Standard Deviation of S	4.583
Standardized Value of S	-0.436
Approximate p-value	0.331
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Toluene-mw-6	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	9
Number Values Reported (n)	9
Minimum	3.4000E-4
Maximum	8.3800E-4
Mean	4.9644E-4
Geometric Mean	4.8142E-4
Median	5.0000E-4
Standard Deviation	1.4223E-4
Coefficient of Variation	0.286
Mann-Kendall Test	
M-K Test Value (S)	2
Tabulated p-value	0.46
Standard Deviation of S	8.679
Standardized Value of S	0.115
Approximate p-value	0.454
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Toluene-mw-7	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	7
Number Values Reported (n)	7
Minimum	5.0000E-4
Maximum	7.1000E-4
Mean	5.3000E-4
Geometric Mean	5.2568E-4
Median	5.0000E-4
Standard Deviation	7.9373E-5
Coefficient of Variation	0.15
Mann-Kendall Test	
M-K Test Value (S)	-2
Tabulated p-value	0.386
Standard Deviation of S	4
Standardized Value of S	-0.25
Approximate p-value	0.401
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Toluene-mw-8	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	3.1000E-4
Maximum	5.0000E-4
Mean	4.6833E-4
Geometric Mean	4.6171E-4
Median	5.0000E-4
Standard Deviation	7.7567E-5
Coefficient of Variation	0.166
Mann-Kendall Test	
M-K Test Value (S)	5
Tabulated p-value	0.235
Standard Deviation of S	3.416
Standardized Value of S	1.171
Approximate p-value	0.121
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Toluene-mw-9	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	5.0000E-4
Maximum	5.0000E-4
Mean	5.0000E-4
Geometric Mean	5.0000E-4
Median	5.0000E-4
Standard Deviation	0
Coefficient of Variation	N/A
Mann-Kendall Test	
M-K Test Value (S)	0
Tabulated p-value	0.5
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Toluene-wc-3					
General Statistics					
Number or Reported Events Not Used	0				
Number of Generated Events	2				
Number Values Reported (n)	2				
Minimum	3.3000E-4				
Maximum	7.4000E-4				
Mean	5.3500E-4				
Geometric Mean	4.9417E-4				
Median	5.3500E-4				
Standard Deviation	2.8991E-4				
Coefficient of Variation	0.542				
Not enough reported values (n) to provide Mann-Kendall Statistics!					

	Mann-Kendall Trend Test Analysis
User Selected Options	
Date/Time of Computation	ProUCL 5.112/13/2018 12:58:34 PM
From File	Historical GW Results - ProUCL Input.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Ethylbenzene-mw-1	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	3
Number Values Reported (n)	3
Minimum	0.00815
Maximum	0.0107
Mean	0.00918
Geometric Mean	0.00912
Median	0.0087
Standard Deviation	0.00134
Coefficient of Variation	0.146
Mann-Kendall Test	
M-K Test Value (S)	-1
Tabulated p-value	N/A
Standard Deviation of S	1.915
Standardized Value of S	0
Approximate p-value	0.5
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Ethylbenzene-mw-2	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	5
Number Values Reported (n)	5
Minimum	0.00559
Maximum	0.0163
Mean	0.00873
Geometric Mean	0.00796
Median	0.00603
Standard Deviation	0.00455
Coefficient of Variation	0.521
Mann-Kendall Test	
M-K Test Value (S)	0
Tabulated p-value	0.592
Standard Deviation of S	4.082
Standardized Value of S	N/A
Approximate p-value	N/A
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Ethylbenzene-mw-3	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	4
Number Values Reported (n)	4
Minimum	5.0000E-4
Maximum	0.001
Mean	6.2500E-4
Geometric Mean	5.9460E-4
Median	5.0000E-4
Standard Deviation	2.5000E-4
Coefficient of Variation	0.4
Mann-Kendall Test	
M-K Test Value (S)	-3
Tabulated p-value	0.375
Standard Deviation of S	2.236
Standardized Value of S	-0.894
Approximate p-value	0.186
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Ethylbenzene-mw-4	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	0.00602
Maximum	0.0174
Mean	0.00981
Geometric Mean	0.00927
Median	0.00875
Standard Deviation	0.00369
Coefficient of Variation	0.376
Mann-Kendall Test	
M-K Test Value (S)	-13
Tabulated p-value	0.146
Standard Deviation of S	11.18
Standardized Value of S	-1.073
Approximate p-value	0.142
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Ethylbenzene-mw-5	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	8
Number Values Reported (n)	8
Minimum	5.0000E-4
Maximum	0.0032
Mean	0.00141
Geometric Mean	0.0011
Median	0.00105
Standard Deviation	0.00103
Coefficient of Variation	0.728
Mann-Kendall Test	
M-K Test Value (S)	-13
Tabulated p-value	0.089
Standard Deviation of S	7.853
Standardized Value of S	-1.528
Approximate p-value	0.0632
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Ethylbenzene-mw-6	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	9
Number Values Reported (n)	9
Minimum	0.00403
Maximum	0.0382
Mean	0.0137
Geometric Mean	0.0103
Median	0.00926
Standard Deviation	0.0112
Coefficient of Variation	0.82
Mann-Kendall Test	
M-K Test Value (S)	3
Tabulated p-value	0.46
Standard Deviation of S	9.539
Standardized Value of S	0.21
Approximate p-value	0.417
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Ethylbenzene-mw-7	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	7
Number Values Reported (n)	7
Minimum	3.9000E-4
Maximum	0.00107
Mean	5.5000E-4
Geometric Mean	5.1909E-4
Median	5.0000E-4
Standard Deviation	2.3537E-4
Coefficient of Variation	0.428
Mann-Kendall Test	
M-K Test Value (S)	7
Tabulated p-value	0.191
Standard Deviation of S	6.506
Standardized Value of S	0.922
Approximate p-value	0.178
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Ethylbenzene-mw-8	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	3.5000E-4
Maximum	5.0000E-4
Mean	4.7500E-4
Geometric Mean	4.7114E-4
Median	5.0000E-4
Standard Deviation	6.1237E-5
Coefficient of Variation	0.129
Mann-Kendall Test	
M-K Test Value (S)	5
Tabulated p-value	0.235
Standard Deviation of S	3.416
Standardized Value of S	1.171
Approximate p-value	0.121
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Ethylbenzene-mw-9	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	5.0000E-4
Maximum	5.0000E-4
Mean	5.0000E-4
Geometric Mean	5.0000E-4
Median	5.0000E-4
Standard Deviation	0
Coefficient of Variation	N/A
Mann-Kendall Test	
M-K Test Value (S)	0
Tabulated p-value	0.5
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Ethylbenzene-wc-3					
General Statistics					
Number or Reported Events Not Used	0				
Number of Generated Events	2				
Number Values Reported (n)	2				
Minimum	0.00308				
Maximum	0.00336				
Mean	0.00322				
Geometric Mean	0.00322				
Median	0.00322				
Standard Deviation	1.9799E-4				
Coefficient of Variation	0.0615				
Not enough reported values (n) to provide Mann-Kendall Statistics!					

	Mann-Kendall Trend Test Analysis
User Selected Options	
Date/Time of Computation	ProUCL 5.112/18/2018 10:56:12 AM
From File	Historical GW Results - ProUCL Input_Reviewed.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Xylenes-mw-1	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	3
Number Values Reported (n)	3
Minimum	0.288
Maximum	0.343
Mean	0.308
Geometric Mean	0.307
Median	0.292
Standard Deviation	0.0307
Coefficient of Variation	0.0997
Mann-Kendall Test	
M-K Test Value (S)	-1
Tabulated p-value	N/A
Standard Deviation of S	1.915
Standardized Value of S	0
Approximate p-value	0.5
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Xylenes-mw-2	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	5
Number Values Reported (n)	5
Minimum	0.0236
Maximum	0.0633
Mean	0.0378
Geometric Mean	0.0353
Median	0.0302
Standard Deviation	0.0164
Coefficient of Variation	0.434
Mann-Kendall Test	
M-K Test Value (S)	-2
Tabulated p-value	0.408
Standard Deviation of S	4.082
Standardized Value of S	-0.245
Approximate p-value	0.403
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Xylenes-mw-3	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	4
Number Values Reported (n)	4
Minimum	0.0015
Maximum	0.0071
Mean	0.0029
Geometric Mean	0.00221
Median	0.0015
Standard Deviation	0.0028
Coefficient of Variation	0.966
Mann-Kendall Test	
M-K Test Value (S)	-3
Tabulated p-value	0.375
Standard Deviation of S	2.236
Standardized Value of S	-0.894
Approximate p-value	0.186
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Xylenes-mw-4	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	0.0162
Maximum	0.124
Mean	0.0346
Geometric Mean	0.0276
Median	0.0228
Standard Deviation	0.0326
Coefficient of Variation	0.942
Mann-Kendall Test	
M-K Test Value (S)	-7
Tabulated p-value	0.3
Standard Deviation of S	11.18
Standardized Value of S	-0.537
Approximate p-value	0.296
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Xylenes-mw-5	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	8
Number Values Reported (n)	8
Minimum	7.4000E-4
Maximum	0.0039
Mean	0.00215
Geometric Mean	0.00194
Median	0.00211
Standard Deviation	9.9069E-4
Coefficient of Variation	0.461
Mann-Kendall Test	
M-K Test Value (S)	-13
Tabulated p-value	0.089
Standard Deviation of S	8.021
Standardized Value of S	-1.496
Approximate p-value	0.0673
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Xylenes-mw-6	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	9
Number Values Reported (n)	9
Minimum	0.00155
Maximum	0.105
Mean	0.0406
Geometric Mean	0.0263
Median	0.0376
Standard Deviation	0.0322
Coefficient of Variation	0.793
Mann-Kendall Test	
M-K Test Value (S)	-12
Tabulated p-value	0.13
Standard Deviation of S	9.592
Standardized Value of S	-1.147
Approximate p-value	0.126
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Xylenes-mw-7	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	7
Number Values Reported (n)	7
Minimum	2.0800E-4
Maximum	0.00357
Mean	0.00191
Geometric Mean	0.00146
Median	0.0015
Standard Deviation	0.00122
Coefficient of Variation	0.637
Mann-Kendall Test	
M-K Test Value (S)	0
Tabulated p-value	0.5
Standard Deviation of S	6.583
Standardized Value of S	N/A
Approximate p-value	N/A
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Xylenes-mw-8	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	0.0015
Maximum	0.0015
Mean	0.0015
Geometric Mean	0.0015
Median	0.0015
Standard Deviation	2.375E-19
Coefficient of Variation	N/A
Mann-Kendall Test	
M-K Test Value (S)	0
Tabulated p-value	0.5
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A
Insufficient evidence to identify a significant	
trend at the specified level of significance.	
Xylenes-mw-9	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	6
Number Values Reported (n)	6
Minimum	0.0015
Maximum	0.0015
Mean	0.0015
Geometric Mean	0.0015
Median	0.0015
Standard Deviation	2.375E-19
Coefficient of Variation	N/A
Mann-Kendall Test	
M-K Test Value (S)	0
Tabulated p-value	0.5
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A
Insufficient evidence to identify a significant	
trend at the specified level of significance.	

Xylenes-wc-3					
General Statistics					
Number or Reported Events Not Used	0				
Number of Generated Events	2				
Number Values Reported (n)	2				
Minimum	0.0316				
Maximum	0.305				
Mean	0.168				
Geometric Mean	0.0982				
Median	0.168				
Standard Deviation	0.193				
Coefficient of Variation	1.149				
Not enough reported values (n) to provide Mann-Kendall Statistics!					

Location	Sample Date	GRO	D_GRO	DRO	D_DRO	RRO	D_RRO	Benzene	D_Benzene	Toluene	D_Toluene	Ethylbenzene	D_Ethylbenzene	Xylenes	D_Xylenes
MW-1	09/2006	0.88	1	123	1	4.23	1	0.0049	1	0.0015	1	0.0087	1	0.292	1
MW-1	09/2011	0.839	1	99.5	1			0.00527	1	0.00472	1	0.0107	1	0.343	1
MW-1	09/2012	1.06	1	69.5	1	4.38	1	0.00423	1	0.00423	1	0.00815	1	0.288	1
MW-2	09/2010	0.234	1	187	1	6.81	1	0.0088	1	0.00103	1	0.00603	1	0.0302	1
MW-2	09/2012	0.377	1	19.5	1	2.08	1	0.0187	1	0.0004	1	0.0097	1	0.0449	1
MW-2	06/2013	0.384	1	19.9	1	2.11	1	0.0239	1	0.0003	1	0.00559	1	0.02702	1
MW-2	09/2015	0.373	1	11.3	1	1.16	1	0.0263	1	0.00037	1	0.0163	1	0.06333	1
MW-2	10/2017	0.164	0	16.5	1	1.84	1	0.0138	1	0.0005	0	0.00601	1	0.0236	1
MW-3	11/2003			5.3	1			0.00025	0	0.0005	0	0.001	1	0.0071	1
MW-3	09/2004	0.05	0	2.71	1	0.992	1	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-3	09/2006	0.05	0	0.94	1	0.43	1	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-3	09/2010	0.05	0	0.3	0	0.25	0	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-4	09/2004	0.354	1	6.07	1	0.25	0	0.00025	0	0.0005	0	0.0073	1	0.0162	1
MW-4	09/2006	0.17	1	18.5	1	0.58	1	0.00025	0	0.0005	0	0.0094	1	0.023	1
MW-4	09/2010	1.48	1	43	1	0.484	1	0.00025	0	0.00434	1	0.0174	1	0.124	1
MW-4	09/2011	0.0854	1	3.37	1			0.00018	1	0.0005	1	0.00928	1	0.0271	1
MW-4	09/2012	0.278	1	3.82	1	0.4	1	0.00043	1	0.0005	0	0.0113	1	0.0339	1
MW-4	06/2013	0.244	1	9.39	1	1	1	0.00025	1	0.0005	0	0.00822	1	0.0226	1
MW-4	08/2014	0.251	1	1.8	1	0.25	0	0.00025	0	0.0005	0	0.00635	1	0.0182	1
MW-4	09/2015	0.263	1	6.27	1	0.488	1	0.0005	1	0.0005	0	0.0147	1	0.0445	1
MW-4	10/2017	0.458	1	7.55	1	0.505	1	0.00018	1	0.0005	0	0.00808	1	0.01973	1
MW-4	10/2018	0.164	1	4.73	1	0.706	0	0.00025	0	0.0005	0	0.00602	1	0.017	1
MW-5	09/2004	0.228	1	4.21	1	0.25	0	0.00025	0	0.0005	0	0.0032	1	0.0039	1
MW-5	09/2006	0.06	1	3.44	1	0.25	0	0.00025	0	0.0005	0	0.0022	1	0.002	1
MW-5	09/2012	0.0716	1	3.14	1	0.431	1	0.00111	1	0.0005	0	0.00229	1	0.00312	1
MW-5	06/2013	0.0459	1	1.61	1	0.484	1	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-5	08/2014	0.05	0	0.225	1	0.25	0	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-5	09/2015	0.103	1	2.6	1	0.351	1	0.00057	1	0.00048	1	0.00096	1	0.00223	1
MW-5	10/2017	0.1	0	3.53	1	0.568	1	0.00052	1	0.0005	0	0.00113	1	0.00222	1
MW-5	10/2018	0.05	0	2.03	1	0.481	0	0.00025	0	0.0005	0	0.0005	0	0.00074	1
MW-6	09/2006	0.3	1	11.2	1	0.9	1	0.0076	1	0.0005	0	0.0155	1	0.059	1
MW-6	09/2010	0.172	1	12.7	1	0.636	1	0.00367	1	0.000838	1	0.00926	1	0.0382	1
MW-6	09/2011	0.105	1	118	1			0.00418	1	0.00034	1	0.00418	1	0.0185	1
MW-6	09/2012	0.479	1	8.36	1	1.09	1	0.00951	1	0.00039	1	0.0233	1	0.105	1
MW-6	06/2013	0.225	1	5.46	1	0.813	1	0.00577	1	0.0005	0	0.00486	1	0.0186	1
MW-6	08/2014	0.05	0	6.94	1	1.41	1	0.00434	1	0.0005	0	0.00403	1	0.0183	1
MW-6	09/2015	0.305	1	8.59	1	1.06	1	0.00823	1	0.0004	1	0.0155	1	0.069	1
MW-6	10/2017	0.2	1	11.2	1	1.39	1	0.00924	1	0.0005	0	0.0084	1	0.0376	1
MW-6	10/2018	0.441	1	4.84	1	0.777	0	0.00025	0	0.0005	0	0.0382	1	0.00155	1
MW-7	09/2011	0.0854	1	19.6	1			0.00107	1	0.0005	0	0.00048	1	0.00352	1
MW-7	09/2012	0.0937	1	12.4	1	1.85	1	0.0012	1	0.0005	0	0.0005	1	0.00139	1
MW-7	06/2013	0.114	1	10.5	1	1.46	1	0.00126	1	0.00071	1	0.00039	1	0.0017	1
MW-7	08/2014	0.0508	1	6.73	1	1.05	1	0.00033	1	0.0005	0	0.0005	0	0.0015	0
MW-7	09/2015	0.0696	1	14.0	1	2.19	1	0.00243	1	0.0005	0	0.00052	1	0.000208	1
MW-7	10/2017	0.05	0	21.1	1	2.83	1	0.00114	1	0.0005	0	0.00039	1	0.0015	1
MW-7	10/2018	0.0428	1	12.0	1	1.34	1	0.00186	1	0.0005	0	0.00107	1	0.00357	1
MW-8	09/2012	0.05	0	0.288	1	0.339	1	0.00025	0	0.00031	1	0.00035	1	0.0015	0

Location	Sample Date	GRO	D_GRO	DRO	D_DRO	RRO	D_RRO	Benzene	D_Benzene	Toluene	D_Toluene	Ethylbenzene	D_Ethylbenzene	Xylenes	D_Xylenes
MW-8	06/2013	0.05	0	0.3	0	0.267	1	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-8	08/2014	0.05	0	0.3	0	0.25	0	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-8	09/2015	0.0443	1	0.312	1	0.25	0	0.00032	1	0.0005	0	0.0005	0	0.0015	0
MW-8	10/2017	0.05	0	0.239	1	0.195	1	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-8	10/2018	0.05	0	0.577	0	0.481	0	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-9	09/2012	0.05	0	0.189	1	0.199	1	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-9	06/2013	0.05	0	0.3	0	0.165	1	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-9	08/2014	0.05	0	0.3	0	0.25	0	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-9	09/2015	0.0551	1	0.314	1	0.25	0	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-9	10/2017	0.1	0	0.303	0	0.157	1	0.00025	0	0.0005	0	0.0005	0	0.0015	0
MW-9	10/2018	0.05	0	0.577	0	0.481	0	0.00025	0	0.0005	0	0.0005	0	0.0015	0
WC-3	09/2015	0.165	1	16.4	1	1.56	1	0.00482	1	0.00074	1	0.00308	1	0.305	1
WC-3	10/2017	0.157	0	7.67	1	1.17	1	0.00654	1	0.00033	1	0.00336	1	0.0316	1

IMPORTANT INFORMATION

Important Information

About Your Geotechnical/Environmental Report

More construction problems are caused by site subsurface conditions than any other factor. The following suggestions and observations are offered to help you manage your risks.

HAVE REALISTIC EXPECTATIONS.

If you have never before dealt with geotechnical or environmental issues, you should recognize that site exploration identifies actual subsurface conditions at those points where samples are taken, at the time they are taken. The data derived are extrapolated by the consultant, who then applies judgment to render an opinion about overall subsurface conditions; their reaction to construction activity; appropriate design of foundations, slopes, impoundments, and recovery wells; and other construction and/or remediation elements. Even under optimal circumstances, actual conditions may differ from those inferred to exist, because no consultant, no matter how qualified, and no subsurface program, no matter how comprehensive, can reveal what is hidden by earth, rock, and time.

DEVELOP THE SUBSURFACE EXPLORATION PLAN WITH CARE.

The nature of subsurface explorations—the types, quantities, and locations of procedures used—in large measure determines the effectiveness of the geotechnical/environmental report and the design based upon it. The more comprehensive a subsurface exploration and testing program, the more information it provides to the consultant, helping to reduce the risk of unanticipated conditions and the attendant risk of costly delays and disputes. Even the cost of subsurface construction may be lowered.

Developing a proper subsurface exploration plan is a basic element of geotechnical/environmental design that should be accomplished jointly by the consultant and the client (or designated professional representatives). This helps the parties involved recognize mutual concerns and makes the client aware of the technical options available. Clients who develop a subsurface exploration plan without the involvement and concurrence of a consultant may be required to assume responsibility and liability for the plan's adequacy.

READ GENERAL CONDITIONS CAREFULLY.

Most consultants include standard general contract conditions in their proposals. One of the general conditions most commonly employed is to limit the consulting firm's liability. Known as a "risk allocation" or "limitation of liability," this approach helps prevent problems at the beginning and establishes a fair and reasonable framework for handling them should they arise.

Various other elements of general conditions delineate your consultant's responsibilities. These are used to help eliminate confusion and misunderstandings, thereby helping all parties recognize who is responsible for different tasks. In all cases, read your consultant's general conditions carefully and ask any questions you may have.

HAVE YOUR CONSULTANT WORK WITH OTHER DESIGN PROFESSIONALS.

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a consultant's report. To help avoid misinterpretations, retain your consultant to work with other project design professionals who are affected by the geotechnical/environmental report. This allows a consultant to explain report implications to design professionals affected by them, and to review their plans and specifications so that issues can be dealt with adequately. Although some other design professionals may be familiar with geotechnical/environmental concerns, none knows as much about them as a competent consultant.

OBTAIN CONSTRUCTION MONITORING SERVICES.

Most experienced clients also retain their consultant to serve during the construction phase of their projects. Involvement during the construction phase is particularly important because this permits the consultant to be on hand quickly to evaluate unanticipated conditions, conduct additional tests if required, and when necessary, recommend alternative solutions to problems. The consultant can also monitor the geotechnical/environmental work performed by contractors. It is essential to recognize that the construction recommendations included in a 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.

Because actual subsurface conditions can be discerned only during earthwork and/or drilling, design consultants need to observe those conditions in order to provide their recommendations. Only the consultant who prepares the report is fully familiar with the background information needed to determine whether or not the report's recommendations are valid. The consultant submitting the report cannot assume responsibility or liability for the adequacy of preliminary recommendations if another party is retained to observe construction.

REALIZE THAT ENVIRONMENTAL ISSUES MAY NOT HAVE BEEN ADDRESSED.

If you have requested only a geotechnical engineering proposal, it will not include services needed to evaluate the likelihood of contamination by hazardous materials or other pollutants. Given the liabilities involved, it is prudent practice to always have a site reviewed from an environmental viewpoint. A consultant cannot be responsible for failing to detect contaminants when the services needed to perform that function are not being provided.

ONE OF THE OBLIGATIONS OF YOUR CONSULTANT IS TO PROTECT THE SAFETY, PROPERTY, AND WELFARE OF THE PUBLIC.

A geotechnical/environmental investigation will sometimes disclose the existence of conditions that may endanger the safety, health, property, or welfare of the public. Your consultant may be obligated under rules of professional conduct, or statutory or common law, to notify you and others of these conditions.

RELY ON YOUR CONSULTANT FOR ADDITIONAL ASSISTANCE.

Your consulting firm is familiar with several techniques and approaches that can be used to help reduce risk exposure for all parties to a construction project, from design through construction. Ask your consultant, not only about geotechnical and environmental issues, but others as well, to learn about approaches that may be of genuine benefit.

The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland