FINAL

2019 Groundwater Monitoring Program Report

Kenai Peninsula Sites

Alaska

Swanson River Field

Kenai Peninsula, Alaska

Prepared For:

Hilcorp Alaska, LLC

December 2019

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Swanson River Field

Kenai Peninsula, Alaska

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ACRONYMS AND ABBREVIATIONS

°C	degree(s) Celsius
µg/L	microgram(s) per liter
%	percent
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
Brice	Brice Environmental Services Corporation
BTEX	benzene, toluene, ethylbenzene, and total xylenes
btoc	below top of casing
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
GAC	granular activated carbon
GRO	gasoline-range organics
H	Analyte result is considered an estimated value and potentially biased low because the sample was prepared and/or analyzed outside of holding time.
HC	hydrocarbon
Hilcorp	Hilcorp Alaska, LLC
ID	Identification
IDW	investigation-derived waste
J (±)	Analyte result is considered an estimated value because the level is above the detection limit and below the limit of quantitation, or the analyte result is considered an estimated value biased high/low due to a QC failure.
LNAPL	light non-aqueous phase liquid
LOQ	limit of quantification
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
NAVD88	North American Vertical Datum of 1988
ND	non-detect
Oil Risk	Oil Risk Consultants
PAH	polycyclic aromatic hydrocarbons
POL	petroleum, oil, and lubricant
PPE	personal protective equipment
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
SIM	selected ion monitoring
SLR	SLR International Corporation
SRF	Swanson River Field
TS	Tank Setting
TSCA	Toxic Substance Control Act
VOC	volatile organic compound

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1.0 INTRODUCTION

This document has been prepared by Brice Environmental Services Corporation (Brice) for Hilcorp Alaska, LLC (Hilcorp) to describe work performed at Hilcorp's Swanson River Field (SRF) (Figure 1). During June and July 2019, Brice conducted groundwater monitoring activities at seven SRF Tank Setting (TS) units (Figure 2) under the Alaska Department of Environmental Conservation (ADEC) conditionally approved Work Plan, *2019 Groundwater Monitoring Program Work Plan, Swanson River Field Contaminated Sites, Kenai, Alaska,* prepared in April 2019 (Brice 2019a), hereinafter referred to as the Work Plan. Conditional ADEC approval was received in the ADEC letter dated 2 July 2019 (ADEC 2019). Note that though the ADEC letter addresses the Kenai Gas Field sites specifically, the conditions discussed in the letter and its attachment were applied to all of the sites in the Hilcorp Contaminated Sites groundwater monitoring program (including SRF), per correspondence with ADEC on 20 June 2019.

The SRF project area includes seven TS units: TS 1-4, TS 1-9, TS 1-27, TS 1-33, TS 2-15, TS 3-4, and TS 3-9. SRF is located at Milepost 17.5 on Swanson River Road in Sterling, Alaska, on a 12-square-mile parcel of land leased from the U.S. Fish and Wildlife Service within the boundaries of the Kenai National Wildlife Refuge. SRF is an oil and gas unit managed by the U.S. Bureau of Land Management. Hilcorp took over SRF operations from Union Oil Company of California in 2012.

Monitoring well installation at the SRF TS units began in 1989, following investigations of contaminated soil at each site. By 1990, 53 monitoring wells were installed across the seven TS units, focusing on hydrocarbon-based contaminants. In 2002, an additional 23 monitoring wells were installed based on groundwater monitoring results. Monitoring wells were generally installed around each TS and within flare pits to monitor potential releases.

Table 1-1 lists the ADEC File Numbers and ADEC Hazard Identification Numbers of the seven TS units included in the 2019 groundwater sampling effort at SRF.

Table 1-1: Site Name and ADEC Reference Summary

Site Name	ADEC File Number	ADEC Hazard ID Number
Swanson River Field		
SRF TS 1-4	2334.38.018	441
SRF TS 1-9	2334.38.019	448
SRF TS 1-27	2334.38.020	442
SRF TS 1-33	2334.38.021	443
SRF TS 2-15	2334.38.022	444
SRF TS 3-4	2334.38.023	445
SRF TS 3-9	2334.38.024	446

Notes:
For definitions, see the Acronyms and Abbreviations section.

1.1 Purpose and Organization of Report

This Report describes the 2019 groundwater monitoring activities performed at seven SRF TS units and has been organized into the following sections:

- Section 1.0 introduces the document purpose, organization, and project objectives.
- Section 2.0 provides the project regulatory criteria.
- Section 3.0 describes field activities including mobilization and site preparation, monitoring well maintenance and inspections, groundwater gauging, groundwater sampling, decontamination, waste management, demobilization, and Work Plan deviations.
- Section 4.0 provides site-specific geology and hydrogeology, previous investigations and monitoring activities, 2019 results (monitoring well inspections and maintenance, groundwater gauging, and groundwater sampling analytical results), recommendations for each SRF TS, quality assurance (QA)/quality control (QC), and analytical data quality.
- Section 5.0 lists the references cited in the document.
- Appendix A includes figures presenting groundwater gauging results, estimated groundwater flow directions, and monitoring well locations and analytical results.
- Appendix B contains data tables for each SRF TS, including groundwater elevation measurements, water quality parameters, and compiled groundwater analytical data (historical and 2019 results).
- Appendix C presents a photographic log, providing visual documentation of project activities.
- Appendix D contains scanned copies of the project field forms, including field instrument calibration forms, well gauging forms, and well purge and sampling forms.
- Appendix E contains scanned copies of the project logbooks and notes.
- Appendix F includes the data quality summary report, sample summary, complete 2019 analytical data tables, and a completed ADEC Laboratory Data Review Checklist for each laboratory data package.
- Appendix G includes the electronic laboratory analytical data packages.

1.2 Project Objectives

The objective of the 2019 field effort was to conduct groundwater monitoring at SRF. To accomplish this objective, the following tasks were completed:

- Mobilization and site setup
- Monitoring well inspections and maintenance
- Monitoring well gauging
- Groundwater sampling
- Sample handling and chain-of-custody
- Decontamination of sampling equipment
- Waste management
- Field documentation

2.0 REGULATORY CRITERIA

Groundwater analytical results were evaluated against the ADEC Table C groundwater cleanup levels presented in Title 18 of the Alaska Administrative Code (AAC), Chapter 75, Section 345 (18 AAC 75.345), Table C (ADEC 2018). Current ADEC Table C groundwater cleanup levels are presented in Table 2-1.

Table 2-1: Groundwater Cleanup Levels

	Analyte	Cleanup Level[1] (µg/L)
POLs		
	GRO	2,200
Petroleum-related VOCs	Benzene	4.6
	Toluene	1,100
	Ethylbenzene	15
	Total xylenes	190
	n-Butylbenzene	1,000
	sec-Butylbenzene	2,000
	tert-Butylbenzene	690
	Isopropylbenzene (cumene)	450
	Naphthalene	1.7
	1,2,4-Trimethylbenzene	56
	1,3,5-Trimethylbenzene	60
	Ethylene glycol	40,000

	Analyte	Cleanup Level[1] (µg/L)
PAH	1-Methylnaphthalene	11
	2-Methylnaphthalene	36
	Acenaphthene	530
	Acenaphthylene	260
	Anthracene	43
	Benz[a]anthracene	0.30
	Benzo[a]pyrene	0.25
	Benzo[b]fluoranthene	2.5
	Benzo[g,h,i]perylene	0.26
	Benzo[k]fluoranthene	0.80
	Chrysene	2.0
	Dibenz[a,h]anthracene	0.25
	Fluoranthene	260
	Fluorene	290
	Indeno[1,2,3-cd]pyrene	0.19
	Naphthalene	1.7
	Phenanthrene	170
	Pyrene	120

Notes:
For definitions, see the Acronyms and Abbreviations section.
[1] Groundwater cleanup levels as listed in 18 AAC 75.345, Table C (ADEC 2018).

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3.0 FIELD ACTIVITIES

This section describes the work performed at SRF during the June and July 2019 field effort. Work conducted at TS 1-4, TS 1-9, TS 1-27, TS 1-33, TS 2-15, TS 3-4, and TS 3-9 included monitoring well gauging, monitoring well inspections and maintenance, and sampling of groundwater monitoring wells. All field and sampling procedures were performed in accordance with the Work Plan (ADEC 2019; Brice 2019a) and ADEC's *Field Sampling Guidance* (ADEC 2017), except for the deviations presented in Section 3.8.

3.1 Mobilization and Site Preparation

The Brice crew mobilized by vehicle from Anchorage to Kenai on 26 June 2019 and arrived onsite at SRF on 27 June 2019. Site preparation activities included glassware inventory, coordination with onsite Hilcorp personnel, and site safety orientation. SRF well condition observations and well gauging activities were conducted on 27 through 29 June and 3 July 2019. Sampling and maintenance activities were conducted from 27 June through 13 July 2019.

3.2 Monitoring Well Inspections and Maintenance

Monitoring wells were inspected at each of the seven SRF TS units, including inspection of the protective monument, inner casing, and lock. The condition of each monitoring well was documented on the groundwater sampling form, including any present condition that may require maintenance (e.g., significant frost-heaving, locks that are broken or difficult to open, or missing caps). In addition, maintenance was performed as needed and recorded in the field logbook or on field forms. Where well casings had heaved to a point hindering monument closure and/or locking, the polyvinyl chloride (PVC) riser was cut to a point allowing secure closure and locking.

Monitoring well inspection observations and any required maintenance are summarized in site-specific tables in Section 4.0. Field forms are included in Appendix D, and logbook notes are included in Appendix E. Photographs of monitoring wells are included in Appendix C.

3.3 Groundwater Gauging

Upon arrival at the TS units, all monitoring wells were located and inspected, and the water levels were measured to 0.01 foot relative to a mark on the top of the well casing using an electronic water level meter or an oil-water interface probe (for wells where light non-aqueous phase liquid [LNAPL] was suspected). Water levels of all monitoring wells at each TS unit were gauged within 2 hours of each other, unless otherwise noted, and are included in Tables B1-1, B2-1, B3-1, B4-1, B5-1, B6-1, and B7-1 in Appendix B. Groundwater gauging results and interpreted groundwater flow directions for each TS unit are presented on Figures 3, 5, 7, 9, 11, 13, and 15 and discussed in Section 4.0.

Interpreted groundwater flow directions are considered estimates for several reasons. The glaciolacustrine stratigraphy underlying the sites sampled in 2019 is complex and heterogeneous. Interbedded silts and sands create aquitards, perched aquifers, artesian aquifers, and zones of high hydraulic conductivity. These geologic and hydrologic characteristics contribute to natural variability in potentiometric head that may be inconsistent with simple, planar surfaces representing groundwater elevation. Further variability in measured groundwater elevations may be introduced by unquantified change in monitoring well casing elevations due to heaving or frost-jacking. If a well monument could no longer be closed due to severe heaving, the PVC casing was cut, and the top-of-casing must be resurveyed so that groundwater elevation from gauging could be used with relative confidence. Lesser amounts of heaving may not be discernible without resurveying a well but may have the potential to cause more than 0.01 foot of elevation change in the casing without visually obvious effect.

Groundwater contours for SRF sites were generated using Surfer 16 modeling software and kriging methodology. Calculated groundwater elevations are presented in feet referenced to the North American Vertical Datum of 1988 (NAVD88). Calculated groundwater elevations and interpreted potentiometric surfaces are presented on Figures 3, 5, 7, 9, 11, 13, and 15. Groundwater elevations are listed in Appendix B.

3.4 Groundwater Sampling

Groundwater sampling activities were conducted at SRF TS units in June and July 2019. Groundwater samples were submitted for the analysis of gasoline-range organics (GRO); petroleum-related volatile organic compounds (VOCs) including benzene, toluene, ethylbenzene, and total xylenes (BTEX); and/or polycyclic aromatic hydrocarbons (PAH). Two samples at SRF TS 1-4 were submitted for ethylene glycol analysis. Groundwater analytical results are presented on Figures 4, 6, 8, 10, 12, 14, and 16.

Groundwater samples were collected from monitoring wells in accordance with low-flow sampling procedures based on U.S. Environmental Protection Agency (EPA) and ADEC guidelines (EPA 2010; ADEC 2017) and the Work Plan (ADEC 2019; Brice 2019a). Monitoring wells were purged and sampled using a QED 1.75-inch-diameter pneumatic bladder pump and Teflon-lined tubing. The tubing for each well was left in place and tied to the well caps or plugs to prevent it from falling downhole. Groundwater quality parameters were monitored using a YSI Model 556 Multi-Parameter with flow-through cell and turbidimeter. Samples were collected either when three monitoring well volumes had been purged, or when at least three water quality parameters stabilized (four when using temperature). Water quality parameters are presented in Tables B1-2, B2-2, B3-2, B4-2, B5-2, B6-2, and B7-2 in Appendix B, and groundwater sampling forms are included in Appendix D.

Groundwater was collected from the tubing directly into laboratory-supplied, preserved (when applicable) sample jars. The samples were sealed, labeled, and immediately placed in a cooler with gel ice to maintain a temperature of 0 to 6 degrees Celsius (°C). A temperature blank was stored with all samples, and a trip blank was stored with any volatile samples. A chain-of-custody form was prepared and

accompanied the samples from the time of collection until the samples were delivered to the ADEC-certified laboratory, SGS North America Inc., in Anchorage, Alaska.

3.5 Decontamination

Reusable, non-dedicated sampling equipment requiring decontamination, including the electronic water level meter or oil-water interface probe, was decontaminated between uses at each monitoring well. Disposable tubing was used for purging and sampling in wells where dedicated tubing was not provided and was left as dedicated tubing in the well.

Decontamination procedures for reusable, non-dedicated sampling equipment consisted of washing the equipment with a mixture of potable water and Alconox, followed by a deionized water rinse. The water generated during decontamination activities of sampling equipment was combined with purge water and collected in U.S. Department of Transportation (DOT)-approved 5-gallon buckets with screw-top lids.

3.6 Waste Management

Wastes generated during the 2019 field activities included purge and decontamination water, recovered product, LNAPL-sorbent socks, and investigation-derived waste (IDW) such as personal protective equipment (PPE). Waste streams generated from activities conducted at SRF are summarized in Table 3-1.

Table 3-1: Waste Streams

Waste Stream	Waste Classification	Quantity	Container	Disposal	Notes
Liquid IDW	Non-TSCA/RCRA regulated	92 gallons	DOT-approved 5-gallon buckets with screw-top lids	GAC	Purge and decontamination water was treated onsite through a GAC filtration unit. Treated water was drained into a secondary container and verified to be absent of sheen prior to discharge to a vegetated area of the site, at least 100 feet from drinking water sources and surface water bodies.
Liquid IDW-TS 1-4	Non-exempt, ethylene glycol	5.5 gallons	DOT-approved 5-gallon bucket with screw-top lid	Hilcorp	Purge water from SRF TS 1-4 impacted with ethylene glycol does not readily adsorb to activated carbon. Transferred to Hilcorp SRF Grind and Inject Facility for storage and subsequent disposal.
LNAPL	Non-exempt	10 gallons	DOT-approved 5-gallon bucket with screw-top lid	Hilcorp	Transferred to Hilcorp for recycling in the process stream.
LNAPL-Sorbent Socks	Non-TSCA/RCRA regulated	8 socks	Polyethylene "Oily Waste" bags contained in 5-gallon buckets with screw-top lids	Hilcorp	Transferred to Hilcorp SRF Grind and Inject Facility for storage and subsequent disposal.

Table 3-1: Waste Streams

Waste Stream	Waste Classification	Quantity	Container	Disposal	Notes
Solid Waste	Non-TSCA/RCRA regulated	4 bags	Heavy 42-gallon contractor garbage bags	Kenai Transfer Station	General refuse included nitrile gloves and other expended PPE, paper towels, and disposable tubing.
Spent GAC	Non-TSCA/RCRA regulated	11 gallons	DOT-approved 5-gallon bucket with screw-top lid	Hilcorp	Hilcorp facilitated disposal.

Notes:
For definitions, see the Acronyms and Abbreviations section.

3.7 Demobilization

Following completion of all field activities, demobilization of field crew and equipment from SRF by vehicle was completed 13 July 2019.

3.8 Work Plan Deviations

The following deviations from the Work Plan (ADEC 2019; Brice 2019a) occurred during the 2019 groundwater monitoring activities:

- Based on ADEC's conditional acceptance of the Work Plan (ADEC 2019; Brice 2019a), petroleum-related VOCs (including BTEX) and PAH were reincorporated into the sampling program to provide verification of 2017 analytical data and defensibility of analytes removed from the sampling program based on 2017 and 2019 analytical results. Of the petroleum-related VOCs and PAH originally added to the analytical suite in 2017, per ADEC request and based on revisions to the ADEC *Field Sampling Guidance* (ADEC 2017), analytes with concentrations observed below 20 percent (%) of ADEC Table C groundwater cleanup levels after two sampling events will be removed from the analytical suite; analytes with concentrations observed to exceed the 20% screening limit will be retained for future sampling events.
    - The Work Plan stated well FS1-33W was to be removed from the groundwater sampling program and was listed as a gauge-only well for 2019 activities; however, the well was added back into the groundwater sampling program due to the reincorporation of petroleum-related VOCs (including BTEX) and PAH.
- A downhole camera was utilized during this monitoring event as a visual aid for various reasons including verification of screened intervals, removal of obstructions, investigation of anomalous gauge data, and confirmation of suspected sheared risers.
- Flaring activity at the TS 1-4 flare pit interrupted purging and sampling activities at wells FS1-4E and FS1-4H. Due to the likelihood of flaring after already starting purging activities, a safety determination was made to collect samples without further stabilization to minimize further exposure.

- An obstruction at approximately 4.39 feet below top of casing (btoc) prevented well TS1-4CC from being sampled during the 2019 groundwater monitoring event. The downhole camera confirmed that the PVC had been sheared from the monument damage.
- Traces of product were detected in the well TS1-9A and was not sampled to minimize compromising impacts to the reusable sampling equipment and the opportunity for cross-contamination.
- The PVC casing at FS1-33H was coated in residual product. PAH samples were collected using a peristaltic pump and VOC samples were collected using a HydraSleeve to minimize compromising impacts to the reusable sampling equipment and the opportunity for cross-contamination.
- Monument casing damage was observed at well FS1-33S, preventing the use of a bladder pump. A peristaltic pump was used to collect PAH samples and a HydraSleeve was used to collect VOC samples.

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4.0 2019 GROUNDWATER MONITORING

Geology and hydrogeology, previous investigation and monitoring activities, well inspections and maintenance findings, gauging results, analytical results, and conclusions and recommendations for each of the SRF TS units are discussed in Sections 4.1 through 4.7. Appendix A presents 2019 groundwater contours and analytical results for each TS unit. Historical sample results and 2019 analytical results discussed in the following sections are summarized in Appendix B. A data quality report, analytical data tables (presenting complete 2019 results), and completed ADEC Laboratory Data Review Checklists are included as Appendix F. The laboratory analytical data packages are provided in Appendix G.

4.1 TS 1-4

SRF TS 1-4 is located in Township 7 North, Range 9 West, Section 4, Seward Meridian (Figure 2). Figures 3 and 4 present 2019 groundwater contours and analytical results, respectively, at TS 1-4.

4.1.1 TS 1-4 Geology and Hydrogeology

Groundwater at TS 1-4 has historically been observed to flow generally to the north or north-northeast during summer/fall sampling events and historical groundwater elevations have typically varied between approximately 130 feet to 142 feet relative to the NAVD88 (Brice 2016a, 2019b).

4.1.2 TS 1-4 Previous Investigations and Monitoring Activities

The groundwater monitoring wells at TS 1-4 were sampled for BTEX on an annual basis from 2000 to 2010. Five monitoring wells were installed by 1990, and three additional monitoring wells were installed in 2002. Benzene concentrations have exceeded the ADEC Table C groundwater cleanup level consistently in samples from monitoring wells TS1-4F, TS1-4G, TS1-4J, and FS1-4E. LNAPL has historically been observed in TS1-4F, TS1-4G, and TS1-4J. During previous sampling events, all BTEX analytes in samples from monitoring wells TS1-4CC and TS1-4DD have been non-detect or detected at concentrations below ADEC Table C groundwater cleanup levels. Between 2011 and 2013, groundwater monitoring did not occur, but monitoring resumed in 2014.

In 2015, the site was moved to a biennial sampling basis and ethylene glycol was added to the analytical suite following a 26 September release of approximately 1,600 gallons of a 50/50 mixture of ethylene glycol and water from a corroded pipeline under the oil line heater located near TS1-4G. Sample results for monitoring wells TS1-4F and FS1-4E exceeded the ADEC Table C groundwater cleanup level for benzene. Monitoring well TS1-4J contained measurable LNAPL during the 2015 event (Brice 2016a).

In 2017, petroleum-related VOCs (including BTEX) and PAH were added to the analytical suite per ADEC request based on revisions to the ADEC *Field Sampling Guidance* (ADEC 2017). Monitoring wells TS1-4EE, TS1-4GR, FS1-4E, and FS1-4H were sampled for petroleum-related VOCs (including BTEX) and PAH. In addition, monitoring wells TS1-4EE and TS1-4GR were sampled for ethylene glycol. Monitoring wells

TS1-4F and TS1-4J were not sampled due to the presence of product. Sorbent socks were flipped, and product was bailed from TS1-4J. Groundwater collected from new well TS1-4GR had persistent soapy bubbles that made it difficult to eliminate headspace entirely from the volatile organic analysis vials. It is likely that the bubbles resulted from a reaction of the acid preservative in the sample container with ethylene glycol present in the well. In monitoring wells FS1-4E and FS1-4H, concentrations of benzene, ethylbenzene, and naphthalene exceeded ADEC Table C groundwater cleanup levels. In monitoring well TS1-4GR, concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, xylenes, ethylene glycol, 1-methylnaphthalene, and naphthalene exceeded ADEC Table C groundwater cleanup levels. Contaminant concentrations were observed to be generally consistent with historical observations, except for the detection of LNAPL in TS1-4F.

One replacement well was installed at TS 1-4 in 2017. Well TS1-4G was replaced with TS1-4GR, approximately 5 feet from the original location. The water collected from new monitoring well TS1-4GR had a distinct odor (not a hydrocarbon odor) and was tinted yellow-brown, indicative of an ethylene glycol presence. During development of this well, recharge was extremely slow, possibly a result of very fine-grained soil in the vicinity of the well (Brice 2019b).

4.1.3 TS 1-4 Monitoring Well Inspections and Maintenance

A downhole camera was used in wells FS1-4E, FS1-4H, TS1-4EE, and TS1-4CC to assess well condition and confirm screened intervals. Screen lengths in FS1-4E and FS1-4H were confirmed to have 10-foot screens. Bentonite was observed on the water level meter probe in well TS1-4EE, but the cause of bentonite infiltration is unknown because the PVC riser was verified to be in good condition when inspected using the downhole camera. Shearing in well TS1-4CC was observed using the downhole camera, verifying an obstruction at approximately 4.39 feet btoc (Appendix C, Photo 8).

Table 4-1 summarizes the well inspection observations and maintenance actions performed at SRF TS 1-4 during the 2019 field activities.

Table 4-1: TS 1-4 Monitoring Well Inspection and Maintenance Summary

Well Name	Condition	Stickup Height (feet)	Gauged	2019 Maintenance and Observations
TS1-4CC	Damaged	1.5	No	Steel casing bent at approximately 25-degree angle. Broken monument lid and collar; cannot securely close and lock. Sheared/obstructed at approximately 4.39 feet btoc.
TS1-4DD	Fair	3.0	Yes	Bentonite on water level meter probe. Heaved.
TS1-4EE	Good	2.5	Yes	Approximately 2.5 inches of bentonite on water level meter probe. Downhole camera confirmed no damage in well. Well cap replaced.
TS1-4F	Good	2.3	LNAPL	HC odor. Sock replaced.
TS1-4GR	Good	2.4	Yes	Distinct/potent non-HC odor. Sock flipped; will be removed (and not replaced) if LNAPL is absent at next event.

Table 4-1: TS 1-4 Monitoring Well Inspection and Maintenance Summary

Well Name	Condition	Stickup Height (feet)	Gauged	2019 Maintenance and Observations
TS1-4J	Altered	1.5	LNAPL	HC odor. Sock replaced. LNAPL visible on probe. No measurable product. Secondary containment constructed around well. Addition to top of the monument to extend well within secondary containment; appears temporary but obstructive.
FS1-4E	Fair	3.5	Yes	Eroded ground around monument casing.
FS1-4H	Fair	2.8	Yes	Misaligned monument lid; cannot close. A locking plug with lock placed in well.

Notes:
For definitions, see the Acronyms and Abbreviations section.

4.1.4 TS 1-4 Groundwater Gauging Results

All viable TS 1-4 monitoring wells were gauged on 29 June 2019 (Figure 3) between 0955 and 1115. Groundwater level measurement was not taken at TS1-4CC due to an obstruction caused by monument damage. Groundwater elevations at TS 1-4 were measured to range from 125.43 feet to 145.20 feet (NAVD88), and the estimated direction of groundwater flow was northwest, which varies slightly from historical observations of flows to the north and north-northeast.

4.1.5 TS 1-4 Groundwater Analytical Results

Six monitoring wells were scheduled to be sampled at TS 1-4 in 2019. Monitoring wells FS1-4E, FS1-4H, TS1-4EE, and TS1-4GR were successfully sampled for petroleum-related VOCs (including BTEX) and PAH. In addition, monitoring wells TS1-4EE and TS1-4GR were sampled for ethylene glycol (Figure 4). Duplicate samples were collected at TS1-4GR, and extra volume for matrix spike (MS)/matrix spike duplicate (MSD) analysis was collected at TS1-4EE.

Wells TS1-4F and TS1-4J were not sampled due to the presence of LNAPL. The sorbent sock at TS1-4J was flipped. Due to natural fluctuation in the groundwater levels, the sorbent sock in well TS1-4F was secured above the water level and replaced at an appropriate depth.

Concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, 1-methylnaphthalene, 2-methylnaphthalene, and ethylene glycol among wells FS1-4E, FS1-4H, and TS1-4GR exceeded ADEC Table C groundwater cleanup levels. Results for all other analytes were either non-detect or were detected below ADEC Table C groundwater cleanup levels. Contaminant concentrations were observed to be generally consistent with historical observations. Samples from FS1-4E and FS1-4H were collected prior to the stabilization of water quality parameters due to the interruption of flare pit activity. TS1-4GR exhibited a strong non-petroleum, oil, and lubricant (POL) odor, and its purge water exhibited a tinted pale-orange color.

Ethylene glycol is an odorless, colorless (though often dyed in commercial applications), viscous liquid used in antifreeze and de-icing solutions as well as in hydraulic brake fluids. The substance easily

penetrates soils and is highly miscible in water, absorbing twice its weight. Studies of ethylene glycol show rapid biodegradation by naturally occurring microorganisms under both aerobic and anaerobic conditions (World Health Organization 2000). As it breaks down, ethylene glycol can exhibit a burnt odor and a rust color; the slippery consistency, orange tint, and non-POL odor observed in TS1-4GR purge water is consistent with these properties of ethylene glycol.

Ingestion of ethylene glycol is the primary exposure pathway of concern; dermal absorption of ethylene glycol by the skin is slow, and its low vapor pressure limits inhalation exposure (Agency for Toxic Substances & Disease Registry 2010). The nearest surface water bodies to TS1-4GR are Swanson River (nearest points of the river at approximately 1,000 feet northeast and 1,125 north) and Hungry Lake (approximately 1,880 feet northwest). TS1-4EE lies approximately 150 feet downgradient (northwest) of TS1-4GR and has shown non-detect concentrations of ethylene glycol in 2017 and 2019, indicating that ethylene glycol is not migrating toward the nearest and downgradient surface water bodies; therefore, wildlife exposure to ethylene glycol by surface water ingestion is not a complete pathway.

Analytical results for petroleum-related VOCs and PAH from the 2017 and 2019 monitoring events were evaluated against 20% of the current ADEC Table C groundwater cleanup levels to determine which analytes will continue to be monitored at TS 1-4. In 2017 and 2019, detected results for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, cumene, naphthalene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene among wells FS1-4E, FS1-4H, and TS1-4GR exceeded 20% of current ADEC Table C groundwater cleanup levels. Results for all other analytes were non-detect or were detected at concentrations less than 20% of ADEC Table C groundwater cleanup levels. Based on these data, wells at TS 1-4 will continue to be monitored for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, cumene, naphthalene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene, in addition to ethylene glycol at TS1-4EE and TS1-4GR only. Analytical results that exceed 20% of current ADEC Table C groundwater cleanup levels are presented in Attachment F-2 (Appendix F).

Table 4-2 summarizes concentrations for each analyte detected above ADEC Table C groundwater cleanup levels for all monitoring wells sampled at SRF TS 1-4. Compiled historical results, including 2019 data, are summarized in Table B1-3 (Appendix B). Complete 2019 analytical results are included in Appendix F.

4.1.6 TS 1-4 Conclusions and Recommendations

Biennial groundwater monitoring at SRF TS 1-4 was completed in July 2019. Planned field activities that were completed included monitoring well inspection and maintenance, measurement of groundwater elevation at seven monitoring wells, and sampling at four monitoring wells.

During monitoring well inspection and maintenance activities, the downhole camera was used to determine screen lengths at FS1-4E and FS1-4H and to investigate the condition of TS1-4CC and TS1-4EE. Wells FS1-4E and FS1-4H were confirmed to have 10-foot screens; the TS1-4CC riser was confirmed to be sheared and is recommended for replacement; and the TS1-4EE riser was confirmed to be in good condition. The condition of TS1-4J was observed to have previously been altered to extend the well above

the constructed secondary containment around the well. The monument lid on FS1-4H was misaligned, preventing secure lid closure, and a locking plug was added. All other wells were in generally good condition and required little maintenance.

Water level measurements collected from six viable wells on 26 June 2019 were combined with casing elevations using 2015 and 2017 survey data to generate a model of the potentiometric surface of the groundwater at TS 1-4. In the June 2019 model, SRF TS 1-4 groundwater flows generally toward the northwest, which varies slightly from historical observations.

During 2019 groundwater monitoring activities, monitoring wells FS1-4E, FS1-4H, TS1-4EE, and TS1-4GR were successfully sampled for petroleum-related VOCs (including BTEX) and PAH. Wells TS-4EE and TS1-4GR were also sampled for ethylene glycol. Wells TS1-4F and TS1-4J were not sampled due to the presence of LNAPL, and sorbent socks were replaced or flipped.

The 2019 groundwater monitoring results indicated concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, 1-methylnaphthalene, 2-methylnaphthalene, and ethylene glycol above ADEC Table C groundwater cleanup levels among wells FS1-4E, FS1-4H, and TS1-4GR; however, based on screening 2017 and 2019 analytical results against 20% of the current ADEC Table C groundwater cleanup levels, monitoring wells at TS 1-4 will continue to be monitored for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, cumene, naphthalene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene, in addition to ethylene glycol at TS1-4EE and TS1-4GR. Results for all other analytes were either non-detect or were detected below ADEC Table C groundwater cleanup levels.

Based on the results from 2019 groundwater monitoring activities, the following actions are recommended:

- During monitoring well installation, decommissioning, and maintenance activities scheduled for 2020 under a separate work plan:
  - Install a new well downgradient of the flare pit to bound potential contaminant source.
  - Decommission TS1-4CC. Severe monument damage and sheared riser obstruction prevented gauging at TS1-4CC during 2019 activities.
  - Resurvey TS1-4DD and FS1-4H to determine new top-of-casing elevations due to heaving.
- Continue to monitor and remove LNAPL in monitoring wells TS1-4F and TS1-4J during each biennial sampling event. If LNAPL is not observed, sample for petroleum-related VOCs (including BTEX) and PAH. Analytes observed below 20% of ADEC Table C groundwater cleanup levels in two consecutive events will be eliminated from this sampling suite.
- Continue sampling monitoring wells FS1-4E, FS1-4H, TS1-4EE, and TS1-4GR for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, cumene, naphthalene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene, on a biennial frequency. Wells TS1-4EE and TS1-4GR will also continue to be sampled for ethylene glycol.
- Continue modeling groundwater contours based on biennial gauge data from wells TS1-4DD, TS1-4EE, TS1-4GR, TS1-4J, FS1-4E, and FS1-4H.

Table 4-2: Summary of Exceedances at SRF TS 1-4

Well Name	1,2,4-Trimethyl benzene	1,3,5-Trimethyl benzene	Benzene	Ethylbenzene	Naphthalene	Xylenes (Total)	1-Methyl naphthalene	2-Methyl naphthalene	Ethylene Glycol
ADEC Table C (µg/L)	*56*	*60*	*4.6*	*15*	*1.7*	*190*	*11*	*36*	*40,000*
FS1-4E[1]	**95.6**	31.2	**44**	**71.2**	**107**	161	**20**	20.6	NA
FS1-4H[1]	3.33	6.44	**5.03**	8.29	**5.51**	4.52	3.25	0.683	NA
TS1-4EE[2]	ND [1] J-	ND [1] J-	ND [0.4] J-	ND [1] J-	ND [0.943]	ND [3] J-	ND [0.0472]	ND [0.0472]	ND [10,000]
TS1-4F	Contained LNAPL								
TS1-4GR[1]	**606**	**370**	**66.2**	**149**	**118**	**233**	**35.9**	**41.1**	**34,000,000**
TS1-4J	Contained LNAPL								

Notes:
For definitions, see the Acronyms and Abbreviations section.
Bold red text indicates that the concentration exceeds the ADEC Table C groundwater cleanup level.
The LOQ for a non-detect result is shown in brackets.
[1] Naphthalene determined by method SW8260C.
[2] Naphthalene determined by method SW8270D SIM.

4.2 TS 1-9

SRF TS 1-9 is located in Township 7 North, Range 9 West, Sections 4 and 9, Seward Meridian (Figure 2). Figures 5 and 6 present 2019 groundwater contours and analytical results, respectively, at TS 1-9.

4.2.1 TS 1-9 Geology and Hydrogeology

Groundwater at TS 1-9 has historically been observed to flow west-northwest. The groundwater elevation is approximately 114 feet relative to the NAVD88, and the historically observed potentiometric surface was very nearly flat (Oil Risk Consultants [Oil Risk] 2011; SLR International Corporation [SLR] 2015; Brice 2016b, 2019b). Findings from 2015 appear to be anomalous with historical results because groundwater was observed to flow southwest (Brice 2016b).

4.2.2 TS 1-9 Previous Investigations and Monitoring Activities

Ten monitoring wells were installed by 1990, and two additional monitoring wells, TS1-9HH and TS1-9II, were installed in 2002. The groundwater monitoring wells at TS 1-9 were sampled for BTEX on an annual basis from 2000 to 2010. Between 2011 and 2013, groundwater monitoring did not occur, but monitoring resumed in 2014. The site was moved to a periodic sampling basis in 2015 with the site wells split between two sampling frequencies, biennial and every 4 years. Concentrations of BTEX analytes have exceeded the ADEC Table C groundwater cleanup levels in historical samples from monitoring wells TS1-9A, TS1-9B, TS1-9C, TS1-9D, FS1-9F, and FS1-9N.

Monitoring well TS1-9U exhibited concentrations of BTEX analytes exceeding ADEC Table C groundwater cleanup levels from 2000 to 2005 and in 2009; however, all BTEX concentrations in this monitoring well have been non-detect or below ADEC Table C groundwater cleanup levels since 2010. TS1-9U is sampled every 4 years.

Since 2013, results for all BTEX analytes in samples from monitoring wells TS1-9HH, TS1-9II, FS1-9D, FS1-9I, and FS1-9M have been non-detect or below ADEC Table C groundwater cleanup levels. LNAPL has been detected in TS1-9B, TS1-9C, TS1-9D, and FS1-9F during previous sampling events (Brice 2016b).

In 2017, petroleum-related VOCs (including BTEX) and PAH were added to the analytical suite per ADEC request based on revisions to the ADEC *Field Sampling Guidance* (ADEC 2017). Monitoring wells TS1-9A, TS1-9C, and FS1-9N were sampled for petroleum-related VOCs (including BTEX) and PAH. Concentrations of 1,2,4-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene were detected above ADEC Table C groundwater cleanup levels among all three wells. Some additional PAH analytes, though non-detect, had reporting limits exceeding ADEC Table C groundwater cleanup levels. Monitoring wells TS1-9B, TS1-9D, and FS1-9F contained product and were not sampled. No measurable product was found in TS1-9B, but many globules of product were observed on the interface probe after gauging. Sorbent socks were installed or replaced, and approximately 200 milliliters of product was removed from FS1-9F (Brice 2019b).

4.2.3 TS 1-9 Monitoring Well Inspections and Maintenance

A downhole camera was used in wells TS1-9C, TS1-9D, TS1-9U, FS1-9D, FS1-9I, FS1-9M, and FS1-9N to verify screen lengths, and 10-foot screens were confirmed for these wells.

Table 4-3 summarizes the well inspection observations and maintenance actions performed at SRF TS 1-9 during 2019 field activities.

Table 4-3: TS 1-9 Monitoring Well Inspection and Maintenance Summary

Well Name	Condition	Stickup Height (feet)	Gauged	2019 Maintenance and Observations
TS1-9A	Fair	2.3	Yes	Concrete base disintegrating from bottom of steel monument. Product on tape and interface probe. Sock placed.
TS1-9B	Good	2.3	Yes	Steel casing repaired with pipe jacket. Slight product trace on probe; no product signal. Soft and sticky hit at total depth. Sock replaced.
TS1-9C	Good	1.7	Yes	Product on casing; none on interface probe. Bailer in monument.
TS1-9D	Good	2.5	Yes	Slight trace of product on sock and slight HC odor. Flipped sock.
TS1-9U	Good	1.8	Yes	None.
TS1-9HH	Fair	2.2	Yes	Heaved. Gap between concrete base and ground surface.
TS1-9II	Good	2.3	Yes	None.
FS1-9D	Good	2.2	Yes	None.
FS1-9F	Fair	-	LNAPL	Attempted product recovery, but only traces and globs removed. Sock replaced.
FS1-9I	Good	3.4	Yes	Removed tubing was rust-colored.
FS1-9M	Good	2.3	Yes	Tilted. Well cap replaced.
FS1-9N	Good	2.0	Yes	PVC heaved against monument.

Notes:
For definitions, see the Acronyms and Abbreviations section.

4.2.4 TS 1-9 Groundwater Gauging Results

All viable TS 1-9 monitoring wells were gauged on 27 June 2019 (Figure 5) between 1320 and 1410. Well TS1-9II was omitted from groundwater contour modeling due to an anomalous groundwater elevation and was replaced with well TS1-9HH for the 2019 model. Groundwater elevation across TS 1-9 ranged from 113.19 feet to 115.08 feet (NAVD88), which excludes the anomalous groundwater elevation at TS1-9II. The estimated direction of groundwater flow was northwest with a relatively flat potentiometric surface, which is generally consistent with historical observations (omitting the anomalous 2015 observations).

4.2.5 TS 1-9 Groundwater Analytical Results

Eleven wells were scheduled to be sampled at TS 1-9 in 2019. Monitoring wells TS1-9C, TS1-9D, TS1-9HH, TS1-9U, FS1-9D, FS1-9I, FS1-9M, and FS1-9N were successfully sampled for petroleum-related VOCs (including BTEX) and PAH (Figure 6). Duplicate samples were collected at TS1-9D and FS1-9N and extra volume for MS/MSD analysis was collected at FS1-9M.

Wells TS1-9A, TS1-9B, and FS1-9F were not sampled due to LNAPL detection. LNAPL has not historically been detected in TS1-9A, but traces of product were observed on the interface probe after gauging activities (Appendix C, Photo 42). Measurable product was not detected in TS1-9B; however, traces of product were detected on the oil-water interface probe, and historically this well has had LNAPL detections. Product was measured to be approximately 0.05 foot in FS1-9F, and only traces of product were removed during product recovery efforts. Sorbent socks were placed or replaced in all three wells.

Concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene exceeded ADEC Table C groundwater cleanup levels among wells TS1-9C, TS1-9D, TS1-9U, and FS1-9N. Results for all other analytes were either non-detect or were below ADEC Table C groundwater cleanup levels. Contaminant concentrations were observed to be generally consistent with historical observations.

Analytical results for petroleum-related VOCs and PAH from the 2017 and 2019 monitoring events were evaluated against 20% of the current ADEC Table C groundwater cleanup levels to determine which analytes will continue to be monitored at TS 1-9. In 2017 and/or 2019, samples for either well FS1-9N or TS1-9C (or both) exhibited concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene exceeded 20% of current ADEC Table C groundwater cleanup levels. Detected results for the same analytes among wells TS1-9D, TS1-9HH, and TS1-9U exceeded 20% of the current ADEC Table C groundwater cleanup levels in 2019; however, these wells require at least one more sampling event (due either to inability to sample in 2017 or due to 4-year sampling frequency) before analytes may be removed from their sampling suite.

Cumene concentrations were also detected in exceedance of the 20% threshold in TS1-9D and are therefore included in the future monitoring sampling suite. In addition, biennially sampled well TS1-9A was not sampled in 2019 due to the presence of LNAPL; continued monitoring of this well will include removal of LNAPL until it is able to be sampled again for petroleum-related VOCs (including BTEX) and PAH. Results for all other analytes were non-detect or were detected at concentrations less than 20% of ADEC Table C groundwater cleanup levels. Based on these data, wells at TS 1-9 will continue to be monitored for petroleum-related VOCs (including BTEX) and PAH. Analytical results that exceed 20% of current ADEC Table C groundwater cleanup levels are presented in Attachment F-2 (Appendix F).

Table 4-4 summarizes concentrations for each analyte detected above ADEC Table C groundwater cleanup levels for all monitoring wells sampled at SRF TS 1-9. Compiled historical results, including 2019 data, are summarized in Table B2-3 (Appendix B). Complete 2019 analytical results are included in Appendix F.

Table 4-4: Summary of Exceedances at SRF TS 1-9

Well Name	1,2,4-Trimethyl benzene	1,3,5-Trimethyl benzene	Benzene	Ethyl benzene	Naphthalene	Total Xylenes	1-Methyl naphthalene
ADEC Table C (µg/L)	*56*	*60*	*4.6*	*15*	*1.7*	*190*	*11*
TS1-9A	Contained LNAPL						
TS1-9B	Contained LNAPL						
TS1-9C[1]	**417**	**320**	0.247 J	**22.1**	**31.0**	**2,530**	**16.9**
TS1-9D[1]	**558**	**318**	**8.08**	**197**	**59.6**	**757**	**11.4**
TS1-9HH[1]	1.63	4.4	0.257 J	ND [1]	0.641 J	ND [3]	0.249
TS1-9U[1]	**64.2**	39.8	1.48	5.56	**11.8**	10.4	**11.5**
FS1-9D[2]	0.786 J	0.412 J	0.442	0.557 J	0.187	2.72 J	0.0586
FS1-9F	Contained LNAPL						
FS1-9I[2]	ND [1]	ND [1]	ND [0.4]	ND [1]	ND [0.0909]	ND [3]	ND [0.0455]
FS1-9M[2]	ND [1]	ND [1]	ND [0.4]	ND [1]	ND [0.0943]	ND [3]	ND [0.0472]
FS1-9N[1]	3.41 J	0.401 J	0.55	ND [1]	**1.9**	2.31 J	0.328

Notes:
For definitions, see the Acronyms and Abbreviations section.
Bold red text indicates that the concentration exceeds the ADEC Table C groundwater cleanup level.
The LOQ for ND analytes is shown in brackets.
[1] Naphthalene determined by method SW8260C.
[2] Naphthalene determined by method SW8270D SIM.

4.2.6 TS 1-9 Conclusions and Recommendations

Biennial groundwater monitoring at SRF TS 1-9 was completed in July 2019. Planned field activities that were completed included monitoring well inspection and maintenance, measurement of groundwater elevation at 11 monitoring wells, and sampling at eight monitoring wells.

During monitoring well inspection and maintenance activities, the downhole camera confirmed 10-foot screens at wells TS1-9C, TS1-9D, TS1-9U, FS1-9D, FS1-9I, FS1-9M, and FS1-9N. All wells were in generally good condition and required little maintenance.

Water level measurements collected on 27 June 2019 were combined with casing elevations using 2015 survey data to generate a model of the potentiometric surface of the groundwater at TS 1-9. In the June 2019 model, the SRF TS 1-9 groundwater flows to the northwest, which is generally consistent with historical observations.

During 2019 groundwater monitoring activities, monitoring wells TS1-9C, TS1-9D, TS1-9HH, TS1-9U, FS1-9D, FS1-9I, FS1-9M, and FS1-9N were successfully sampled for petroleum-related VOCs (including BTEX) and PAH. Monitoring wells TS1-9A, TS1-9B, and FS1-9F were not sampled due to the presence of LNAPL. LNAPL-sorbent socks were installed or replaced, and only traces of product were removed from FS1-9F during product recovery.

The 2019 groundwater monitoring results indicated exceedances of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene above ADEC Table C groundwater cleanup levels; however, based on screening 2017 and 2019 analytical results against 20% of the current ADEC Table C groundwater cleanup levels, monitoring wells at TS 1-9 will continue to be monitored for petroleum-related VOCs (including BTEX) and PAH. Results for all other analytes were either non-detect or were less than ADEC Table C groundwater cleanup levels.

Based on the 2019 activities and observations, the following actions are recommended:

- Continue to monitor and remove LNAPL in monitoring wells TS1-9A, TS1-9B, and FS1-9F during each biennial sampling event. If LNAPL is not observed, sample well(s) for petroleum-related VOCs (including BTEX) and PAH. Analytes observed below 20% of ADEC Table C groundwater cleanup levels in two consecutive events will be eliminated from this sampling suite.
- Continue sampling monitoring wells TS1-9C, TS1-9D, and FS1-9N for petroleum-related VOCs (including BTEX) and PAH on a biennial frequency. Analytes observed below 20% of ADEC Table C groundwater cleanup levels in two consecutive events will be eliminated from this sampling suite.
- Continue sampling monitoring wells TS1-9HH, TS1-9U, FS1-9D, FS1-9I, and FS1-9M for petroleum-related VOCs (including BTEX) and PAH once every 4 years. The next sampling event will be in 2023. Analytes observed below 20% of ADEC Table C groundwater cleanup levels in two consecutive events will be eliminated from this sampling suite.
- Continue modeling groundwater contours based on biennial gauge data from wells TS1-9A, TS1-9C, TS1-9U, TS1-9II, FS1-9I, and FS1-9N.

4.3 TS 1-27

SRF TS 1-27 is located in Township 8 North, Range 9 West, Sections 22 and 27, Seward Meridian (Figure 2). Figures 7 and 8 present 2019 groundwater contours and analytical results, respectively, at TS 1-27.

4.3.1 TS 1-27 Geology and Hydrogeology

Groundwater at TS 1-27 has historically been observed to flow to the west-southwest during summer/fall sampling events, and the groundwater elevation is approximately 245 feet relative to the NAVD88 (Brice 2016c, 2019b).

4.3.2 TS 1-27 Previous Investigations and Monitoring Activities

The groundwater monitoring wells at TS 1-27 were sampled for BTEX on an annual basis from 2000 to 2010. Between 2011 and 2013, groundwater monitoring did not occur, but monitoring resumed in 2014. The site was moved to a periodic sampling basis in 2015 with the site wells split between two sampling frequencies, biennial and every 4 years. Four monitoring wells (TS1-27G, TS1-27J, TS1-27K, and FS1-27C) were installed by 1990, and the remaining three wells, TS1-27L, TS1-27M, and TS1-27N, were installed in 2002.

Benzene, ethylbenzene, and xylenes have exceeded the ADEC Table C groundwater cleanup levels since 2000 in wells TS1-27G, TS1-27J, TS1-27K, TS1-27L, and TS1-27M. Analytical results in wells TS1-27N and FS1-27C have consistently been non-detect. LNAPL has not been measured in any of the monitoring wells at TS 1-27 (SLR 2015; Brice 2016c).

In 2017, petroleum-related VOCs (including BTEX) and PAH were added to the analytical suite per ADEC request based on revisions to the ADEC *Field Sampling Guidance* (ADEC 2017). Concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene exceeded the ADEC Table C groundwater cleanup levels in monitoring wells TS1-27G, TS1-27K, TS1-27L, and TS1-27M (Brice 2019b).

4.3.3 TS 1-27 Monitoring Well Inspections and Maintenance

A downhole camera was used in wells TS1-27G, TS1-27K, and TS1-27L to verify screen lengths, and 10-foot screens were confirmed for these wells. Using the downhole camera as a visual aid, tubing obstructions were removed from wells TS1-27K and TS1-27L at approximately 6 feet and 2 feet btoc, respectively.

Table 4-5 summarizes the well inspection observations and maintenance actions performed at SRF TS 1-27 during the 2019 field activities.

Table 4-5: TS 1-27 Monitoring Well Inspection and Maintenance Summary

Well Name	Condition	Stickup Height (feet)	Gauged	2019 Maintenance and Observations
TS1-27G	Good	1.75	Yes	None.
TS1-27J	Good	2.0	Yes	Cap replaced. HC odor.
TS1-27K	Good	2.0	Yes	HC odor on removed tubing, but none in well or on water level meter probe.
TS1-27L	Good	2.5	Yes	HC odor. Orange globs and gray sediment (not characteristic of bentonite) on water level meter probe. Hard hit at total depth.
TS1-27M	Good	2.0	Yes	None.
TS1-27N	Good	2.25	Yes	Well is located on a mound. Stickup height was measured to top of mound. PVC is heaved against monument.
FS1-27C	Good	2.80	Yes	None.

Notes:
For definitions, see the Acronyms and Abbreviations section.

4.3.4 TS 1-27 Groundwater Gauging Results

All viable TS 1-27 monitoring wells were gauged on 3 July 2019 (Figure 7) between 0750 and 0850. Groundwater elevations at TS 1-27 ranged between 241.54 feet and 252.33 feet (NAVD88), and the estimated direction of groundwater flow was west-southwest, which is consistent with historical observations.

4.3.5 TS 1-27 Groundwater Analytical Results

Five wells were scheduled to be sampled at TS 1-27 in 2019. Monitoring wells TS1-27G, TS1-27K, TS1-27L, TS1-27M, and FS1-27C were successfully sampled for petroleum-related VOCs (including BTEX) and PAH (Figure 8). One duplicate sample was collected at monitoring well TS1-27K, and extra volume for MS/MSD analysis was collected at monitoring well TS1-27G.

Concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene exceeded ADEC Table C groundwater cleanup levels among wells TS1-27G, TS1-27K, TS1-27L, and TS1-27M. Results for all other analytes were either non-detect or were detected below ADEC Table C groundwater cleanup levels. Anomalous results were observed in well TS1-27L (contaminant concentrations appeared lower than historical results) and well TS1-27M (contaminant concentrations appeared higher than historical results). Evaluation of historical results from these wells indicates that collected samples may have accidentally been swapped or mislabeled. Contaminant concentrations for all other results were observed to be generally consistent with historical observations.

Analytical results for petroleum-related VOCs and PAH from the 2017 and 2019 monitoring events were evaluated against 20% of the current ADEC Table C groundwater cleanup levels to determine which analytes will continue to be monitored at TS 1-27. In 2017 and 2019, detected results for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, cumene, naphthalene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene exceeded 20% of current ADEC Table C groundwater cleanup levels among wells TS1-27G, TS1-27K, TS1-27L, and TS1-27M. Results for all other analytes were non-detect or were detected at concentrations less than 20% of ADEC Table C groundwater cleanup levels. Well FS1-27C is sampled every 4 years and requires at least one more sampling event before analytes may be removed from its sampling suite. Based on these data, wells TS1-27G, TS1-27K, TS1-27L, and TS1-27M will continue to be monitored for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, cumene, naphthalene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene. Well FS1-27C will continue to be monitored for petroleum-related VOCs (including BTEX) and PAH. Analytical results that exceed 20% of current ADEC Table C groundwater cleanup levels are presented in Attachment F-2 (Appendix F).

Table 4-6 summarizes concentrations for each analyte detected above ADEC Table C groundwater cleanup levels for all monitoring wells sampled at SRF TS 1-27. Compiled historical results, including 2019 data, are summarized in Table B3-3 (Appendix B). Complete 2019 analytical results are included in Appendix F.

Table 4-6: Summary of Exceedances at SRF TS 1-27

Well Name	1,2,4-Trimethyl benzene	1,3,5-Trimethyl benzene	Benzene	Ethyl benzene	Naph thalene	Total Xylenes	1-Methyl naphthalene	2-Methyl naphthalene
ADEC Table C (µg/L)	*56*	*60*	*4.6*	*15*	*1.7*	*190*	*11*	*36*
FS1-27C[1]	ND [1]	ND [1]	ND [0.4]	ND [1]	ND [0.105]	ND [3]	ND [0.0525]	ND [0.0525]
TS1-27G[2]	**60.6 J-**	19.6	**9.24**	**23.2 J-**	**9.94**	**265 J-**	0.457	0.181
TS1-27K[2]	**1320**	**394**	**36.6**	**704**	**301**	**2590**	**58**	**60.9**
TS1-27L[2,3]	ND [1]	ND [1]	ND [0.4]	0.67 J	**2.47**	ND [3]	0.358	0.248
TS1-27M[2,3]	**343**	**99.4**	3.85	**41.4**	**64.9**	180	**15.4**	15.3

Notes:
For definitions, see the Acronyms and Abbreviations section.
Bold red text indicates that the concentration exceeds the ADEC Table C cleanup level.
The LOQ for non-detect analytes is shown in brackets.
[1] Naphthalene result reported from method SW8270D SIM.
[2] Naphthalene result reported from method SW8260C.
[3] Analytical results for these wells are notably inconsistent with previous results and indicate that these samples may have been switched.

4.3.6 TS 1-27 Conclusions and Recommendations

Biennial groundwater monitoring at SRF TS 1-27 was completed in July 2019. Planned field activities that were completed included monitoring well inspection and maintenance, measurement of groundwater elevation at seven monitoring wells, and sampling at five monitoring wells.

During monitoring well inspection and maintenance activities, the downhole camera was used to confirm 10-foot screened intervals for wells TS1-27G, TS1-27K, and TS1-27L. Tubing obstructions were also removed from wells TS1-27K and TS1-27L using the downhole camera as a visual aid. Besides some observed heaving in TS1-27N, all other wells were in generally good condition and required little maintenance.

Water level measurements collected on 3 July 2019 were combined with casing elevations using 2015 survey data to generate a model of the potentiometric surface of the groundwater at TS 1-27. In the July 2019 model, groundwater flows to the west-southwest, which is consistent with historical observations.

During 2019 groundwater monitoring activities, monitoring wells TS1-27G, TS1-27K, TS1-27L, TS1-27M, and FS1-27C were successfully sampled for petroleum-related VOCs (including BTEX) and PAH. The 2019 groundwater monitoring results indicated exceedances of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene above ADEC Table C groundwater cleanup levels. Based on screening 2017 and 2019 analytical results against 20% of the current ADEC Table C groundwater cleanup levels, monitoring wells TS1-27G, TS1-27K, TS1-27L, and TS1-27M will continue to be monitored for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, cumene, naphthalene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene. Well FS1-27C is sampled every 4 years and will continue to be sampled for

petroleum-related VOCs (including BTEX) and PAH for at least one additional monitoring event. Results for all other analytes were either non-detect or were less than ADEC Table C cleanup levels.

Based on the 2019 activities and observations, the following actions are recommended:

- Continue sampling monitoring wells TS1-27G, TS1-27K, TS1-27L, and TS1-27M for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, cumene, naphthalene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene on a biennial frequency.
- Continue sampling monitoring well FS1-27C for petroleum-related VOCs (including BTEX) and PAH once every 4 years. The next sampling event will be in 2023. Analytes observed below 20% of ADEC Table C groundwater cleanup levels in two consecutive events will be eliminated from this sampling suite.
- Continue modeling groundwater contours based on biennial gauge data from wells TS1-27K, TS1-27L, TS1-27M, TS1-27N, and FS1-27C.

4.4 TS 1-33

SRF TS 1-33 is located in Township 8 North, Range 9 West, Section 33, Seward Meridian (Figure 2). Figures 9 and 10 present 2019 groundwater contours and analytical results, respectively, at TS 1-33.

4.4.1 TS 1-33 Geology and Hydrogeology

Groundwater at TS 1-33 has historically been observed to flow to the east-southeast during summer/fall sampling events, and the groundwater elevation is approximately 145 feet relative to the NAVD88 (SLR 2015; Brice 2016d, 2019b).

4.4.2 TS 1-33 Previous Investigations and Monitoring Activities

Eight monitoring wells were installed by 1990, four monitoring wells (TS1-33JJ, TS1-33KK, TS1-33O2, and FS1-33T) were installed in 2002, and two monitoring wells (TS1-33N and FS1-33W) were installed in 2017. The groundwater monitoring wells at TS 1-33 were sampled for BTEX on an annual basis from 2000 to 2010. Between 2011 and 2013, groundwater monitoring did not occur, but monitoring resumed in 2014. The site was moved to a periodic sampling basis in 2015 with the site wells split between two sampling frequencies, biennial and every 4 years.

Benzene, ethylbenzene, and xylenes detected in groundwater samples at TS1-33 have exceeded ADEC Table C cleanup levels since 2000. Analytes consistently exhibiting concentrations in exceedance of the ADEC Table C cleanup levels since 2000 include: benzene in samples collected from four monitoring wells (TS1-33Q, TS1-33O2, FS1-33F, and FS1-33H), ethylbenzene in samples collected from three monitoring wells (TS1-33Q, TS1-33O2, and FS1-33H), and xylenes in samples collected from one monitoring well (TS1-33Q). TS1-33U has also had consistent benzene exceedances, although this well has not been sampled since 2009 due to an obstruction. Ethylbenzene exceedances have occurred periodically in FS1-33R since 2000, but the well has not been sampled since 2014; FS1-33R was not located in 2017 and is assumed to be either decommissioned or destroyed.

Benzene concentrations have exceeded the ADEC Table C cleanup level occasionally in samples from five monitoring wells at TS 1-33; three times in samples collected from TS1-33KK (in 2002, 2003, and 2010), six times in samples collected from FS1-33O (as recently as 2014), five times in samples collected from FS1-33R (as recently as 2010), and five times in samples collected from FS1-33S (as recently as 2010). BTEX concentrations in samples collected from TS1-33JJ, TS1-33P, and FS1-33T have been non-detect or below the ADEC Table C cleanup levels since 2000. Measurable LNAPL has been observed four times in TS1-33U (2000, 2001, 2003, and 2005) and five times in FS1-33H (2000-2003, 2014).

In 2017, petroleum-related VOCs (including BTEX) and PAH were added to the analytical suite per ADEC request based on revisions to the ADEC *Field Sampling Guidance* (ADEC 2017). Concentrations of 1,2,4-trimethylbenze, 1,3,5-trimethylbenzene benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene exceeded ADEC Table C groundwater cleanup levels in monitoring wells FS1-33F, FS1-33H, TS1-33O2, and TS1-33Q. Monitoring well TS1-33U was replaced with monitoring well TS1-33UR, which was not sampled due to product presence in the well and in soil cuttings during installation.

4.4.3 TS 1-33 Monitoring Well Inspections and Maintenance

A downhole camera was used to assess well casing and screen conditions in wells FS1-33F, FS1-33O, FS1-33S, and TS1-33Q. Screen lengths were confirmed to be 5 feet in well FS1-33F and 10 feet in wells FS1-33S and TS1-33Q. Monument casing damage at FS1-33S prevented the use of a bladder pump due to a crushed opening; the downhole camera was used to visually verify that the PVC casing was in good condition and does not require replacement, but the monument casing needs repair.

The downhole camera was also utilized in neighboring wells FS1-33F and FS1-33O to investigate a likely cause of an anomalous 2017 groundwater elevation difference of approximately 10 feet. When gauging FS1-33O, the water level meter made a weak, intermittent water signal at approximately 17 feet btoc (solid water signal was at approximately 29 feet btoc); however, when gauged in 2017, the water level was at approximately 18 feet btoc. The weak, intermittent signal in FS1-33O appeared to be a false signal causing water measurement discrepancies in 2017. The downhole camera visually verified a wet, white, viscous residue lining the PVC casing at the same depth (approximately 17 feet btoc); the type and source of the residue could not be identified.

Table 4-7 summarizes the well inspection observations and maintenance actions performed at SRF TS 1-33 during the 2019 field activities.

Table 4-7: TS 1-33 Monitoring Well Inspection and Maintenance Summary

Well Name	Condition	Stickup Height (feet)	Gauged	2019 Maintenance and Observations
TS1-33JJ	Good	2.4	Yes	Hard hit at total depth.
TS1-33KK	Good	3.0	Yes	Soft hit at total depth. Orange residue on water level meter probe. Orange staining on removed tubing. Septic odor. Lock replaced.
TS1-33N	Good	2.75	Yes	None.
TS1-33O2	Poor	2.0	Yes	Monument destroyed. No monument lid; cannot be securely locked. Well is under pipeline; difficult to access. Gray sediment (not characteristic of bentonite) on probe. Soft hit at total depth.
TS1-33P	Good	1.25	Yes	Hard hit at total depth. PVC heaved against monument. Well cap replaced.
TS1-33Q	Good	2.0	Yes	Heaved. Hard hit at total depth.
TS1-33UR	Good	2.75	Yes	Hard hit at total depth. Sock flipped.
FS1-33F	Good	2.75	Yes	Soft hit at total depth.
FS1-33H	Fair	2.5	Yes	Sock replaced.
FS1-33O	Good	2.75	Yes	Mud on tape and probe at approximately 29.2 feet btoc. Water level meter made weak, intermittent signal.
FS1-33S	Poor	1.5	Yes	No monument lid; cannot be securely closed and locked. Monument damaged, bent in middle. Well plug replaced.
FS1-33T	Good	2.75	Yes	None.
FS1-33W	Good	2.0	Yes	Tree fallen on lock—bent but still functions. Hard hit at total depth.

Notes:
For definitions, see the Acronyms and Abbreviations section.

4.4.4 TS 1-33 Groundwater Gauging Results

All viable TS 1-33 monitoring wells were gauged on 3 July 2019 (Figure 9) between 1240 and 1440. Well TS1-33Q is heaved and has been omitted from groundwater contour modeling until it can be resurveyed to determine a new top-of-casing elevation. Groundwater elevations at TS 1-33 ranged between 130.84 feet and 161.33 feet (NAVD88), and the estimated direction of groundwater flow was southeast, which is generally consistent with historical observations.

4.4.5 TS 1-33 Groundwater Analytical Results

Eight monitoring wells were scheduled to be sampled at TS 1-33 in 2019. Monitoring wells TS1-33JJ, TS1-33O2, TS1-33Q, TS1-33UR, FS1-33F, FS1-33H, FS1-33S, and FS1-33W were successfully sampled for petroleum-related VOCs (including BTEX) and PAH. Duplicate samples were collected at TS1-33O2 and FS1-33F. Extra volume for MS/MSD analysis was collected at TS1-33Q.

Well FS1-33W was moved to sampling once every 4 years in 2017 due to non-detect results for VOCs and PAH analytes in both this well and upgradient well FS1-33S; however, with the reincorporation of VOCs and PAH per ADEC request (ADEC 2019), samples were collected at FS1-33W in 2019. Well TS1-33UR was sampled for the first time since it was installed in 2017. Wells FS1-33F and TS1-33UR were sampled, and sorbent socks were flipped or replaced during 2019 activities, although no measurable product was

observed. The PVC casing at FS1-33H was observed to be coated in product; therefore, PAH samples were collected using a peristaltic pump, and VOC samples were collected using a HydraSleeve to minimize compromising impacts to the reusable sampling equipment and the opportunity for cross-contamination. A peristaltic pump and HydraSleeve were also used at well FS1-33S to collect PAH and VOC samples, respectively, due to significant monument damage that prevented the use of a bladder pump.

Concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene exceeded ADEC Table C groundwater cleanup levels among FS1-33F, FS1-33H, TS1-33O2, TS1-33Q, and TS1-33UR. Results for all other analytes were either non-detect or were detected below ADEC Table C groundwater cleanup levels. Contaminant concentrations were observed to be generally consistent with historical observations.

Analytical results for petroleum-related VOCs and PAH from the 2017 and 2019 monitoring events were evaluated against 20% of the current ADEC Table C groundwater cleanup levels to determine which analytes will continue to be monitored at TS 1-33. In 2017 and 2019, detected results for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, cumene, naphthalene, tert-butylbenzene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene exceeded 20% of current ADEC Table C groundwater cleanup levels among wells FS1-33F, FS1-33H, FS1-33O2, and TS1-33Q. In 2017 only, the detected result for benzo(a)anthracene in FS1-33H exceeded 20% of the current ADEC Table C groundwater cleanup level. Detected results for benzene, ethylbenzene, and naphthalene in well TS1-33UR exceeded 20% of the current ADEC Table C groundwater cleanup levels. Well TS1-33UR was not sampled in 2017 due to the presence of LNAPL; therefore, this well will continue to be monitored for LNAPL and sampled for petroleum-related VOCs and PAH (as well conditions allow) until analytes may be reduced after two consecutive sampling events. Results for all other analytes were non-detect or were detected at concentrations less than 20% of ADEC Table C groundwater cleanup levels. Based on these data, wells at TS 1-33 will continue to be monitored for petroleum-related VOCs (including BTEX) and PAH. Analytical results that exceed 20% of current ADEC Table C groundwater cleanup levels are presented in Attachment F-2 (Appendix F).

Table 4-8 summarizes concentrations for each analyte detected above the ADEC Table C cleanup levels. Compiled historical results, including 2019 data, are summarized in Table B4-3 (Appendix B). Complete 2019 analytical results are included in Appendix F.

Table 4-8: Summary of Exceedances at SRF TS 1-33

Well Name	1,2,4-Trimethyl benzene	1,3,5-Trimethyl benzene	Benzene	Ethylbenzene	Naphthalene	Total Xylenes	1-Methyl naphthalene
ADEC Table C (µg/L)	*56*	*60*	*4.6*	*15*	*1.7*	*190*	*11*
FS1-33F[1]	0.49 J	ND [1]	**123 J**	0.68 J	0.333	3.22 J	0.17
FS1-33H[2]	4.75	12.5	**9.33**	**35.1**	**4.41**	12.1	1.72
FS1-33S[1]	ND [1]	5.29	0.98	ND [1]	ND [0.111]	ND [3]	ND [0.0553]
FS1-33W[1]	ND [1]	ND [1]	ND [0.4]	ND [1]	ND [0.0962] H	ND [3]	ND [0.0481] H
TS1-33JJ[2]	ND [1]	ND [1]	0.58	ND [1]	0.31 J	ND [3]	ND [0.0558] J-
TS1-33O2[2]	1.44	ND [1]	**192**	**179**	**48.4**	30.3	**24.4**
TS1-33Q[2]	**542**	**345**	**45.3 J-**	**1,050**	**41.3**	**1,760**	3.43
TS1-33UR[2]	0.75 J	ND [1]	**22.4**	**23.6**	**15.8**	1.77 J	ND [0.0508]

Notes:
For definitions, see the Acronyms and Abbreviations section.
Bold red text indicates that the concentration exceeds the ADEC Table C cleanup level.
The LOQ for ND analytes is shown in brackets.
[1] Naphthalene determined by method SW8270D SIM.
[2] Naphthalene determined by method SW8260C.

4.4.6 TS 1-33 Conclusions and Recommendations

Biennial groundwater monitoring at SRF TS 1-33 was completed in July 2019. Planned field activities that were completed included monitoring well inspection and maintenance, measurement of groundwater elevation at 13 monitoring wells, and sampling at eight monitoring wells.

During monitoring well inspection and maintenance activities, the downhole camera was used to assess well casing and screen conditions. Screen lengths were confirmed to be 10 feet in TS1-33Q and 5 feet in FS1-33F. In addition, the cause of water level measurement discrepancies observed in well FS1-33O in 2017 was identified as viscous residue that caused an erroneous reading on the water level meter. Lastly, the condition of the PVC casing in well FS1-33S was determined to be good despite the damaged monument casing that prevented sampling with a bladder pump.

Water level measurements collected on 3 July 2019 were combined with casing elevations using 2015 and 2017 survey data to generate a model of the potentiometric surface of the groundwater at TS 1-33. Elevation data from well TS1-33Q was omitted from the groundwater contour model due to significant heaving. In the July 2019 model, TS 1-33 groundwater flows to the southeast, consistent with historical observations.

During 2019 groundwater monitoring activities, monitoring wells TS1-33JJ, TS1-33O2, TS1-33Q, TS1-33UR, FS1-33F, FS1-33H, FS1-33S, and FS1-33W were successfully sampled for petroleum-related VOCs (including BTEX) and PAH. Well FS1-33W was added back into the sampling program, and TS1-33UR was sampled for the first time since installation in 2017. Measurable product was not detected in monitoring

wells FS1-33F and TS1-33UR, but sorbent socks were replaced. PAH and VOC samples were collected using a peristaltic pump and HydraSleeve instead of a bladder pump in two wells: to minimize compromising impacts to the reusable sampling equipment and the opportunity for cross-contamination in well FS1-33H, and because of monument damage in well FS1-33S.

The 2019 groundwater monitoring results indicated exceedances of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene above ADEC Table C cleanup levels. Screening 2017 and 2019 analytical results for petroleum-related VOCs and PAH against 20% of the current ADEC Table C groundwater cleanup levels indicated that most wells at TS 1-33 require continued monitoring for a subset of analytes including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, benzo(a)anthracene, cumene, naphthalene, tert-butylbenzene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene. Well TS1-33UR was unable to be sampled in 2017 due to LNAPL; therefore, this well will be monitored for LNAPL and will be sampled for petroleum-related VOCs (including BTEX) and PAH (as well conditions allow) until analytes may be reduced after two consecutive sampling events.

Based on the 2019 activities and observations, the following actions are recommended:

- During monitoring well installation, decommissioning, and maintenance activities scheduled for 2020 under a separate work plan:
  - Replace TS1-33O2. This well is damaged and difficult to access.
  - Decommission MW1-33A. This well is not in the sampling program and has been damaged by the flare. Decommissioning can only occur when the location can be accessed safely.
  - Repair FS1-33S. The monument casing has been damaged, preventing access using a bladder pump; however, the PVC screen and riser have been confirmed to be in good condition using a downhole camera.
  - Decommission TS1-33N. This well has been removed from the sampling program because no upgradient source was identified.
- Continue to monitor and remove LNAPL in monitoring well TS1-33UR during each biennial sampling event. If LNAPL is not observed, sample for petroleum-related VOCs (including BTEX) and PAH. Analytes observed below 20% of ADEC Table C groundwater cleanup levels in two consecutive events will be eliminated from this sampling suite.
- Continue sampling the replacement well for TS1-33O2, TS1-33Q, FS1-33F, FS1-33H, and FS1-33S, for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, benzo(a)anthracene, cumene, naphthalene, tert-butylbenzene, xylenes, 1-methylnaphthalene, and 2-methylnaphthalene on a biennial frequency.
- Move FS1-33W from biennial sampling to sampling every 4 years based on non-detect sample results from 2017 and 2019 and results either non-detect or below ADEC Table C groundwater cleanup levels in upgradient well FS1-33S.
- Continue sampling monitoring wells TS1-33JJ and FS1-33W for petroleum-related VOCs (including BTEX) and PAH once every 4 years. The next sampling event will be in 2023. Analytes observed

below 20% of ADEC Table C groundwater cleanup levels in two consecutive events will be eliminated from this sampling suite.

- Continue modeling groundwater contours based on biennial gauge data from the replacement well for TS1-33O2, TS1-33P, TS1-33Q, TS1-33JJ, TS1-33KK, FS1-33F, FS1-33H, FS1-33O, FS1-33S, FS1-33T, and FS1-33W.

4.5 TS 2-15

SRF TS 2-15 is located in Township 8 North, Range 9 West, Section 15, Seward Meridian (Figure 2). Figures 11 and 12 present 2019 groundwater contours and analytical results, respectively, at TS 2-15.

4.5.1 TS 2-15 Geology and Hydrogeology

Groundwater at TS 2-15 has historically been observed to flow to the west-northwest during summer/fall sampling events, and groundwater elevation is approximately 310 feet relative to the NAVD88 (SLR 2015; Brice 2016e, 2019b).

4.5.2 TS 2-15 Previous Investigations and Monitoring Activities

Two monitoring wells (TS2-15O and FS2-15B) were installed at TS 2-15 by 1990. Three additional wells (TS2-15P, TS2-15Q, and TS2-15R) were installed in 2002. The groundwater monitoring wells at TS 2-15 were sampled for BTEX on an annual basis from 2000 to 2010. Between 2011 and 2013, groundwater monitoring did not occur, but monitoring resumed in 2014. The site was moved to a periodic sampling basis in 2015 with the site wells split between two sampling frequencies, biennial and once every 4 years. Concentrations of benzene, ethylbenzene, and xylenes have exceeded the ADEC Table C groundwater cleanup levels in samples from monitoring well TS2-15O since 2000. Concentrations of toluene in TS2-15O exceeded the ADEC Table C cleanup level in 2000 but have been below current cleanup levels since 2001. Since 2000, BTEX has not been detected or has been detected at low concentrations in samples collected from monitoring wells TS2-15P, TS2-15Q, TS2-15R, and FS2-15B. LNAPL has not been observed in any of the monitoring wells at TS 2-15 (SLR 2015; Brice 2016e).

In 2017, petroleum-related VOCs (including BTEX) and PAH were added to the analytical suite per ADEC request based on revisions to the ADEC *Field Sampling Guidance* (ADEC 2017). Ethylbenzene and naphthalene concentrations exceeded ADEC Table C groundwater cleanup levels in well TS2-15O. Contaminant concentration trends were observed to be generally consistent with historical observations; and although consistent, concentrations of benzene and xylenes were below cleanup levels (Brice 2019b).

4.5.3 TS 2-15 Monitoring Well Inspections and Maintenance

A downhole camera was used in wells FS2-15B and TS2-15O to determine screen lengths, and 10-foot screens were confirmed for both wells. Obstructive tubing was removed from well TS2-15O at approximately 2 feet btoc using the downhole camera as a visual aid.

Table 4-9 summarizes the well inspection observations and maintenance actions performed at SRF TS 2-15 during the 2019 field activities.

Table 4-9: TS 2-15 Monitoring Well Inspection and Maintenance Summary

Well Name	Condition	Stickup Height (feet)	Gauged	2019 Maintenance and Observations
TS2-15O	Fair	1.5	Yes	Monument casing pierced and does not affect PVC casing. Monument lid repaired. Faint HC odor.
TS2-15P	Good	2.5	Yes	Hard hit at total depth.
TS2-15Q	Good	2.25	Yes	Soft hit at total depth. Small amount of brown residue on probe.
TS2-15R	Fair	2.25	Yes	Monument lid broken; cannot lock. Hard hit at total depth.
FS2-15B	Good	3.0	Yes	Monument casing loose. Soft hit at total depth. Black residue on water level meter probe. Non-HC odor. Well cap replaced.

Notes:
For definitions, see the Acronyms and Abbreviations section.

4.5.4 TS 2-15 Groundwater Gauging Results

All viable TS 2-15 monitoring wells were gauged on 3 July 2019 (Figure 11) between 0600 and 0700. Groundwater elevations ranged between 299.84 feet and 313.36 feet (NAVD88) at TS 2-15, and estimated direction of groundwater was northwest, which is generally consistent with historical observations.

4.5.5 TS 2-15 Groundwater Analytical Results

Four wells were scheduled to be sampled at TS 2-15 in 2019. Monitoring wells TS2-15O, TS2-15P, TS2-15R, and FS2-15B were successfully sampled for petroleum-related VOCs (including BTEX) and PAH. A duplicate sample was collected at monitoring well TS2-15O, and extra volume for MS/MSD analysis was collected at monitoring well TS2-15P.

Concentrations of 1,2,4-trimethylbenzene, benzene, ethylbenzene, naphthalene, and xylenes in well TS2-15O exceeded ADEC Table C groundwater cleanup levels. Results for all other analytes were either non-detect or were detected below ADEC Table C groundwater cleanup levels. Contaminant concentrations are observed to be generally consistent with historical observations.

Analytical results for petroleum-related VOCs and PAH from the 2017 and 2019 monitoring events were evaluated against 20% of the current ADEC Table C groundwater cleanup levels. In 2017 and 2019, detected results for 1,2,4-trimethylbenzene, benzene, ethylbenzene, naphthalene, and xylenes in well TS2-15O exceeded 20% of current ADEC Table C groundwater cleanup levels. In 2019, detected results for 1,3,5-trimethylbenzene and 1-methylnaphtalene in well TS2-15O also exceeded 20% of current ADEC Table C groundwater cleanup levels. Results for all other analytes were non-detect or were detected at concentrations less than 20% of ADEC Table C groundwater cleanup levels. Wells TS2-15P, TS2-15R, and FS2-15B are sampled every 4 years and require at least one additional sampling event before analytes may be removed from their sampling suite. Based on these data, well TS2-15O will continue to be monitored for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene,

xylenes, and 1-methylnaphthalene on a biennial frequency; and wells TS2-15P, TS2-15R, and FS2-15B will continue to be sampled for petroleum-related VOCs (including BTEX) and PAH every 4 years. Analytical results that exceed 20% of current ADEC Table C groundwater cleanup levels are presented in Attachment F-2 (Appendix F).

Table 4-10 summarizes concentrations for each analyte detected above the ADEC Table C cleanup levels. Compiled historical results, including 2019 data, are summarized in Table B5-3 (Appendix B). Complete 2019 analytical results are included in Appendix F.

Table 4-10: Summary of Exceedances at SRF TS 2-15

Well Name	1,2,4-Trimethylbenzene	Benzene	Ethylbenzene	Naphthalene	Xylenes (Total)
ADEC Table C (µg/L)	*56*	*4.6*	*15*	*1.7*	*190*
TS2-15O[1]	**84.7**	**6.44**	**189**	**14.4**	**633**
TS2-15P[2]	ND [1]	ND [0.4]	ND [1]	ND [0.0909]	ND [3]
TS2-15R[2]	ND [1]	ND [0.4]	ND [1]	ND [0.107]	ND [3]
FS2-15B[2]	ND [1]	ND [0.4]	ND [1]	ND [0.104]	ND [3]

Notes:
For definitions, see the Acronyms and Abbreviations section.
Bold red text indicates that the concentration exceeds the ADEC Table C cleanup level.
Naphthalene result reported from method SW8260C.

4.5.6 TS 2-15 Conclusions and Recommendations

Biennial groundwater monitoring at SRF TS 2-15 was completed in July 2019. Planned field activities that were completed included monitoring well inspection and maintenance, measurement of groundwater elevation at five monitoring wells, and sampling at four monitoring wells.

During groundwater monitoring well inspection and maintenance activities, a downhole camera was used to determine screen lengths in wells TS2-15O and FS2-15B, which were confirmed to be 10 feet. The monument lid on TS2-15R is broken and cannot be locked; this well is recommended for repair during monitoring well installation, decommissioning, and maintenance activities scheduled for 2020 under a separate work plan. The monument lid on TS2-15O was repaired. All other wells were in generally good condition and require little maintenance.

Water level measurements collected on 3 July 2019 were combined with casing elevations using 2015 survey data to generate a model of the potentiometric surface of the groundwater at TS 2-15. In the July 2019 model, SRF TS 2-15 groundwater flows to the northwest, which is generally consistent with historical observations.

During 2019 groundwater monitoring activities, monitoring wells TS2-15O, TS2-15P, TS2-15R, and FS2-15B were successfully sampled for petroleum-related VOCs (including BTEX) and PAH. The 2019 groundwater monitoring results indicated exceedances of 1,2,4-trimethylbenzene, benzene, ethylbenzene,

naphthalene, and xylenes above ADEC Table C groundwater cleanup levels. Results for all other analytes were either non-detect or were less than ADEC Table C groundwater cleanup levels.

Screening 2017 and 2019 analytical results against 20% of the current ADEC Table C groundwater cleanup levels indicated that monitoring well TS2-15O will continue to be monitored for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene. Wells TS2-15P, TS2-15R, and FS2-15B have not been sampled more than once for these analytes and will continue to be monitored for petroleum-related VOCs and PAH.

Based on the 2019 activities and observations, the following actions are recommended:

- Repair monument lid on TS2-15R during monitoring well installation, decommissioning, and maintenance activities scheduled for 2020 under a separate work plan.
- Continue sampling monitoring well TS2-15O for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene on a biennial frequency.
- Continue sampling monitoring wells FS2-15B, TS2-15P, and TS2-15R for petroleum-related VOCs (including BTEX) and PAH once every 4 years. The next sampling event will be in 2023. Analytes observed below 20% of ADEC Table C groundwater cleanup levels in two consecutive events will be eliminated from this sampling suite.
- Continue modeling groundwater contours based on biennial gauge data from wells TS2-15O, TS2-15P, TS2-15Q, TS2-15R, and FS2-15B.

4.6 TS 3-4

SRF TS 3-4 is located in Township 7 North, Range 9 West, Sections 4 and 5, Seward Meridian (Figure 2). Figures 13 and 14 present 2019 groundwater elevations and contours and analytical results, respectively, at TS 3-4.

4.6.1 TS 3-4 Geology and Hydrogeology

Groundwater at TS 3-4 has historically been observed to flow generally to the southeast during summer/fall sampling events, and the groundwater elevation is approximately 146 feet relative to the NAVD88 (Oil Risk 2011; SLR 2015; Brice 2016f, 2019b).

4.6.2 TS 3-4 Previous Investigations and Monitoring Activities

Seven monitoring wells were installed by 1990, and five additional monitoring wells were installed in 2002. The groundwater monitoring wells at TS 3-4 were sampled for BTEX on an annual basis from 2000 to 2010. Between 2011 and 2013, groundwater monitoring did not occur, but monitoring resumed in 2014. The site was moved to a periodic sampling basis in 2015 with the site wells split between two sampling frequencies, biennial and every 4 years.

BTEX analytes have been detected at concentrations exceeding ADEC Table C cleanup levels in wells TS3-4D, TS3-4P, FS3-4D, and FS3-4F since groundwater monitoring began in 2000, and in TS3-4CC since it

was installed in 2002. LNAPL was observed in TS3-4D and FS3-4D during previous sampling events as well as the most current sampling event. During previous sampling events, results for all BTEX analytes in monitoring wells TS3-4Z, TS3-4MM, TS3-4NN, TS3-4OO, TS3-4PP, FS3-4A, and FS3-4B were non-detect or below the ADEC Table C cleanup levels (SLR 2015; Brice 2016f). No surface water was observed at or adjacent to the site, and it was determined that contaminated groundwater was adequately bound downgradient by uncontaminated monitoring wells TS3-4MM, FS3-4A, and FS3-4B (Brice 2016f).

In 2017, petroleum-related VOCs (including BTEX) and PAH were added to the analytical suite per ADEC request based on revisions to the ADEC *Field Sampling Guidance* (ADEC 2017). Concentrations of 1,2,4-trimethylbenzene, benzene, ethylbenzene, naphthalene, and 1-methylnaphthalene exceeded the ADEC Table C groundwater cleanup level among monitoring wells TS3-4CC, TS3-4P, and FS3-4F. Product was detected in wells FS3-4D and TS3-4D, and they were not sampled. At approximately 18 feet btoc, an obstruction in TS3-4CC prevented deployment of a HydraSleeve, and VOC samples were collected using a peristaltic pump (Brice 2019b).

4.6.3 TS 3-4 Monitoring Well Inspections and Maintenance

A downhole camera was used in wells FS3-4A, FS3-4B, FS3-4F, and TS3-4P to verify screen lengths, and 10-foot screens were confirmed for these wells. In addition, the downhole camera was used to investigate an anticipated 2017 obstruction in well TS3-4CC, and no obstruction was encountered or observed. However, a tubing obstruction was removed from well TS3-4P at approximately 4 feet btoc using the downhole camera as a visual aid.

Table 4-11 summarizes the well inspection observations and maintenance actions performed at SRF TS 3-4 during 2019 field activities.

Table 4-11: TS 3-4 Monitoring Well Inspection and Maintenance Summary

Well Name	Condition	Stickup Height (feet)	Gauged	2019 Maintenance and Observations
TS3-4D	Good	2.0	Yes	Product detected on water level meter tape and probe. Sock placed.
TS3-4P	Good	1.3	Yes	Faint HC odor on water level meter probe.
TS3-4Z	Good	1.6	Yes	None.
TS3-4CC	Fair	2.0	Yes	Monument is slightly tilted. Well cap replaced.
TS3-4MM	Heaved	2.8	Yes	None.
TS3-4NN	Heaved	3.4	Yes	Well cap replaced.
TS3-4OO	Heaved	2.8	Yes	Monument casing is loose.
TS3-4PP	Fair	2.5	Yes	Monument casing is loose.
FS3-4A	Heaved	2.5	Yes	Concrete base displaced. PVC casing tilted. Monument is casing loose. Dark gray sediment (not characteristic of bentonite) on water level meter probe.
FS3-4B	Heaved	1.5	Yes	Well cap replaced.

Table 4-11: TS 3-4 Monitoring Well Inspection and Maintenance Summary

Well Name	Condition	Stickup Height (feet)	Gauged	2019 Maintenance and Observations
FS3-4D	Heaved	Not Measured	LNAPL	Smaller diameter (1.25-inch) nested inside 2-inch PVC casing. 1-inch sorbent sock placed. Approximately 2.5 gallons of product removed.
FS3-4F	Fair	1.5	Yes	Slightly tilted monument.

Notes:
For definitions, see the Acronyms and Abbreviations section.

4.6.4 TS 3-4 Groundwater Gauging Results

All viable TS 3-4 monitoring wells were gauged on 27 June 2019 (Figure 13) between 1650 and 1850. The depth to water in FS3-4D was not measured due to the presence of product. Groundwater elevations across TS 3-4 ranged from 138.51 feet to 150.27 feet (NAVD88) at TS 3-9, and estimated direction of groundwater was east, which is generally consistent with historical observations.

4.6.5 TS 3-4 Groundwater Analytical Results

Nine monitoring wells were scheduled to be sampled at TS 3-4 in 2019. Monitoring wells TS3-4CC, TS3-4MM, TS3-4OO, TS3-4P, FS3-4A, FS3-4B, and FS3-4F were successfully sampled for petroleum-related VOCs (including BTEX) and PAH. A duplicate sample was collected at TS3-4P, and extra volume for MS/MSD analysis was collected at FS3-4A.

LNAPL was detected in wells FS3-4D and TS3-4D, and they were not sampled. Sorbent socks were placed in both wells. Trace amounts of product were detected at TS3-4D, and approximately 2.5 gallons of product was recovered from FS3-4D.

Concentrations of benzene, ethylbenzene, and naphthalene exceeded ADEC Table C groundwater cleanup levels in well TS3-4P, as did concentrations of naphthalene in well TS3-4CC. Results for all other analytes were either non-detect or were detected below ADEC Table C groundwater cleanup levels. Contaminant concentrations were observed to be generally consistent with historical observations; however, all results were below ADEC Table C groundwater cleanup levels in well FS3-4F, compared to several exceedances that were observed during monitoring in 2017.

Analytical results for petroleum-related VOCs and PAH from the 2017 and 2019 monitoring events were evaluated against 20% of the current ADEC Table C groundwater cleanup levels. In 2017 and 2019, detected results for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene exceeded 20% of current ADEC Table C groundwater cleanup levels among wells TS3-4CC, TS3-4P, FS3-4A, and FS3-4F. Results for all other analytes were non-detect or were detected at concentrations less than 20% of ADEC Table C groundwater cleanup levels. Wells TS3-4MM, TS3-4OO, and FS3-4B are sampled every 4 years and require at least one additional sampling event before analytes may be removed from their sampling suite. Based on these data, wells TS3-4CC, TS3-4P, FS3-4, and FS3-4F will continue to be monitored for 1,2,4-trimethylbenzene, 1,3,5-

trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene on a biennial frequency; and wells TS3-4MM, TS3-4OO, and FS3-4B will continue to be monitored for petroleum-related VOCs and PAH every 4 years. Analytical results that exceed 20% of current ADEC Table C groundwater cleanup levels are presented in Attachment F-2 (Appendix F).

Table 4-12 summarizes concentrations for each analyte detected above the ADEC Table C cleanup levels. Compiled historical results, including 2019 data, are summarized in Table B6-3 (Appendix B). Complete 2019 analytical results are included in Appendix F.

Table 4-12: Summary of Exceedances at SRF TS 3-4

Well Name	Benzene	Ethylbenzene	Naphthalene
ADEC Table C (µg/L)	*4.6*	*15*	*1.7*
TS3-4CC[1]	0.44	11.5	**6.55**
TS3-4D	Contained LNAPL		
TS3-4MM[1]	ND [0.4]	ND [1]	ND [0.102]
TS3-4OO[1]	ND [0.4]	ND [1]	ND [0.107]
TS3-4P[2]	**595**	**176**	**30.1**
FS3-4A[1]	2.05	0.46 J	ND [0.0943]
FS3-4B[1]	0.56	ND [1]	ND [0.0992]
FS3-4D	Contained LNAPL		
FS3-4F[1]	ND [0.4]	ND [1]	ND [0.0909] J-

Notes:
For definitions, see the Acronyms and Abbreviations section.
Bold red text indicates that the concentration exceeds the ADEC Table C groundwater cleanup level.
The LOQ for non-detect analytes is shown in brackets.
[1] Naphthalene determined by method SW8270D SIM.
[2] Naphthalene determined by method SW8260C.

4.6.6 TS 3-4 Conclusions and Recommendations

Biennial groundwater monitoring at SRF TS 3-4 was completed in July 2019. Planned field activities that were completed included monitoring well inspection and maintenance, measurement of groundwater elevation at 12 monitoring wells, and sampling at seven monitoring wells.

During monitoring well inspection and maintenance, a downhole camera was used at wells FS3-4A, FS3-4B, FS3-4F, and TS3-4P to confirm 10-foot screens. A tubing obstruction at approximately 4 feet btoc in TS3-4P was removed using the downhole camera. Well FS3-4D was observed to have a smaller (1.5-inch) diameter casing nested inside a larger (2-inch) diameter casing. Wells TS3-4MM, TS3-4NN, TS3-4OO, FS3-4A, FS3-4B, and FS3-4D were observed to be heaved. All other wells were observed to be in generally good condition and required little maintenance.

Water level measurements collected on 27 June 2019 were combined with casing elevations using 2015 survey data to generate a model of the groundwater. In the June 2019 model, SRF TS 3-4 groundwater flows generally toward the east, which is generally consistent with historical observations.

During 2019 groundwater monitoring activities, monitoring wells TS3-4CC, TS3-4MM, TS3-4OO, TS3-4P, FS3-4A, FS3-4B, and FS3-4F were successfully sampled for petroleum-related VOCs (including BTEX) and PAH. Monitoring wells FS3-4D and TS3-4D were not sampled due to the presence of LNAPL. Sorbent socks were placed in both wells. Trace amounts of product was detected at TS3-4D and approximately 2.5 gallons of product was recovered from FS3-4D.

The 2019 groundwater monitoring results indicated exceedances of benzene, ethylbenzene, and naphthalene. Results for all other analytes were either non-detect or were less than ADEC Table C groundwater cleanup levels. Screening 2017 and 2019 analytical results against 20% of the current ADEC Table C groundwater cleanup levels indicated that monitoring wells TS3-4CC, TS3-4P, FS3-4, and FS3-4F will continue to be monitored for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene. Wells TS3-4MM, TS3-4OO, and FS3-4B have not been sampled more than once for these analytes and will continue to be monitored for petroleum-related VOCs and PAH.

Based on the 2019 activities and observations, the following actions are recommended:

- Continue to monitor and remove LNAPL in monitoring wells FS3-4D and TS3-4D during each biennial sampling event. If LNAPL is not observed, sample well(s) for petroleum-related VOCs (including BTEX) and PAH.
- Continue sampling monitoring wells TS3-4CC, TS3-4P, FS3-4A, and FS3-4F for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene on a biennial frequency.
- Continue sampling monitoring wells TS3-4MM, TS3-4OO, and FS3-4B for petroleum-related VOCs and PAH once every 4 years. The next sampling event will be in 2023. Analytes observed below 20% of ADEC Table C groundwater cleanup levels in two consecutive events will be eliminated from this sampling suite.
- Continue modeling groundwater contours based on biennial gauge data from wells TS3-4Z, TS3-4CC, TS3-4MM, TS3-4NN, TS3-4OO, TS3-4PP, FS3-4A, FS3-4B, and FS3-4F.

4.7 TS 3-9

SRF TS 3-9 is located in Township 7 North, Range 9 West, Section 9, Seward Meridian (Figure 2). Figures 17 and 18 present 2019 groundwater contours and analytical results, respectively, at TS 3-9.

4.7.1 TS 3-9 Geology and Hydrogeology

Groundwater at TS 3-9 has historically been observed to flow generally to the east during summer/fall sampling events, and the groundwater elevation is approximately 150 feet relative to the NAVD88. Observed groundwater flow direction slightly deviated from historical observations in 2014 when groundwater flow was toward the southeast, and in 2015 and 2017, when groundwater flowed generally northeast (Oil Risk 2011; SLR 2015; Brice 2016g, 2019b).

4.7.2 TS 3-9 Previous Investigations and Monitoring Activities

Ten monitoring wells were installed by 1990, and four additional monitoring wells (TS3-9AA, TS3-9BB, TS3-9CC, and TS3-9DD) were installed in 2002. The groundwater monitoring wells at TS 3-9 were sampled for BTEX on an annual basis from 2000 to 2010. Between 2011 and 2013, groundwater monitoring did not occur, but monitoring resumed in 2014. The site was moved to a periodic sampling basis in 2015 with the site wells split between two sampling frequencies, biennial and every 4 years.

Benzene, ethylbenzene, and xylenes have been detected in groundwater samples collected at TS 3-9 at concentrations exceeding the ADEC Table C cleanup level since 2000. Analytes with concentrations consistently exceeding the ADEC Table C cleanup levels since 2000 include benzene in samples collected from four monitoring wells (TS3-9C/9CR, TS3-9F, TS3-9V, and FS3-9E), ethylbenzene in samples collected from four monitoring wells (TS3-9C, TS3-9F, TS3-9T, and FS3-9E), and xylenes in samples collected from two monitoring wells (TS3-9C/CR and TS3-9F). Benzene, ethylbenzene, and xylenes consistently exceeded ADEC Table C cleanup levels in monitoring well TS3-9C from 2000 to 2010; however, it was no longer sampled after 2010 due to LNAPL presence in 2014 and an obstruction in the well in 2015. It was decommissioned in 2017 and replaced with monitoring well TS3-9CR, which again exceeded ADEC Table C cleanup levels for only benzene and xylenes.

Benzene concentrations have exceeded the ADEC Table C cleanup level occasionally in samples collected from seven monitoring wells at TS 3-9: eight times in samples collected from TS3-9A (most recently in 2007), nine times in samples collected from in TS3-9S (most recently in 2009), 12 times in samples collected from TS3-9T (most recently in 2017), five times in samples collected from in TS3-9U (most recently in 2014), once in TS3-9AA (2005), six times in samples collected from TS3-9BB (most recently in 2017) and once in FS3-9B (2002). Ethylbenzene concentrations have occasionally exceeded the ADEC Table C cleanup level in samples collected from seven monitoring wells at TS 3-9: once in TS3-9A (2002), four times in samples collected from TS3-9S (most recently in 2002), twice in samples collected from TS3-9U (2000 and 2003), seven times in samples collected from TS3-9V (most recently in 2015), four times in samples collected from TS3-9AA (most recently in 2006), eight times in samples collected from TS3-9BB (most recently in 2017), and once in FS3-9B (2002). Xylene concentrations have exceeded the ADEC Table C cleanup level occasionally in samples collected from three monitoring wells at TS 3-9: once in TS3-9A (2010), once in TS3-9U (2003), and nine times in samples collected from FS3-9E (most recently in 2010). Since 2000, BTEX concentrations in TS3-9CC, TS3-9DD, and FS3-9G have not been detected or have been detected at low concentrations.

LNAPL has been observed in TS3-9C (most recently in 2015), TS3-9F (most recently in 2017), TS3-9T (most recently in 2002), TS3-9U (most recently in 2005), and FS3-9E (most recently in 2019) (Brice 2016g).

4.7.3 TS 3-9 Monitoring Well Inspections and Maintenance

The downhole camera was used at wells TS3-9F, TS3-9T, TS3-9U, TS3-9V, and FS3-9G to verify screen intervals. Wells TS3-9F and FS3-9G were confirmed to have 5-foot screens; wells TS3-9U and TS3-9V were confirmed to have 10-foot screens; and well TS3-9T was confirmed to have a 15-foot screen.

Table 4-13 summarizes the well inspection observations and maintenance actions performed at SRF TS 3-9 during the 2019 field activities.

Table 4-13: TS 3-9 Monitoring Well Inspection and Maintenance Summary

Well Name	Condition	Stickup Height (feet)	Gauged	2019 Maintenance and Observations
TS3-9A	Good	2.5	LNAPL	Sock replaced. Recovered approximately 1 gallon of product. Measured product thickness is 1.32 feet.
TS3-9CR	Good	2.5	Yes	Lock replaced. Located on boundary of temporary secondary containment. Slight HC odor.
TS3-9F	Fair	2.3	Yes	Sock flipped. PVC casing coated with product/residue. Concrete base cracked. Trace product on oil-water interface probe.
TS3-9S	Good	1.8	Yes	None.
TS3-9T	Good	2.0	Yes	Slight HC odor on water level meter probe. Bailer located in monument. Trace product on downhole camera.
TS3-9U	Good	2.3	Yes	Sock flipped. Well cap replaced.
TS3-9V	Good	2.0	Yes	Gray sediment (not characteristic of bentonite) on water level meter probe.
TS3-9AA	Good	2.5	Yes	Gray sediment (not characteristic of bentonite) on water level meter probe.
TS3-9BB	Good	2.0	Yes	Gray sediment (not characteristic of bentonite) on water level meter probe.
TS3-9CC	Good	2.0	Yes	Broken monument lid and collar. Mislabeled “TS3-9T” and corrected to “TS3-9CC.” Gray sediment (not characteristic of bentonite) on probe.
TS3-9DD	Good	2.5	Yes	None.
FS3-9B	Good	2.5	Yes	None.
FS3-9E	Good	-	LNAPL	Sock replaced.
FS3-9G	Good	1.75	Yes	PVC casing tilted against monument.

Notes:
For definitions, see the Acronyms and Abbreviations section.

4.7.4 TS 3-9 Groundwater Gauging Results

All viable TS 3-9 monitoring wells were gauged on 28 June 2019 between 1155 and 1355. Well TS3-9BB was omitted from the groundwater contour model due to an anomalous groundwater elevation, and well TS3-9A was omitted due to over 3 feet of LNAPL present (Appendix C, Photo 118). Groundwater elevations ranged between 146.65 feet and 149.83 feet at TS 3-9, and estimated direction of groundwater flow in 2019 was generally southeast, which varies slightly from historical northeast observations in 2015 and 2017 but is consistent with 2014 historical observations.

4.7.5 TS 3-9 Groundwater Analytical Results

Twelve monitoring wells were scheduled to be sampled at TS 3-9 in 2019. Monitoring wells TS3-9AA, TS3-9BB, TS3-9DD, TS3-9CR, TS3-9F, TS3-9T, TS3-9U, TS3-9V, FS3-9B, and FS3-9G were successfully sampled for petroleum-related VOCs (including BTEX) and PAH. Duplicate samples were collected from TS3-9BB and TS3-9V. Extra volume for MS/MSD analysis was collected at FS3-9B.

LNAPL was detected in monitoring wells TS3-9A and FS3-9E, and these wells were not sampled. The cooler containing samples from monitoring wells TS3-9F, TS3-9T, TS3-9U, TS3-9V, and FS3-9G collected in early

July was received with measured temperature exceeding 6°C when received at the laboratory; therefore, these samples were re-collected on 12 July 2019. During the first round of sampling, residual product was observed coating the PVC casing of TS3-9F; when samples were re-collected at TS3-9F, a peristaltic pump was used to eliminate contact between sampling equipment and the product-coated PVC casing.

Concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene exceeded ADEC Table C groundwater cleanup levels among wells TS3-9BB, TS3-9CR, TS3-9F, TS3-9T, and TS3-9V. Results for all other analytes were either non-detect or were detected below ADEC Table C groundwater cleanup levels. Contaminant concentrations were generally consistent with historical observations.

Analytical results for petroleum-related VOCs and PAH from the 2017 and 2019 monitoring events were evaluated against 20% of the current ADEC Table C groundwater cleanup levels. In 2017 and 2019, detected results for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene exceeded ADEC Table C groundwater cleanup levels among wells TS3-9BB, TS3-9CR, TS3-9T, and TS3-9V. Detected results for the same analytes in wells TS3-9AA, TS3-9F, and TS3-9U exceeded 20% of the current ADEC Table C groundwater cleanup levels in 2019; these wells are sampled every 4 years and require at least one additional sampling event before analytes may be removed from their sampling suite. In addition, well TS3-9F was not sampled in 2017 due to presence of LNAPL and requires at least one additional sampling event before analytes may be removed from the biennial sampling suite. Results for all other analytes were non-detect or were detected at concentrations less than 20% of ADEC Table C groundwater cleanup levels. Based on these data, wells at TS 3-9 will continue to be monitored for petroleum-related VOCs and PAH. Analytical results that exceed 20% of current ADEC Table C groundwater cleanup levels are presented in Attachment F-2 (Appendix F).

Table 4-14 summarizes concentrations for each analyte detected above the ADEC Table C cleanup levels. Compiled historical results, including 2019 data, are summarized in Table B7-3 (Appendix B). Complete 2019 analytical results are included in Appendix F.

Table 4-14: Summary of Exceedances at SRF TS 3-9

Well Name	1,2,4-Trimethyl benzene	1,3,5-Trimethyl benzene	Benzene	Ethyl benzene	Naphthalene	Xylenes (Total)	1-Methyl naphthalene
ADEC Table C (µg/L)	*56*	*60*	*4.6*	*15*	*1.7*	*190*	*11*
TS3-9A	Contained LNAPL						
TS3-9AA[1]	ND [1]	0.413 J	0.786	2.87	0.42 J	ND [3]	0.033 J
TS3-9BB[1]	ND [1]	2.27	**5.34**	**35.9**	0.842 J	ND [3]	ND [0.0463]
TS3-9CR[1]	**424**	**395**	**8.55**	7.86	**21.1**	**894**	5.02 J-
TS3-9DD[2]	ND [1]	ND [1]	ND [0.4]	ND [1]	ND [0.0926]	ND [3]	ND [0.0463]
TS3-9F[1]	**536**	**290**	**13.7**	**493**	**89.7**	**1,580**	**24.2**
TS3-9G[2]	ND [1]	ND [1]	ND [0.4]	ND [1]	ND [0.101]	ND [3]	ND [0.0504]
TS3-9T[1]	7.76	9.31	3.19	**31.7**	**3.82**	2.55 J	3.3

Table 4-14: Summary of Exceedances at SRF TS 3-9

Well Name	1,2,4-Trimethyl benzene	1,3,5-Trimethyl benzene	Benzene	Ethyl benzene	Naphthalene	Xylenes (Total)	1-Methyl naphthalene
TS3-9U[1]	2.11	0.9 J	1.05	1.73	0.913	3.37	ND [0.049]
TS3-9V[1]	18.5	17.1 J	**17.5**	2.34	**17.8**	15.9	2.74

Notes:
For definitions, see the Acronyms and Abbreviations section.
Bold red text indicates that the concentration exceeds ADEC Table C groundwater cleanup levels.
The LOQ for non-detect analytes is shown in brackets.
[1] Naphthalene determined by method SW8260C.
[2] Naphthalene determined by method SW8270D SIM.

4.7.6 TS 3-9 Conclusions and Recommendations

Biennial groundwater monitoring at SRF TS 3-9 was completed in July 2019. Planned field activities that were completed included monitoring well inspection and maintenance, measurement of groundwater elevation at 14 monitoring wells, and sampling at 10 monitoring wells.

During monitoring well inspection and maintenance activities, the downhole camera was used in wells TS3-9F, TS3-9T, TS3-9U, TS3-9V, and FS3-9G. Screen lengths were confirmed to be 5 feet in TS3-9F and FS3-9G, 10 feet in TS3-9U and TS3-9V, and 15 feet in TS3-9T. TS3-9CC was relabeled due to mislabeling and has a broken monument lid and collar that is recommended for repair during monitoring well installation, decommissioning, and maintenance activities scheduled for 2020 under a separate work plan. All other wells were in generally good condition and required little maintenance.

Water level measurements collected on 28 June 2019 were combined with casing elevations using 2015 and 2017 survey data to generate a model of the potentiometric surface of the groundwater. In the June 2019 model, SRF TS 3-9 groundwater flows generally to the southeast, which is consistent with 2014 historical observations.

During 2019 groundwater monitoring activities, monitoring wells TS3-9AA, TS3-9BB, TS3-9DD, TS3-9CR, TS3-9F, TS3-9T, TS3-9U, TS3-9V, FS3-9B, and FS3-9G were successfully sampled in 2019 and analyzed for petroleum-related VOCs (including BTEX) and PAH. Monitoring wells TS3-9A and FS3-9E were not sampled due to the presence of LNAPL, and sorbent socks were replaced in both of these wells.

The 2019 groundwater monitoring results indicated exceedances of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene above ADEC Table C groundwater cleanup levels. Results for all other analytes were either non-detect or less than ADEC Table C groundwater cleanup levels. Screening 2017 and 2019 analytical results against 20% of the current ADEC Table C groundwater cleanup levels indicated that most wells at TS 3-9 require continued monitoring for a subset of analytes including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, ethylbenzene, naphthalene, xylenes, and 1-methylnaphthalene; however, because well TS3-9F was not sampled in 2017 due to LNAPL detection and requires at least one more sampling event,

monitoring wells at TS 3-9 will continue to be monitored for petroleum-related VOCs (including BTEX) and PAH.

Based on the 2019 activities and observations, the following actions are recommended:

- Repair TS3-9CC during monitoring well installation, decommissioning, and maintenance activities scheduled for 2020 under a separate work plan. Monument lid and collar are broken and cannot be securely locked.
- Continue to monitor and remove LNAPL in monitoring well TS3-9A during each biennial sampling event. If LNAPL is not observed, sample for petroleum-related VOCs (including BTEX) and PAH.
- Continue sampling monitoring wells TS3-9BB, TS3-9CR, TS3-9F, TS3-9T, and TS3-9V for petroleum-related VOCs (including BTEX) and PAH on a biennial frequency. Analytes observed below 20% of ADEC Table C groundwater cleanup levels in two consecutive events will be eliminated from this sampling suite.
- Continue sampling monitoring wells TS3-9AA, TS3-9DD, FS3-9B, and FS3-9G for petroleum-related VOCs (including BTEX) and PAH once every 4 years. The next sampling event will be in 2023. Analytes observed below 20% of ADEC Table C groundwater cleanup levels in two consecutive events will be eliminated from this sampling suite.
- Continue modeling groundwater contours based on biennial gauge data from wells TS3-9A, TS3-9CR, TS3-9S, TS3-9V, TS3-9AA, TS3-9BB, TS3-9CC, TS3-9DD, FS3-9B, and FS3-9G.

4.8 Quality Assurance and Quality Control

QA/QC procedures were maintained throughout the sampling activities. QA procedures included the collection and analysis of field duplicates, adherence to appropriate sample collection methodology as described in the Work Plan (Brice 2019a), and preparation of a chemical data quality review by qualified Brice staff. The data quality review included the completion of an ADEC Laboratory Data Review Checklist for each analytical report. Any QA/QC discrepancies were identified in the ADEC Laboratory Data Review Checklists presented in Appendix F.

4.9 Analytical Data Quality

Although several data quality issues were identified that required results to be qualified, all data were considered usable and the overall quality of the project data was acceptable. Complete details of the data quality review are included in the summary report and the completed ADEC Laboratory Data Review Checklist for each laboratory analytical data package in Appendix F. Laboratory analytical data packages are included in Appendix G.

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5.0 REFERENCES

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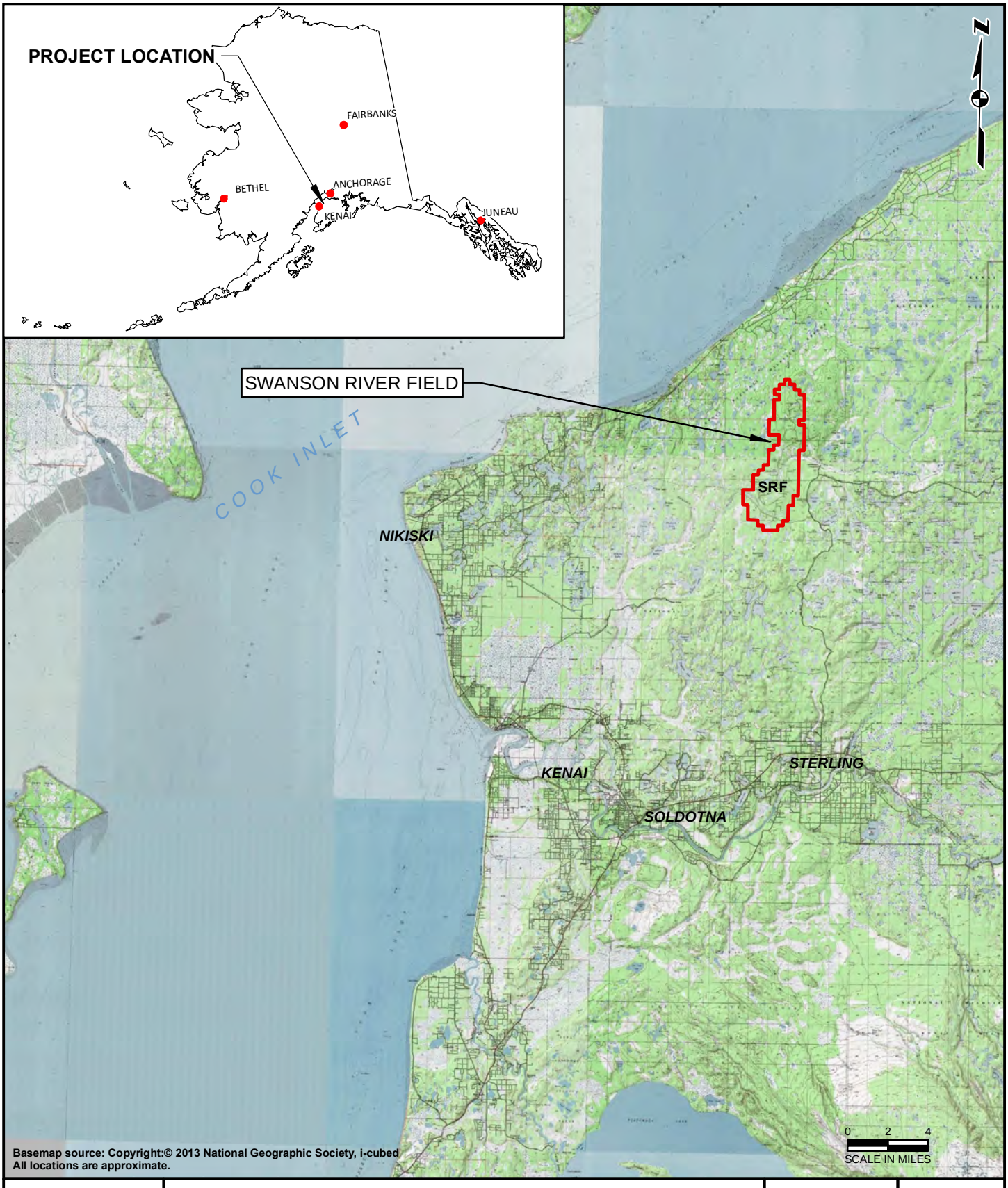
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APPENDIX A:
FIGURES

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2019 GROUNDWATER MONITORING PROGRAM REPORT
SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

STATE AND SITE VICINITY

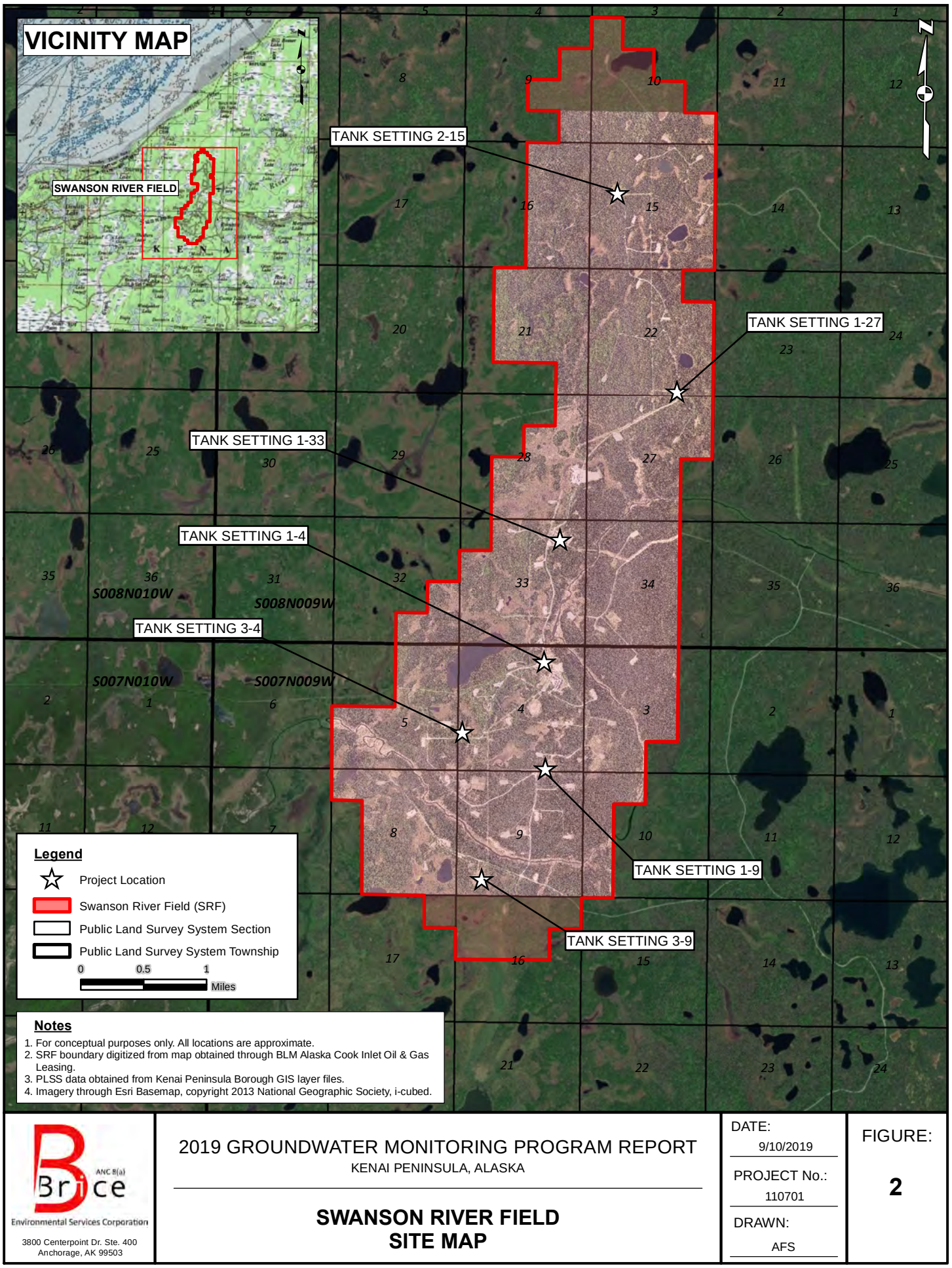
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2019 GROUNDWATER MONITORING PROGRAM REPORT

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD SITE MAP

DATE: 9/10/2019

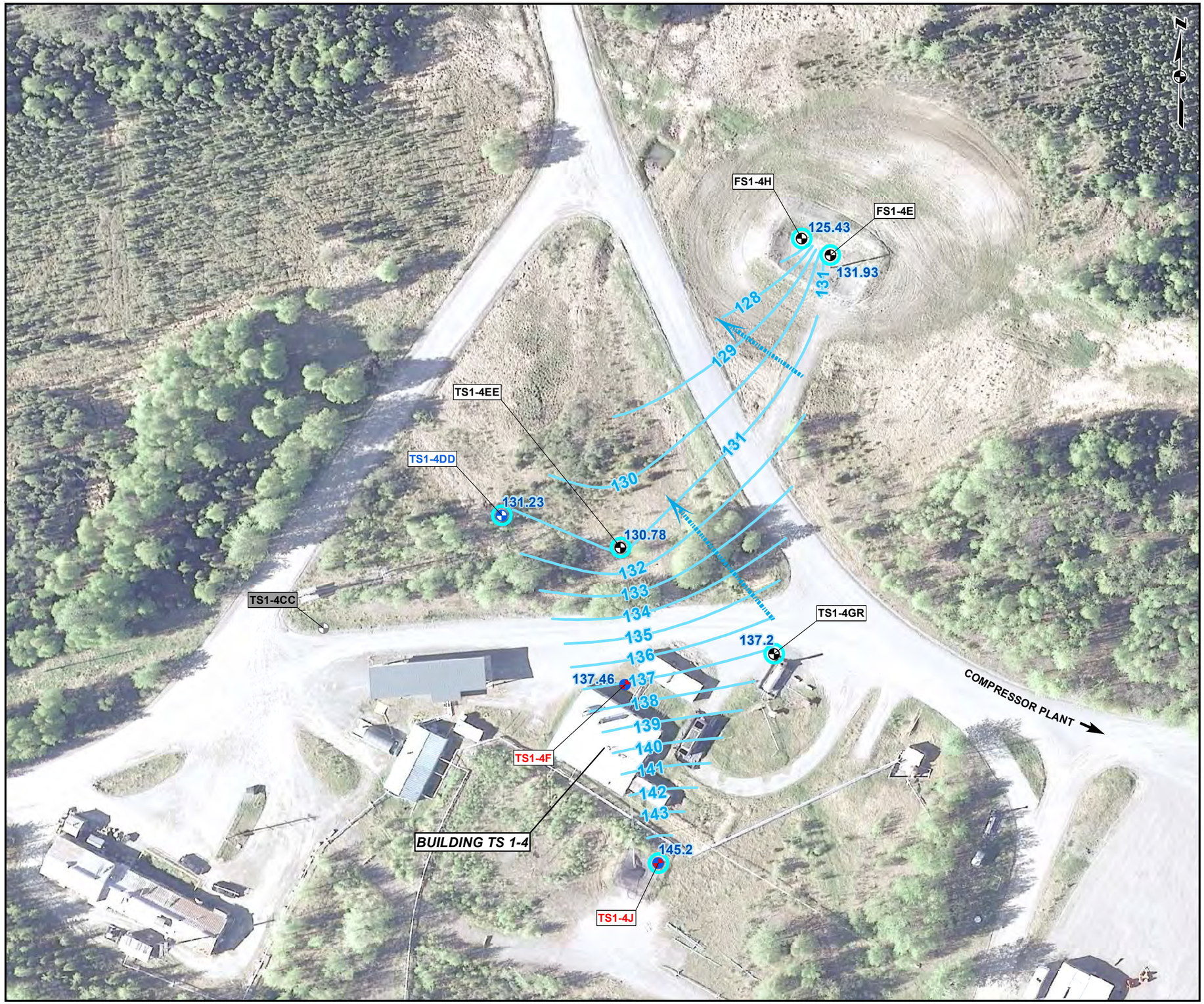
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2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 1-4 MONITORING WELL LOCATIONS AND GROUNDWATER FLOW DIRECTION

Legend

- Approximate Groundwater Flow Direction
- XX.XX — Groundwater Elevation (feet)
- 100 — Groundwater Contour with Elevation (feet)

Monitoring Well Location

- Gauged
- Gauged Not Sampled - LNAPL Present
- Gauged and Sampled Well in Program
- To Be Decommissioned
- Water Table Modeling Well

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Groundwater elevations provided in NAVD88 datum.
4. Cyan circles around the well symbol indicate that the well is used in water table modeling. Groundwater contours were generated with Surfer 16 software using kriging.
5. Monitoring well TS1-4CC was designated as a water table monitoring well in 2017, but the well was severely damaged between the 2017 and 2019 sampling events and can no longer be gauged. It is excluded from modeling.

80 40 0 80 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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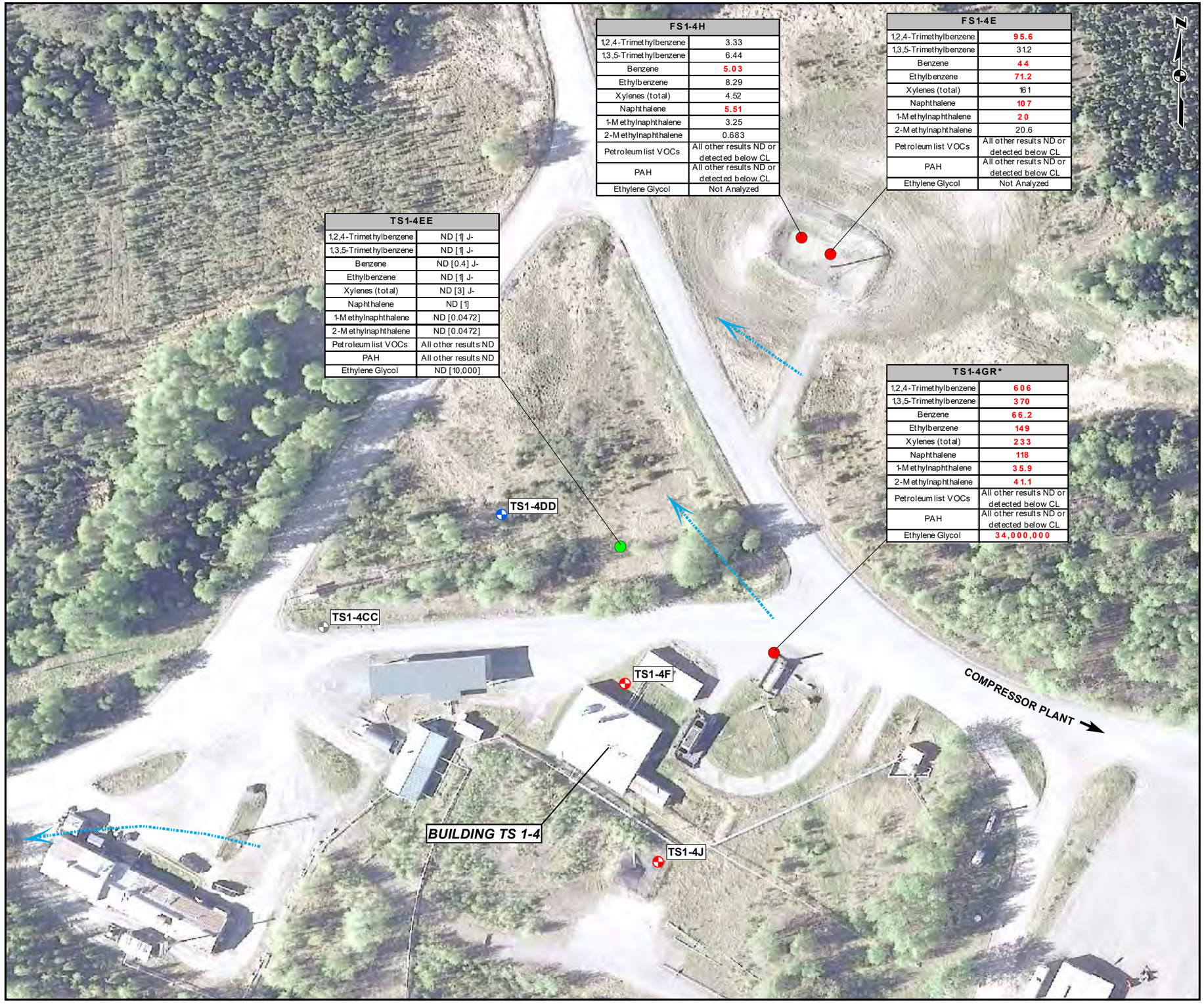
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2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 1-4 ANALYTICAL RESULTS

Legend

Approximate Groundwater Flow Direction

Monitoring Well Location

- Gauged
- All Results Below Cleanup Levels
- Result(s) Exceeding Cleanup Levels
- Not Sampled - LNAPL Present
- To Be Decommissioned

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Results presented for analytes exceeding the ADEC CL in one or more wells during the 2019 groundwater monitoring event.
4. **Bold** value indicates that the result exceeds the ADEC CL.
5. All results presented in ug/L.
6. For duplicate samples, the highest detected result is reported.
7. Naphthalene was analyzed by SW8260C (VOC) and SW8270D SIM (PAH); only one result is displayed.

Abbreviations

ADEC	Alaska Department of Environmental Conservation
CL	Cleanup Level per 18 AAC 75, Table C (ADEC 2018a)
DRO	diesel-range organics
J-	estimated value biased low
LNAPL	light non-aqueous phase liquid
LOQ	limit of quantitation
ND	non-detect; LOQ given [in brackets]
PAH	polycyclic aromatic hydrocarbons
RRO	residual-range organics
ug/L	micrograms per liter
VOC	volatile organic compound
*	duplicate

18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018)	
Analyte	**µg/L**
1,2,4-Trimethylbenzene	56
1,3,5-Trimethylbenzene	60
Benzene	4.6
Ethylbenzene	15
Xylenes (total)	190
Naphthalene	1.7
1-Methylnaphthalene	11
2-Methylnaphthalene	36
Ethylene Glycol	40000

80 40 0 80 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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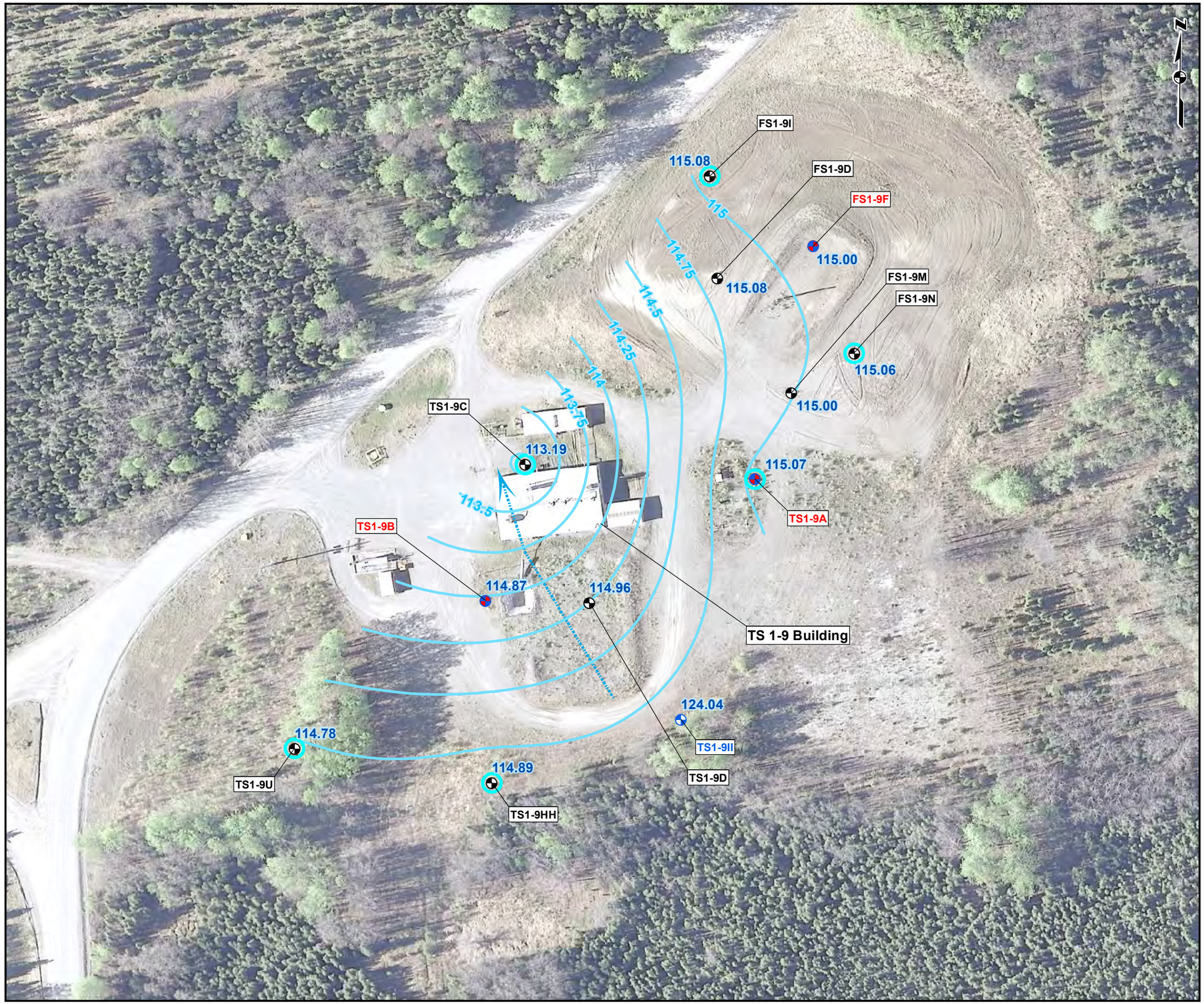
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2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 1-9 MONITORING WELL LOCATIONS AND GROUNDWATER FLOW DIRECTION

Legend

- Approximate Groundwater Flow Direction
- XX.XX — Groundwater Elevation (feet)
- 100.00 — Groundwater Contour with Elevation (feet)

Monitoring Well Location

- Gauged
- Gauged Not Sampled - LNAPL Present
- Gauged and Sampled Well in Program
- Water Table Modeling Well

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Groundwater elevations provided in NAVD88 datum.
4. Cyan circles around the well symbol indicate that the well is used in water table modeling. Groundwater contours were generated with Surfer 16 software using kriging.
5. Monitoring well TS1-9II was designated as a water table monitoring well in 2017, but the groundwater elevation calculated in 2019 is such an extreme outlier that it is not considered representative. This well was replaced with TS1-9HH in the 2019 model.

80 40 0 80 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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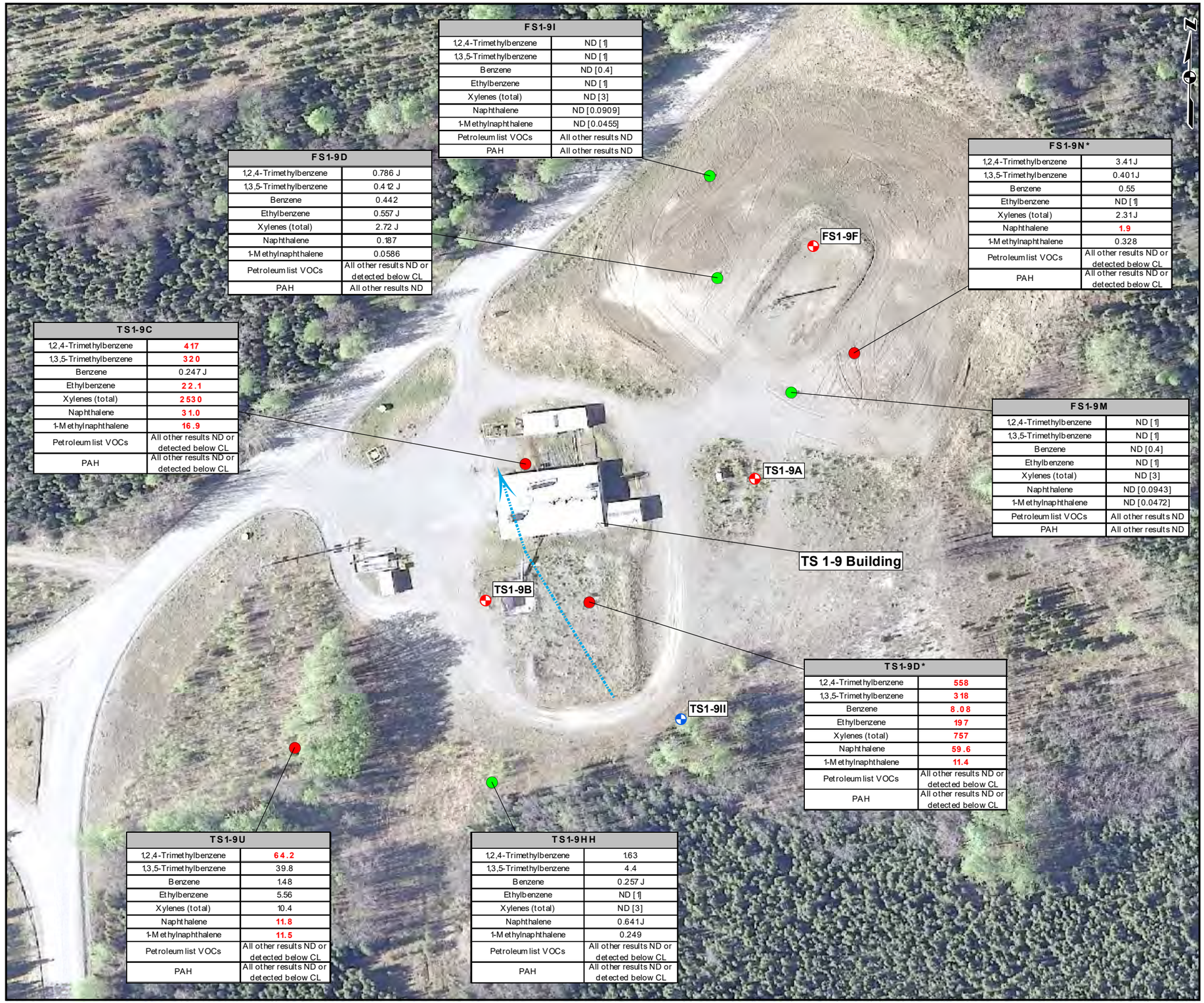
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2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 1-9 ANALYTICAL RESULTS

Legend

Approximate Groundwater Flow Direction

Monitoring Well Location

- Gauged
- All Results Below Cleanup Levels
- Result(s) Exceeding Cleanup Levels
- Not Sampled - LNAPL Present

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Results presented for analytes exceeding the ADEC CL in one or more wells during the 2019 groundwater monitoring event.
4. **Bold** value indicates that the result exceeds the ADEC CL.
5. All results presented in mg/L.
6. For duplicate samples, the highest detected result is reported.
7. Naphthalene was analyzed by SW8260C (VOC) and SW8270D SIM (PAH); only one result is displayed.

Abbreviations

ADEC	Alaska Department of Environmental Conservation
CL	Cleanup Level per 18 AAC 75, Table C (ADEC 2018a)
DRO	diesel-range organics
J	estimated value
LNAPL	light non-aqueous phase liquid
LOQ	limit of quantitation
ND	non-detect; LOQ given [in brackets]
PAH	polycyclic aromatic hydrocarbons
RRO	residual-range organics
ug/L	micrograms per liter
VOC	volatile organic compound
*	duplicate

18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018)	
Analyte	**µg/L**
1,2,4-Trimethylbenzene	56
1,3,5-Trimethylbenzene	60
Benzene	4.6
Ethylbenzene	15
Xylenes (total)	190
Naphthalene	1.7
1-Methylnaphthalene	11

80 40 0 80 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET

HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 1-27 MONITORING WELL LOCATIONS AND GROUNDWATER FLOW DIRECTION

Legend

Approximate Groundwater Flow Direction

- Approximate Groundwater Flow Direction
- 100 — Groundwater Contour with Elevation (feet)
- XX.XX — Groundwater Elevation (feet)
- Gauged
- Gauged and Sampled Well in Program
- Water Table Modeling Well

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Groundwater elevations provided in NAVD88 datum.
4. Cyan circles around the well symbol indicate that the well is used in water table modeling. Groundwater contours were generated with Surfer 16 software using kriging.

80 40 0 80 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 1-27 ANALYTICAL RESULTS



FS1-27C	
1,2,4-Trimethylbenzene	ND [1]
1,3,5-Trimethylbenzene	ND [1]
Benzene	ND [0.4]
Ethylbenzene	ND [1]
Xylenes (total)	ND [3]
Naphthalene	ND [0.105]
1-Methylnaphthalene	ND [0.0525]
2-Methylnaphthalene	ND [0.0525]
Petroleum list VOCs	All other results ND
PAH	All other results ND

TS1-27K*	
1,2,4-Trimethylbenzene	**1320**
1,3,5-Trimethylbenzene	**394**
Benzene	**36.6**
Ethylbenzene	**704**
Xylenes (total)	**2590**
Naphthalene	**301**
1-Methylnaphthalene	**58**
2-Methylnaphthalene	**60.9**
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND or detected below CL

TS1-27L	
1,2,4-Trimethylbenzene	ND [1]
1,3,5-Trimethylbenzene	ND [1]
Benzene	ND [0.4]
Ethylbenzene	0.67 J
Xylenes (total)	ND [3]
Naphthalene	**2.47**
1-Methylnaphthalene	0.358
2-Methylnaphthalene	0.248
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND

TS1-27M	
1,2,4-Trimethylbenzene	**343**
1,3,5-Trimethylbenzene	**99.4**
Benzene	3.85
Ethylbenzene	**41.4**
Xylenes (total)	180
Naphthalene	**64.9**
1-Methylnaphthalene	**15.4**
2-Methylnaphthalene	15.3
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND or detected below CL

TS1-27G	
1,2,4-Trimethylbenzene	**60.6 J-**
1,3,5-Trimethylbenzene	19.6
Benzene	**9.24**
Ethylbenzene	**23.2 J-**
Xylenes (total)	**265 J-**
Naphthalene	**9.94**
1-Methylnaphthalene	0.457
2-Methylnaphthalene	0.181
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND

Legend

Approximate Groundwater Flow Direction

Monitoring Well Location

- Gauged
- All Results Below Cleanup Levels
- Result(s) Exceeding Cleanup Levels

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Results presented for analytes exceeding the ADEC CL in one or more wells during the 2019 groundwater monitoring event.
4. **Bold** value indicates that the result exceeds the ADEC CL.
5. All results presented in ug/L.
6. For duplicate samples, the highest detected result is reported.
7. Naphthalene was analyzed by SW8260C (VOC) and SW8270D SIM (PAH); only one result is displayed.
8. Anomalous results were observed in wells TS1-27L and TS1-27M. Evaluation of historical results from these wells indicates that collected samples may have been swapped or mislabeled.

Abbreviations

ADEC	Alaska Department of Environmental Conservation
CL	Cleanup Level per 18 AAC 75, Table C (ADEC 2018a)
DRO	diesel-range organics
J	estimated value
J-	estimated value biased low
LNAPL	light non-aqueous phase liquid
LOQ	limit of quantitation
ND	non-detect; LOQ given [in brackets]
PAH	polycyclic aromatic hydrocarbons
RRO	residual-range organics
ug/L	Micrograms per liter
VOC	volatile organic compound
*	duplicate

18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018)	
Analyte	**µg/L**
1,2,4-Trimethylbenzene	56
1,3,5-Trimethylbenzene	60
Benzene	4.6
Ethylbenzene	15
Xylenes (total)	190
Naphthalene	17
1-Methylnaphthalene	11
2-Methylnaphthalene	36

80 40 0 80 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 1-33 MONITORING WELL LOCATIONS AND GROUNDWATER FLOW DIRECTION



Legend

- Approximate Groundwater Flow Direction
- XX.XX — Groundwater Elevation (feet)
- 100 — Groundwater Contour with Elevation (feet)

Monitoring Well Location

- Gauged
- Gauged and Sampled Well in Program
- To Be Decommissioned
- Water Table Modeling Well

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Groundwater elevations provided in NAVD88 datum.
4. Cyan circles around the well symbol indicate that the well is used in water table modeling. Groundwater contours were generated with Surfer 16 software using kriging.
5. Well TS1-33Q was selected as a water table modeling well, but has not yet been resurveyed after being cut down in 2017. This well is known to heave. It was excluded from modeling in 2019.

100 50 0 100 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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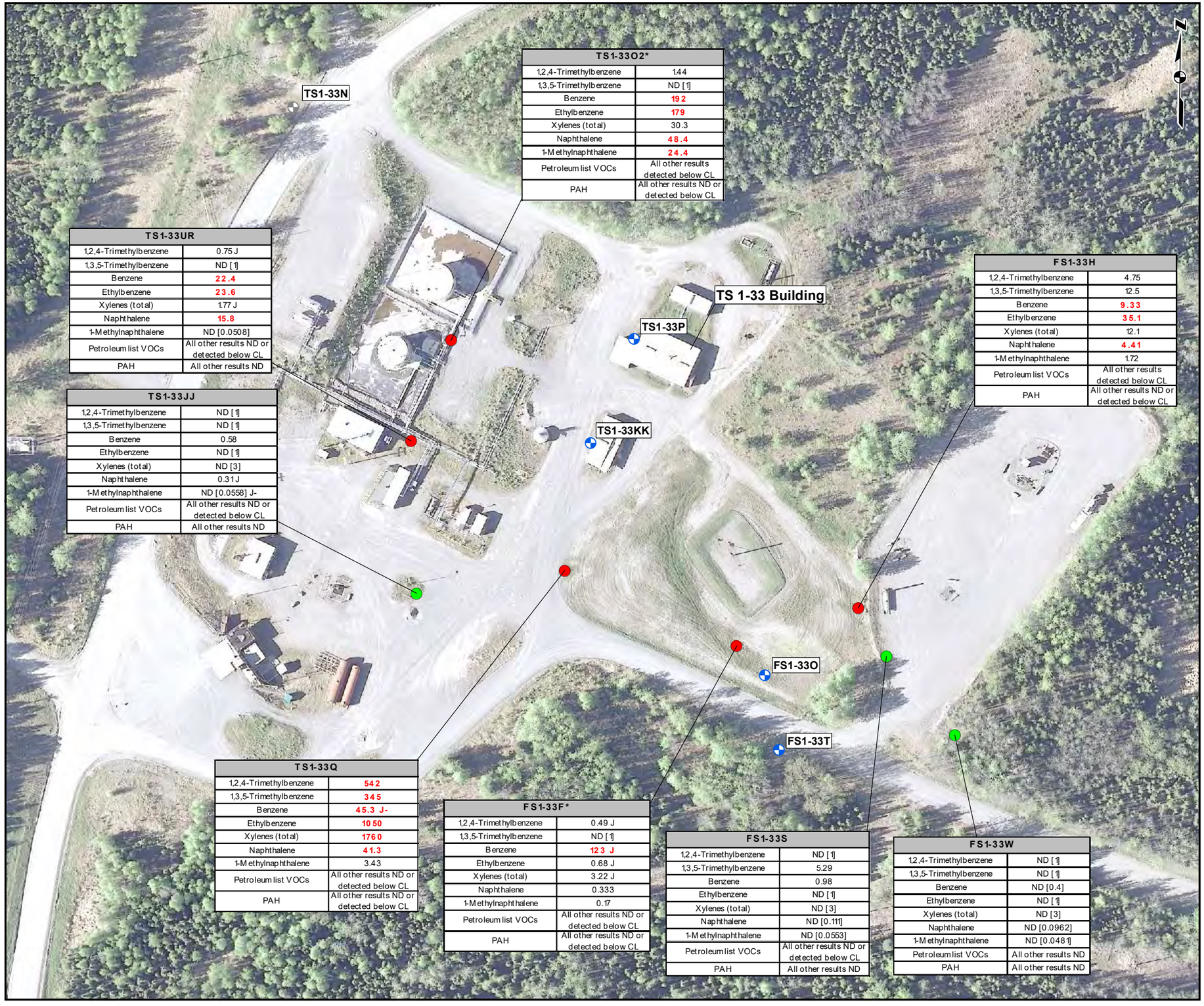
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1 INCH



TS1-33UR	
1,2,4-Trimethylbenzene	0.75 J
1,3,5-Trimethylbenzene	ND [1]
Benzene	**22.4**
Ethylbenzene	**23.6**
Xylenes (total)	1.77 J
Naphthalene	**15.8**
1-Methylnaphthalene	ND [0.0508]
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND

TS1-33JJ	
1,2,4-Trimethylbenzene	ND [1]
1,3,5-Trimethylbenzene	ND [1]
Benzene	0.58
Ethylbenzene	ND [1]
Xylenes (total)	ND [3]
Naphthalene	0.31J
1-Methylnaphthalene	ND [0.0558] J-
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND

TS1-33Q	
1,2,4-Trimethylbenzene	**542**
1,3,5-Trimethylbenzene	**345**
Benzene	**45.3 J-**
Ethylbenzene	**1050**
Xylenes (total)	**1760**
Naphthalene	**41.3**
1-Methylnaphthalene	3.43
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND or detected below CL

TS1-33O2*	
1,2,4-Trimethylbenzene	1.44
1,3,5-Trimethylbenzene	ND [1]
Benzene	**192**
Ethylbenzene	**179**
Xylenes (total)	30.3
Naphthalene	**48.4**
1-Methylnaphthalene	**24.4**
Petroleum list VOCs	All other results detected below CL
PAH	All other results ND or detected below CL

FS1-33H	
1,2,4-Trimethylbenzene	4.75
1,3,5-Trimethylbenzene	12.5
Benzene	**9.33**
Ethylbenzene	**35.1**
Xylenes (total)	12.1
Naphthalene	**4.41**
1-Methylnaphthalene	1.72
Petroleum list VOCs	All other results detected below CL
PAH	All other results ND or detected below CL

FS1-33F*	
1,2,4-Trimethylbenzene	0.49 J
1,3,5-Trimethylbenzene	ND [1]
Benzene	**12.3 J**
Ethylbenzene	0.68 J
Xylenes (total)	3.22 J
Naphthalene	0.333
1-Methylnaphthalene	0.17
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND or detected below CL

FS1-33S	
1,2,4-Trimethylbenzene	ND [1]
1,3,5-Trimethylbenzene	5.29
Benzene	0.98
Ethylbenzene	ND [1]
Xylenes (total)	ND [3]
Naphthalene	ND [0.111]
1-Methylnaphthalene	ND [0.0553]
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND

FS1-33W	
1,2,4-Trimethylbenzene	ND [1]
1,3,5-Trimethylbenzene	ND [1]
Benzene	ND [0.4]
Ethylbenzene	ND [1]
Xylenes (total)	ND [3]
Naphthalene	ND [0.0962]
1-Methylnaphthalene	ND [0.0481]
Petroleum list VOCs	All other results ND
PAH	All other results ND

2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 1-33 ANALYTICAL RESULTS

Legend

Monitoring Well Location

- Gauged
- All Results Below Cleanup Levels
- Result(s) Exceeding Cleanup Levels
- To Be Decommissioned

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Results presented for analytes exceeding the ADEC CL in one or more wells during the 2019 groundwater monitoring event.
4. **Bold** value indicates that the result exceeds the ADEC CL.
5. All results presented in ug/L.
6. For duplicate samples, the highest detected result is reported.
7. Naphthalene was analyzed by SW8260C (VOC) and SW8270D SIM (PAH); only one result is displayed.

Abbreviations

ADEC	Alaska Department of Environmental Conservation
CL	Cleanup Level per 18 AAC 75, Table C (ADEC 2018a)
DRO	diesel-range organics
J	estimated value
J-	estimated value biased low
LNAPL	light non-aqueous phase liquid
LOQ	limit of quantitation
ND	non-detect; LOQ given [in brackets]
PAH	polycyclic aromatic hydrocarbons
RRO	residual-range organics
ug/L	micrograms per liter
VOC	volatile organic compound
*	duplicate

18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018)	
Analyte	**µg/L**
1,2,4-Trimethylbenzene	56
1,3,5-Trimethylbenzene	60
Benzene	4.6
Ethylbenzene	15
Xylenes (total)	190
Naphthalene	1.7
1-Methylnaphthalene	11
2-Methylnaphthalene	36

100 50 0 100 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 2-15 MONITORING WELL LOCATIONS AND GROUNDWATER FLOW DIRECTION

Legend

- Approximate Groundwater Flow Direction
- XX.XX — Groundwater Elevation (feet)
- 100 — Groundwater Contour with Elevation (feet)

Monitoring Well Location

- Gauged
- Gauged and Sampled Well in Program
- Water Table Modeling Well

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Groundwater elevations provided in NAVD88 datum.
4. Cyan circles around the well symbol indicate that the well is used in water table modeling. Groundwater contours were generated with Surfer 16 software using kriging.

60 30 0 60 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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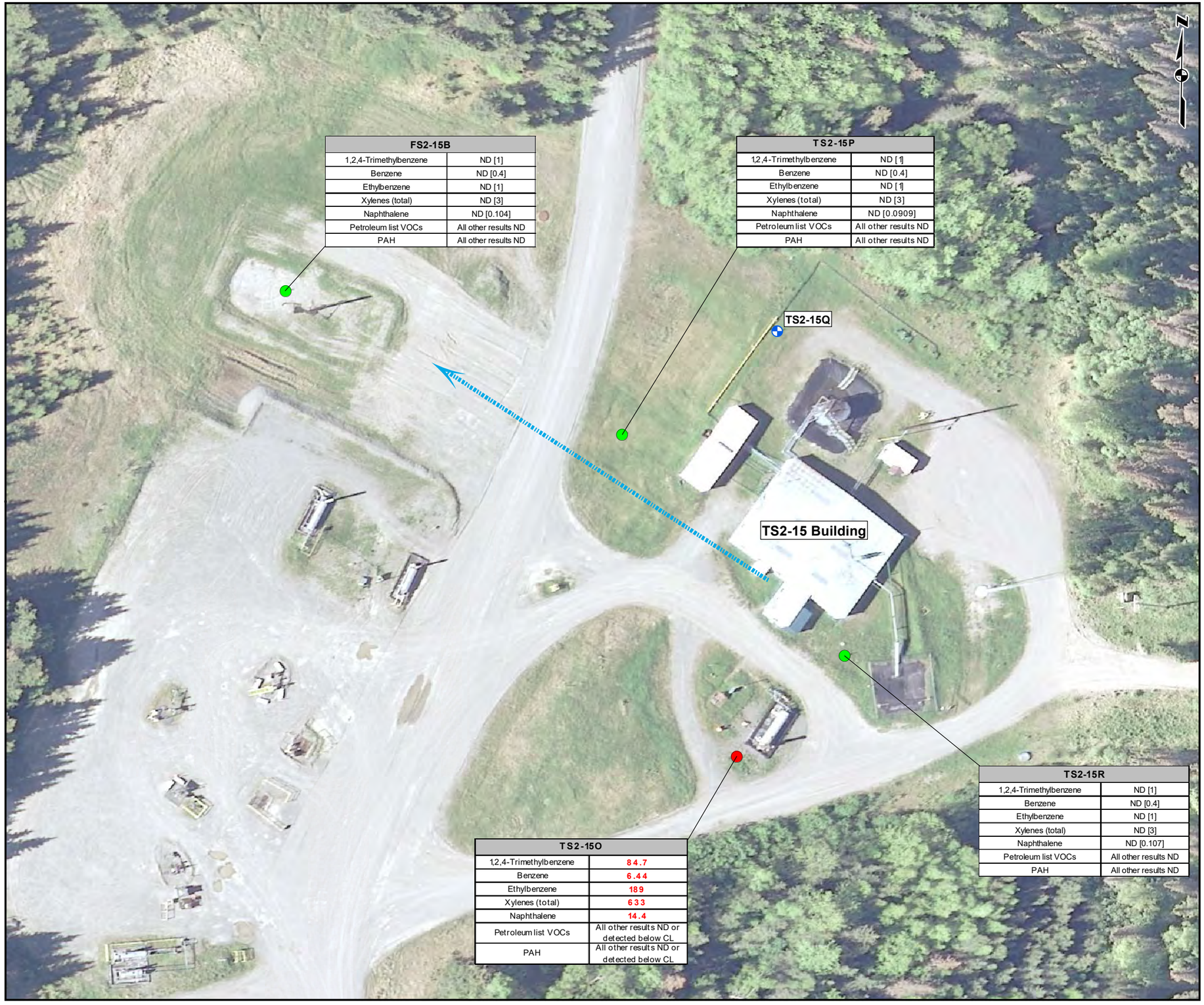
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2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 2-15 ANALYTICAL RESULTS

Legend

Approximate Groundwater Flow Direction

Monitoring Well Location

- Gauged
- All Results Below Cleanup Levels
- Result(s) Exceeding Cleanup Levels

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Results presented for analytes exceeding the ADEC CL in one or more wells during the 2019 groundwater monitoring event.
4. **Bold** value indicates that the result exceeds the ADEC CL.
5. All results presented in ug/L.
6. For duplicate samples, the highest detected result is reported.
7. Naphthalene was analyzed by SW8260C (VOC) and SW8270D SIM (PAH); only one result is displayed.

Abbreviations

ADEC	Alaska Department of Environmental Conservation
CL	Cleanup Level per 18 AAC 75, Table C (ADEC 2018a)
DRO	diesel-range organics
LNAPL	light non-aqueous phase liquid
LOQ	limit of quantitation
ND	non-detect; LOQ given [in brackets]
PAH	polycyclic aromatic hydrocarbons
RRO	residual-range organics
ug/L	micrograms per liter
VOC	volatile organic compound
*	duplicate

18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018)

Analyte	µg/L
1,2,4-Trimethylbenzene	56
Benzene	4.6
Ethylbenzene	15
Xylenes (total)	190
Naphthalene	1.7

60 30 0 60 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 3-4 MONITORING WELL LOCATIONS AND GROUNDWATER FLOW DIRECTION

Legend

- Approximate Groundwater Flow Direction
- 100 — Groundwater Contour with Elevation (feet)
- XX.XX — Groundwater Elevation (feet)

Monitoring Well Location

- Gauged
- Gauged Not Sampled - LNAPL Present
- Gauged and Sampled Well in Program
- Water Table Modeling Well

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Groundwater elevations provided in NAVD88 datum.
4. Cyan circles around the well symbol indicate that the well is used in water table modeling. Groundwater contours were generated with Surfer 16 software using kriging.

80 40 0 80 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 3-4 ANALYTICAL RESULTS

Legend

Approximate Groundwater Flow Direction

Monitoring Well Location

- Gauged
- All Results Below Cleanup Levels
- Result(s) Exceeding Cleanup Levels
- Not Sampled - LNAPL Present

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Results presented for analytes exceeding the ADEC CL in one or more wells during the 2019 groundwater monitoring event.
4. **Bold** value indicates that the result exceeds the ADEC CL.
5. All results presented in ug/L.
6. For duplicate samples, the highest detected result is reported.
7. Naphthalene was analyzed by SW8260C (VOC) and SW8270D SIM (PAH); only one result is displayed.

Abbreviations

ADEC	Alaska Department of Environmental Conservation
CL	Cleanup Level per 18 AAC 75, Table C (ADEC 2018a)
DRO	diesel-range organics
J	estimated value
J-	estimated value biased low
LNAPL	light non-aqueous phase liquid
LOQ	limit of quantitation
ND	non-detect; LOQ given [in brackets]
PAH	polycyclic aromatic hydrocarbons
RRO	residual-range organics
ug/L	micrograms per liter
VOC	volatile organic compound
*	duplicate

18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018)	
Analyte	µg/L
Benzene	4.6
Ethylbenzene	15
Naphthalene	1.7

80 40 0 80 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 3-9 MONITORING WELL LOCATIONS AND GROUNDWATER FLOW DIRECTION

Legend

- Approximate Groundwater Flow Direction
- 100.0 — Groundwater Contour with Elevation (feet)
- XX.XX — Groundwater Elevation (feet)
- XX.XX — Estimated Groundwater Elevation Due To LNAPL (feet)

Monitoring Well Location

- Gauged
- Gauged Not Sampled - LNAPL Present
- Gauged and Sampled Well in Program
- Water Table Modeling Well

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Groundwater elevations provided in NAVD88 datum.
4. Cyan circles around the well symbol indicate that the well is used in water table modeling. Groundwater contours were generated with Surfer 16 software using kriging.
5. TS3-9BB was proposed as a water table modeling well in 2017. The groundwater elevation in this well is a significant outlier compared to the nearest wells. It has been left out of the model in 2019.
6. TS3-9A had a significant presence (> 1') of LNAPL in 2019, and confidence in this measurement is not high. Groundwater elevation in this well was not used in the model in 2019.

80 40 0 80 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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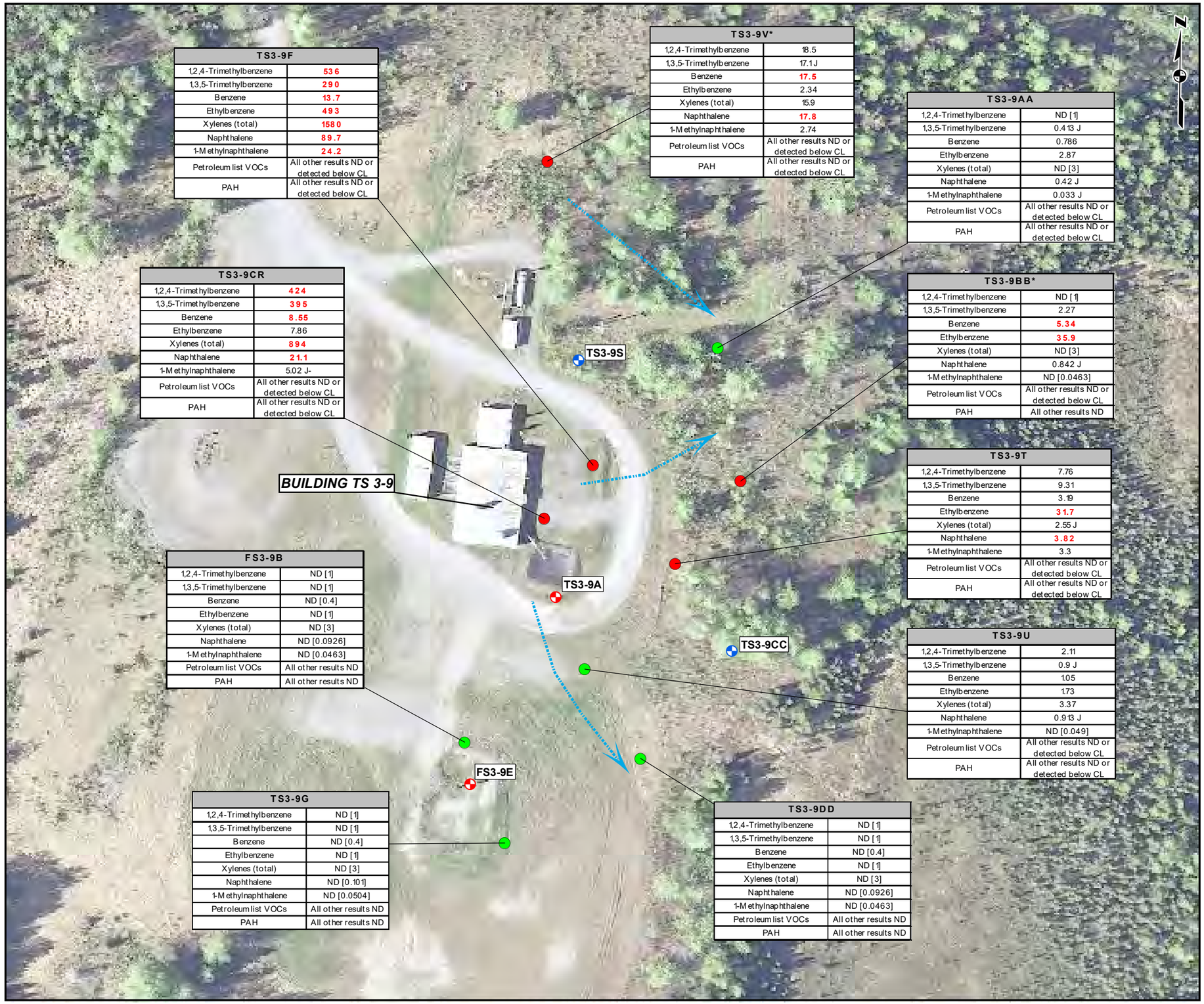
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TS3-9F	
1,2,4-Trimethylbenzene	536
1,3,5-Trimethylbenzene	290
Benzene	13.7
Ethylbenzene	493
Xylenes (total)	1580
Naphthalene	89.7
1-Methylnaphthalene	24.2
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND or detected below CL

TS3-9V*	
1,2,4-Trimethylbenzene	18.5
1,3,5-Trimethylbenzene	17.1 J
Benzene	17.5
Ethylbenzene	2.34
Xylenes (total)	15.9
Naphthalene	17.8
1-Methylnaphthalene	2.74
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND or detected below CL

TS3-9AA	
1,2,4-Trimethylbenzene	ND [1]
1,3,5-Trimethylbenzene	0.413 J
Benzene	0.786
Ethylbenzene	2.87
Xylenes (total)	ND [3]
Naphthalene	0.42 J
1-Methylnaphthalene	0.033 J
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND or detected below CL

TS3-9CR	
1,2,4-Trimethylbenzene	424
1,3,5-Trimethylbenzene	395
Benzene	8.55
Ethylbenzene	7.86
Xylenes (total)	894
Naphthalene	21.1
1-Methylnaphthalene	5.02 J-
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND or detected below CL

TS3-9BB*	
1,2,4-Trimethylbenzene	ND [1]
1,3,5-Trimethylbenzene	2.27
Benzene	5.34
Ethylbenzene	35.9
Xylenes (total)	ND [3]
Naphthalene	0.842 J
1-Methylnaphthalene	ND [0.0463]
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND

TS3-9T	
1,2,4-Trimethylbenzene	7.76
1,3,5-Trimethylbenzene	9.31
Benzene	3.19
Ethylbenzene	31.7
Xylenes (total)	2.55 J
Naphthalene	3.82
1-Methylnaphthalene	3.3
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND or detected below CL

FS3-9B	
1,2,4-Trimethylbenzene	ND [1]
1,3,5-Trimethylbenzene	ND [1]
Benzene	ND [0.4]
Ethylbenzene	ND [1]
Xylenes (total)	ND [3]
Naphthalene	ND [0.0926]
1-Methylnaphthalene	ND [0.0463]
Petroleum list VOCs	All other results ND
PAH	All other results ND

TS3-9U	
1,2,4-Trimethylbenzene	2.11
1,3,5-Trimethylbenzene	0.9 J
Benzene	1.05
Ethylbenzene	1.73
Xylenes (total)	3.37
Naphthalene	0.913 J
1-Methylnaphthalene	ND [0.049]
Petroleum list VOCs	All other results ND or detected below CL
PAH	All other results ND or detected below CL

TS3-9G	
1,2,4-Trimethylbenzene	ND [1]
1,3,5-Trimethylbenzene	ND [1]
Benzene	ND [0.4]
Ethylbenzene	ND [1]
Xylenes (total)	ND [3]
Naphthalene	ND [0.101]
1-Methylnaphthalene	ND [0.0504]
Petroleum list VOCs	All other results ND
PAH	All other results ND

TS3-9DD	
1,2,4-Trimethylbenzene	ND [1]
1,3,5-Trimethylbenzene	ND [1]
Benzene	ND [0.4]
Ethylbenzene	ND [1]
Xylenes (total)	ND [3]
Naphthalene	ND [0.0926]
1-Methylnaphthalene	ND [0.0463]
Petroleum list VOCs	All other results ND
PAH	All other results ND

2019 GROUNDWATER MONITORING PROGRAM REPORT - SWANSON RIVER FIELD

KENAI PENINSULA, ALASKA

SWANSON RIVER FIELD TANK SETTING 3-9 ANALYTICAL RESULTS

Legend

Approximate Groundwater Flow Direction

Monitoring Well Location

- Gauged
- All Results Below Cleanup Levels
- Result(s) Exceeding Cleanup Levels
- Not Sampled - LNAPL Present

Notes

1. For conceptual purposes only. All locations are approximate.
2. Imagery acquired from Quantum Spatial Inc. Imagery was taken on 31 May 2017.
3. Results presented for analytes exceeding the ADEC CL in one or more wells during the 2019 groundwater monitoring event.
4. **Bold** value indicates that the result exceeds the ADEC CL.
5. All results presented in ug/L.
6. For duplicate samples, the highest detected result is reported.
7. Naphthalene was analyzed by SW8260C (VOC) and SW8270D SIM (PAH); only one result is displayed.

Abbreviations

ADEC	Alaska Department of Environmental Conservation
CL	Cleanup Level per 18 AAC 75, Table C (ADEC 2018a)
DRO	diesel-range organics
J	estimated value
LNAPL	light non-aqueous phase liquid
LOQ	limit of quantitation
ND	non-detect; LOQ given [in brackets]
PAH	polycyclic aromatic hydrocarbons
RRO	residual-range organics
ug/L	micrograms per liter
VOC	volatile organic compound
*	duplicate

18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018)	
Analyte	µg/L
1,2,4-Trimethylbenzene	56
1,3,5-Trimethylbenzene	60
Benzene	4.6
Ethylbenzene	15
Xylenes (total)	190
Naphthalene	1.7
1-Methylnaphthalene	11

80 40 0 80 FEET

ALASKA STATE PLANE ZONE 4, US SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

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APPENDIX B:
TABLES

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Table B1-1: SRF Tank Setting 1-4 Groundwater Elevation Data
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Location	Well ID	Date	Measured Depths		Product Thickness (feet)	Well Casing		Groundwater Elevation (feet)	Heaving Observed 2019
			To Water (feet btoc)	To Product (feet btoc)		Total Depth (feet btoc)	Top Elevation (feet)		
Tank Setting 1-4	TS1-4CC	6/29/2019	Not gauged in 2019; casing sheared and obstructed.						
	TS1-4DD[b]	6/29/2019	5.69	--	--	16.50	136.92	131.23	Slight
	TS1-4EE[b]	6/29/2019	6.30	--	--	15.70	137.08	130.78	No
	TS1-4F[b]	6/29/2019	11.15	11.14	0.01	24.36	148.61	137.46	No
	TS1-4GR[a]	6/29/2019	14.45	--	--	20.50	151.65	137.20	No
	TS1-4J[b]	6/29/2019	10.20	--	--	22.28	155.40	145.20	No
	FS1-4H[b]	6/29/2019	14.27	--	--	20.38	139.70	125.43	No
	FS1-4E[a]	6/29/2019	9.33	--	--	17.63	141.26	131.93	No

Notes:

[a] Top of casing elevation data from a survey conducted by Brice in October 2017.
Elevation expressed relative to NAVD88.

[b] Top of casing elevation data from a survey conducted by McLane Consulting, Inc. in November 2015.
Elevation expressed relative to NAVD88.

-- Not applicable or not measured.

Abbreviations:

btoc	below top of casing (i.e., below measuring point)
ID	identification
NAVD88	North American Vertical Datum of 1988

Table B1-2: SRF Tank Setting 1-4 Field-Measured Groundwater Quality Parameters
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Location	Well ID	Date	Measured Parameters						Qualitative Observations		
			Temperature (°C)	Specific Conductivity (µS/cm)	DO (mg/L)	ORP (mV)	pH	Turbidity (NTU)	Color	Sheen	Odor
TS 1-4	TS1-4EE	7/7/2019	11.39	533	0.44	57.6	6.72	1.35	Clear	None	None
	TS1-4F	6/29/2019	Contained LNAPL								
	TS1-4GR	7/7/2019	19.96	5865	0.38	21.2	5.49	11	Pale orange tint	None	Distinct, not HC
	TS1-4J	6/29/2019	Contained LNAPL								
	FS1-4H	7/6/2019	27.00	494	0.61	-54.3	6.36	13.5	Clear yellow	None	HC
	FS1-4E	7/6/2019	27.21	456	0.43	-74.9	6.41	--	Cloudy, orange tint	None	Slight HC, metallic

Abbreviations:

--	not measured/not observed	LNAPL	light non-aqueous phase liquid
µS/cm	microSiemen(s) per centimeter	mg/L	milligram(s) per liter
°C	degree(s) Celsius	mV	millivolt(s)
DO	dissolved oxygen	NTU	nephelometric turbidity unit(s)
HC	hydrocarbon	ORP	oxidation-reduction potential
ID	identification	pH	potential of hydrogen

Table B1-3: SRF Tank Setting 1-4 Groundwater Analytical Results
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Well ID	Sample ID	Date	Duplicate	BTEX EPA Method SW8260[a] [µg/L]				EPA SW8015 [µg/L]	EPA Method 8260 [µg/L]	EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Ethylene Glycol	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels [µg/L]				**4.6**	**1100**	**15**	**190**	**40000**	**--**	**--**	
TS1-4CC	TS1-4CC	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	--	
	TS1-4CC	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	--	
	TS1-4CC	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	--	
	TS1-4CC	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	--	
	TS1-4CC	9/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	--	
	TS1-4CC	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	--	
	TS1-4CC	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	--	
	TS1-4CC	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	--	
	TS1-4CC	11/16/2010		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	--	
	TS1-4CC-0914	9/10/2014		ND [0.4]	ND [1]	0.32 J	5.08 J	--	--	--	
	--	9/22/2017		--	--	--	--	--	--	--	Gauge only
	--	6/29/2019		--	--	--	--	--	--	--	Obstructed; not gauged
TS1-4DD	TS1-4DD	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	--	
	TS1-4DD	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	--	
	TS1-4DD	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	--	
	TS1-4DD	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	--	
	TS1-4DD	9/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	--	
	TS1-4DD	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	--	
	TS1-4DD	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	--	
	TS1-4DD	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	--	
	TS1-4DD	11/16/2010		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	--	
	TS1-4DD-0914	9/10/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	--	
	SRTS1-4DD-1015	10/7/2015		ND [0.4]	ND [1]	ND [1]	ND [3]	--	--	--	
	--	9/22/2017		--	--	--	--	--	--	--	Gauge only
	--	6/29/2019		--	--	--	--	--	--	--	Gauge only
TS1-4EE	TS1-4EE	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	--	
	TS1-4EE	10/2003		**8.4**	1.2	ND [1]	ND [3]	--	--	--	
	TS1-4EE	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	--	
	TS1-4EE	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	--	
	TS1-4EE	9/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	--	
	TS1-4EE	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	--	
	TS1-4EE	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	--	
	TS1-4EE	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	--	
	TS1-4EE	11/16/2010		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	--	
	TS1-4EE-0914	9/10/2014		ND [0.4]	ND [1]	0.77 J	11.96	--	--	--	
	SRTS1-4EE-1015	10/7/2015		ND [0.4]	ND [1]	ND [1]	ND [3]	11000	--	--	
	SRF14-TS14EE-0917	9/22/2017		ND [0.4]	ND [1]	ND [1]	ND [3]	ND [10000] H	All other results ND.	All results ND.	
	SRF14-TS14EEZ-0917	9/22/2017	X	ND [0.4]	ND [1]	ND [1]	ND [3]	ND [10000] H	All other results ND.	All results ND.	
	SRF14-TS14EE-0719	7/7/2019		ND [0.4] J-	ND [1] J-	ND [1] J-	ND [3] J-	ND [10000]	All other results ND.	All results ND.	

Table B1-3: SRF Tank Setting 1-4 Groundwater Analytical Results
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Well ID	Sample ID	Date	Duplicate	BTEX EPA Method SW8260[a] [µg/L]				EPA SW8015 [µg/L]	EPA Method 8260 [µg/L]	EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Ethylene Glycol	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels [µg/L]				**4.6**	**1100**	**15**	**190**	**40000**	**--**	**--**	
TS1-4F	TS1-4F	12/2000		**160**	ND [20]	**180**	**2100**	--	--	--	0.29 feet LNAPL
	TS1-4F	12/2001		**65**	ND [20]	**95**	**1400**	--	--	--	0.4 feet LNAPL
	TS1-4F	11/2002		**93**	ND [20]	**180**	**2500**	--	--	--	0.5 feet LNAPL
	TS1-4F	10/2003		**99**	ND [20]	**160**	**2500**	1800	--	--	
	TS1-4F	10/2004		**83**	ND [10]	**232**	**3680**	--	--	--	Trace LNAPL
	TS1-4F	11/2005		**55.3**	ND [25]	**126**	**2510**	--	--	--	
	TS1-4F	9/2006		**66.6**	ND [25]	**103**	**3290**	--	--	--	
	TS1-4F	10/2007		**50.5**	ND [25]	**170**	**3390**	--	--	--	
	TS1-4F	10/2008		**31.5**	ND [25]	**87.5**	**2780**	--	--	--	
	TS1-4F	10/2009	X	**42.6**	ND [25]	**100**	**2830**	--	--	--	
	TS1-4F	10/2009		**46.1**	10.8	**170**	**2980**	--	--	--	
	TS1-4F	11/16/2010		**31.2**	12.5	**206**	**2900**	--	--	--	
	TS1-4F-0914	9/10/2014		**26.4**	4.8 J	**169**	**2499**	--	--	--	
	TS1-94F-0914	9/10/2014	X	**27**	4.7 J	**172**	**2303**	--	--	--	
	SRTS1-4F-1015	10/7/2015		**22 J**	ND [100]	**188**	**2194**	--	--	--	
	SRTS1-4F9-1015	10/7/2015	X	**25**	ND [50]	**197**	**2257**	--	--	--	
	--	9/22/2017		--	--	--	--	--	--	--	LNAPL present
	--	6/29/2019		--	--	--	--	--	--	--	LNAPL present
TS1-4G	TS1-4G	12/2000		**500**	20	**200**	**1400**	--	--	--	0.74 feet LNAPL
	TS1-4G	12/2001		**260**	13	**110**	**800**	--	--	--	0.4 feet LNAPL
	TS1-4G	11/2002		**550**	13	**200**	**1000**	--	--	--	0.7 feet LNAPL
	TS1-4G	10/2003		**180**	11	**150**	**850**	200	--	--	
	TS1-4G	10/2004		**480**	5.53	**106**	**484**	--	--	--	Trace LNAPL
	TS1-4G	11/2005		**498**	ND [5]	**165**	**445**	--	--	--	0.02 feet LNAPL
	TS1-4G	9/2006		**388**	2.56	**29.8**	**286**	--	--	--	
	TS1-4G	10/2007		**176**	ND [10]	**105**	**264**	--	--	--	
	TS1-4G	10/2008		**350**	ND [5]	**117**	**192**	--	--	--	
	TS1-4G	10/2009		**275**	8.1	**146**	**299**	--	--	--	
	TS1-4G	11/16/2010		**291**	8	**73.5**	166	--	--	--	
	TS1-4G	--		--	--	--	--	--	--	--	Obstruction in well
	TS1-4G	--		--	--	--	--	--	--	--	Obstruction in well
	TS1-4G	10/10/2017		--	--	--	--	--	--	--	Decommissioned

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Well ID	Sample ID	Date	Duplicate	BTEX EPA Method SW8260[a] [µg/L]				EPA SW8015 [µg/L]	EPA Method 8260 [µg/L]	EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Ethylene Glycol	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels [µg/L]				4.6	1100	15	190	40000	--	--	
TS1-4GR	SRF14-TS14GR-1017	10/10/2017		**38.5 J-**	2.02 J-	**138 J-**	**199**	**24000000**	**Naphthalene 70.2 J-** **1,2,4-Trimethylbenzene 303 J-** **1,3,5-Trimethylbenzene 226 J-** All other results detected below cleanup levels.	**1-Methylnaphthalene 21.4** **Naphthalene 32.9** *Benzo[a]anthracene ND [1]* *Benzo[a]pyrene ND [0.4]* *Benzo[g,h,i]perylene ND [1]* *Benzo[k]fluoranthene ND [1]* *Dibenzo[a,h]anthracene ND [0.4]* *Indeno[1,2,3-c,d]pyrene ND [1]* All other results ND or detected below cleanup levels.	Installed 10/5/2017. Non-HC odor, yellow tint, viscous.
	SRF14-TS14GRZ-1017	10/10/2017	X	**35.4 J-**	2.41 J-	**113 J-**	166	**22000000**	**Naphthalene 54.6 J-** **1,2,4-Trimethylbenzene 354 J-** **1,3,5-Trimethylbenzene 267 J-** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 20.8** **Naphthalene 32** Benzo[a]anthracene ND [1.07] Benzo[a]pyrene ND [0.427] Benzo[g,h,i]perylene ND [1.07] Benzo[k]fluoranthene ND [1.07] Dibenzo[a,h]anthracene ND [0.4] Indeno[1,2,3-c,d]pyrene ND [1.07] All other results ND or detected below cleanup levels.	Installed 10/5/2017. Non-HC odor, yellow tint, viscous.
	SRF14-TS14GR-0719	7/7/2019		**66.2**	3.77	**149**	**233**	**34000000**	**1,2,4-Trimethylbenzene 586** **1,3,5-Trimethylbenzene 360** **Naphthalene 111** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 30.1** **Naphthalene 46.7** All other results ND or detected below cleanup levels.	Non-HC odor, orange tint.
	SRF14-TS14GRZ-0719	7/7/2019	X	**65.6**	3.8	**149**	**232**	**27000000**	**1,2,4-Trimethylbenzene 606** **1,3,5-Trimethylbenzene 370** **Naphthalene 118** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 35.9** **2-Methylnaphthalene 41.1** **Naphthalene 55.7** All other results ND or detected below cleanup levels.	Non-HC odor, orange tint.

Table B1-3: SRF Tank Setting 1-4 Groundwater Analytical Results
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Well ID	Sample ID	Date	Duplicate	BTEX EPA Method SW8260[a] [µg/L]				EPA SW8015 [µg/L]	EPA Method 8260 [µg/L]	EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Ethylene Glycol	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels [µg/L]				**4.6**	**1100**	**15**	**190**	**40000**	**--**	**--**	
TS1-4J	TS1-4J	12/2000		**930**	90	**88**	**290**	--	--	--	1.1 feet LNAPL
	TS1-4J	12/2001		**770**	44	**90**	**290**	--	--	--	2 feet LNAPL
	TS1-4J	11/2002		**780**	36	**73**	**270**	--	--	--	LNAPL film
	TS1-4J	10/2003		**660**	30	**98**	**360**	2800	--	--	
	TS1-4J	10/2004		**136**	26.8	**40**	**204**	--	--	--	Trace LNAPL
	TS1-4J	11/2005		**667**	7.97	**52.2**	**262**	--	--	--	
	TS1-4J	9/2006		**908**	11.5	**17.3**	183	--	--	--	
	TS1-4J	10/2007		**502**	ND [25]	**ND [25]**	137	--	--	--	
	TS1-4J	10/2008		**832**	ND [5]	ND [5]	104	--	--	--	
	TS1-4J	10/2009		**787**	22.2	**22.4**	**211**	--	--	--	
	TS1-4J	12/26/2010		**758**	21.6	**50.2**	**247**	--	--	--	
	TS1-4J-0914	9/10/2014		**698**	ND [10]	**131**	**343.1**	--	--	--	
	--	10/7/2015		--	--	--	--	--	--	--	LNAPL present
	--	9/22/2017		--	--	--	--	--	--	--	LNAPL present
	--	6/29/2019		--	--	--	--	--	--	--	LNAPL present
FS1-4H	FS1-4H	12/2000		ND [1]	ND [1]	ND [1]	ND [2]	--	--	--	
	FS1-4H	12/2001		**49**	1.6	1.6	3.4	--	--	--	
	FS1-4H	11/2002		**6**	2.2	4.5	22	--	--	--	
	FS1-4H	10/2003		**6.3**	3.1	1.9	4	--	--	--	
	FS1-4H	10/2004		1.6	ND [0.5]	2.48	3.18	--	--	--	
	FS1-4H	11/2005		2.92	1.84	0.844	4.49	--	--	--	
	FS1-4H	9/2006		3.16	0.561	1.53	1.2	--	--	--	
	FS1-4H	10/2007		0.64	ND [0.5]	0.78	ND [1.5]	--	--	--	
	FS1-4H	11/2008		4.25	ND [0.5]	9.49	4.95	--	--	--	
	FS1-4H	12/2009		2.18	9.39	6.25	ND [1.5]	--	--	--	
	FS1-4H	12/26/2010		**8.18**	8.52	**24.2**	ND [1.5]	--	--	--	
	FS1-4H-0914	9/10/2014		2.65	ND [1]	2.05	11.89	--	--	--	
	SRFS1-4H-1015	10/8/2015		3.21	0.48 J	6.2	3.44	--	--	--	
	SRF14-FS14H-0917	9/22/2017		**8.52**	1.13	**46.6**	7	--	**Naphthalene 1.79** All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	
	SRF14-FS14H-0719	7/6/2019		**5.03**	0.534 J	8.29	4.52	--	**Naphthalene 5.51** All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	

Table B1-3: SRF Tank Setting 1-4 Groundwater Analytical Results
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Well ID	Sample ID	Date	Duplicate	BTEX EPA Method SW8260[a] [µg/L]				EPA SW8015 [µg/L]	EPA Method 8260 [µg/L]	EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Ethylene Glycol	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels [µg/L]				**4.6**	**1100**	**15**	**190**	**40000**	**--**	**--**	
FS1-4E	FS1-4E	12/2000		1.2	ND [1]	ND [1]	4.8	--	--	--	
	FS1-4E	12/2001		**75**	3	**73**	**320**	--	--	--	
	FS1-4E	11/2002		**79**	ND [10]	**91**	**350**	--	--	--	
	FS1-4E	10/2003		**95**	ND [10]	**86**	**260**	--	--	--	
	FS1-4E	10/2004		**50.1**	ND [0.5]	**61.1**	125	--	--	--	
	FS1-4E	11/2005		**43.8**	ND [0.5]	**71.2**	144	--	--	--	
	FS1-4E	9/2006		**55.4**	ND [0.5]	**61.9**	111	--	--	--	
	FS1-4E	10/2007		**63.5**	ND [5]	**71.8**	108	--	--	--	
	FS1-4E	11/2008		**48.5**	ND [0.5]	**67.4**	114	--	--	--	
	FS1-4E	12/2009		**61.1**	1.66	**68.7**	123	--	--	--	
	FS1-4E	12/26/2010		**44.9**	1.22	**38.3**	48.6	--	--	--	
	FS1-4E-0914	9/10/2014		**25.9**	ND [1]	**42.5**	90.01 J	--	--	--	
	SRFS1-4E-1015	10/8/2015		**36.4**	ND [5]	**45.8**	77.45	--	--	--	
	SRF14-FS14E-0917	9/22/2017		**33**	0.35 J	**42.4**	70	--	**Naphthalene 60.2** **1,2,4-Trimethylbenzene 53.8** All other results ND or detected below cleanup levels.	**Naphthalene 24.6** All other results ND or detected below cleanup levels.	Metallic odor
	SRF14-FS14E-0719	7/6/2019		**44**	0.429 J	**71.2**	161	--	**Naphthalene 107** **1,2,4-Trimethylbenzene 95.6** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 20** **Naphthalene 52.8** All other results ND or detected below cleanup levels.	

Notes:

Bold results exceed ADEC cleanup levels.

Italic results are ND with LOQ [in brackets] exceeding cleanup levels.

[a] EPA method 8021B was used for samples dated (11/16/2010 and 12/26/2010).

[b] Groundwater cleanup levels as listed in 18 AAC 75.345, Table C (ADEC 2018).

-- Not analyzed.

Data Flags:"

H	Analysis conducted outside the analytical holding time; result is potentially biased low.
J (±)	Result is an estimated value below the PQL or LOQ, or the result is an estimated value biased high/low/indeterminate due to a QC failure.
ND	Analyte was not detected. The PQL or LOQ is given [in brackets].

Abbreviations:

µg/L	microgram(s) per liter	EPA	U.S. Environmental Protection Agency	PAH	polycyclic aromatic hydrocarbons
AAC	Alaska Administrative Code	HC	hydrocarbon	PQL	practical quantitation limit
ADEC	Alaska Department of Environmental Conservation	ID	identification	SIM	selected ion monitoring
AK	Alaska	LNAPL	light non-aqueous phase liquid	VOC	volatile organic compound
BTEX	benzene, toluene, ethylbenzene, and total xylenes	LOQ	limit of quantification		

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Table B2-1: SRF Tank Setting 1-9 Groundwater Elevation Data
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Location	Well ID	Date	Measured Depths		Product Thickness (feet)	Well Casing		Groundwater Elevation (feet)	Heaving Observed 2019
			To Water (feet btoc)	To Product (feet btoc)		Total Depth (feet btoc)	Top Elevation[a] (feet)		
TS 1-9	TS1-9A	6/27/2019	22.73	--	Trace	29.64	137.80	115.07	No
	TS1-9B	6/27/2019	22.31	--	Trace	26.39	137.18	114.87	No
	TS1-9C	6/27/2019	22.61	--	--	27.00	135.80	113.19	No
	TS1-9D	6/27/2019	21.91	--	--	27.40	136.87	114.96	No
	TS1-9HH	6/27/2019	20.92	--	--	30.70	135.81	114.89	Yes
	TS1-9II[c]	6/27/2019	12.36	--	--	30.95	136.40	124.04	No
	TS1-9U	6/27/2019	23.87	--	--	29.59	138.65	114.78	No
	FS1-9D	6/27/2019	14.03	--	--	19.90	129.11	115.08	No
	FS1-9F[b]	6/27/2019	12.69	12.64	0.05	--	127.69	114.96	No
	FS1-9I	6/27/2019	13.70	--	--	19.58	128.78	115.08	No
	FS1-9M	6/27/2019	20.52	--	--	25.92	135.52	115.00	No
	FS1-9N	6/27/2019	17.03	--	--	25.00	132.09	115.06	Yes

Notes:

[a] Top of casing elevation data from a survey conducted by McLane Consulting, Inc. in November 2015. Elevation expressed relative to NAVD88.

[b] Potentiometric surface elevations are corrected for LNAPL thickness assuming a specific gravity of 0.84 g/cm^3 based upon Swanson River Crude having an API gravity of 37 degrees.

[c] Groundwater elevation was determined to be anomalous. Calculated groundwater was such an extreme outlier that it is not considered representative and was replaced with well TS1-9HH in the groundwater contour model.

-- Not applicable or not measured.

Abbreviations:

API	American Petroleum Institute
btoc	below top of casing (i.e., below measuring point)
g/cm^3	gram(s) per cubic centimeter
ID	identification
LNAPL	light non-aqueous phase liquid
NAVD88	North American Vertical Datum of 1988

Table B2-2: SRF Tank Setting 1-9 Field-Measured Groundwater Quality Parameters
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Location	Well ID	Date	Measured Parameters						Qualitative Observations		
			Temperature (°C)	Specific Conductivity (µS/cm)	DO (mg/L)	ORP (mV)	pH	Turbidity (NTU)	Color	Sheen	Odor
TS 1-9	TS1-9A	6/27/2019	Contained LNAPL								
	TS1-9B	6/27/2019	Contained LNAPL								
	TS1-9C	7/6/2019	10.99	132	1.49	119.5	6.07	8.18	Clear	None	HC
	TS1-9D	7/6/2019	10.48	296	0.35	36.9	6.28	7.70	Clear	None	Strong HC
	TS1-9HH	7/5/2019	7.02	108	5.47	81.2	6.77	7.45	Clear	None	None
	TS1-9U	7/5/2019	9.39	127	0.87	113.8	6.36	2.69	Clear	None	Slight HC
	FS1-9D	7/5/2019	8.22	59	0.58	117.5	5.71	1.74	Clear	None	Slight HC, metallic
	FS1-9F	6/27/2019	Contained LNAPL								
	FS1-9I	7/5/2019	7.40	27	10.52	300.3	5.78	1.68	Clear	None	None
	FS1-9M	7/5/2019	7.75	81	7.90	233.6	5.72	0.98	Clear	None	None
	FS1-9N	7/5/2019	8.51	42	1.50	117.4	6.05	3.50	Clear	None	Faint HC

Abbreviations:

--	not measured/not observed	LNAPL	light non-aqueous phase liquid
µS/cm	microSiemen(s) per centimeter	mg/L	milligram(s) per liter
°C	degree(s) Celsius	mV	millivolt(s)
DO	dissolved oxygen	NTU	nephelometric turbidity unit(s)
HC	hydrocarbon	ORP	oxidation-reduction potential
ID	identification	pH	potential of hydrogen

Table B2-3: SRF Tank Setting 1-9 Groundwater Analytical Results
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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260B[a] [µg/L]					EPA Method 8270 SIM	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS1-9A	TS1-9A	11/2000		**270**	**1500**	**580**	**3500**	--	--	
	TS1-9A	11/2001		**160**	560	**350**	**1100**	--	--	
	TS1-9A	11/2002		**85**	710	**370**	**2200**	--	--	
	TS1-9A	10/2003		**50**	40	**220**	140	--	--	
	TS1-9A	10/2003	X	**49**	39	**230**	140	--	--	
	TS1-9A	10/2004		**52.8**	327	**290**	**1580**	--	--	
	TS1-9A	11/2005		**46.3**	369	**329**	**1900**	--	--	
	TS1-9A	10/20/2006		**39.1**	511	**371**	**2600**	--	--	
	TS1-9A	10/4/2007		**12.4**	78.8	**131**	**778**	--	--	
	TS1-9A	10/22/2008		**29.5**	497	**389**	**2980**	--	--	
	TS1-9A	10/15/2009		**39**	216	**332**	**1830**	--	--	
	TS1-9A	12/26/2010		**19.6**	53.6	**264**	**1420**	--	--	
	TS1-9A2	12/26/2010	X	**18.8**	51.1	**278**	**1660**	--	--	
	TS1-9A-0914	9/8/2014		**7.77**	50	**175**	**1392**	--	--	
	SRTS1-9A-1015	10/6/2015		**9.91**	43.5	**152**	**1197**	--	--	
	SRF19-TS19A-0917	9/24/2017		**6.4**	17.3 J	**117**	**890**	**Naphthalene 29.5** **1,2,4-Trimethylbenzene 108** All other results ND or detected below cleanup levels.	**Naphthalene 10.1 J** *Benzo[a]anthracene ND [0.49]* *Benzo[g,h,i]perylene ND [0.49] J-* *Indeno[1,2,3-c,d]pyrene ND [0.49] J-* All other results ND or detected below cleanup levels.	
	SRF19-TS19AZ-0917	9/24/2017	X	**5.6**	9.9 J	**100**	**783**	**Naphthalene 32** **1,2,4-Trimethylbenzene 104** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 13.5** **Naphthalene 16.3 J** *Benzo[a]anthracene ND [0.504]* *Benzo[g,h,i]perylene ND [0.504]* *Indeno[1,2,3-c,d]pyrene ND [0.504]* All other results ND or detected below cleanup levels.	Sheen and odor
	--	6/27/2019		--	--	--	--	--	--	LNAPL present

Table B2-3: SRF Tank Setting 1-9 Groundwater Analytical Results
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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260B[a] [µg/L]					EPA Method 8270 SIM	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels [µg/L]				4.6	1100	15	190	--	--	
TS1-9B	TS1-9B	11/2000		**650**	95	**230**	**3700**	--	--	1.2 feet LNAPL
	TS1-9B	11/2001		**Casing parted**				--	--	1.6 feet LNAPL
	TS1-9B	11/2002		**650**	81	**330**	**7200**	--	--	1.7 feet LNAPL
	TS1-9B	10/2003		**640**	84	**330**	**6600**	--	--	1.5 feet LNAPL
	TS1-9B	10/2004		**691**	71.3	**362**	**7540**	--	--	
	TS1-9B	11/2005		**631**	65.8	**319**	**6970**	--	--	0.5 feet LNAPL
	TS1-9B	10/25/2006		**531**	70.9	**309**	**7440**	--	--	
	TS1-9B	10/25/2006	X	**492**	80.8	**290**	**7014**	--	--	
	TS1-9B	10/5/2007		**390**	ND [50]	**304**	**8100**	--	--	
	TS1-9B	11/17/2008		**377**	ND [50]	**214**	**5400**	--	--	
	TS1-9B	10/15/2009		**557**	66.6	**308**	**5830**	--	--	
	TS1-9B	12/26/2010		**430**	24	**286**	**6000**	--	--	
	TS1-9B2	12/26/2010	X	**444**	20.9	**264**	**5590**	--	--	
	--	9/8/2014		--	--	--	--	--	--	LNAPL present
	SRTS1-9B-1015	10/6/2015		**306**	ND [5]	**466**	**2637**	--	--	
	SRTS1-9B9-1015	10/6/2015	X	**315**	ND [5]	**449**	**2587**	--	--	
	--	9/23/2017		--	--	--	--	--	--	LNAPL present
	--	6/27/2019		--	--	--	--	--	--	LNAPL present
TS1-9C	TS1-9C	11/2000		**ND [100]**	ND [100]	**280**	**12000**	--	--	Sheen observed
	TS1-9C	11/2001		**ND [100]**	ND [100]	**320**	**14000**	--	--	Sheen observed
	TS1-9C	11/2002		**ND [100]**	ND [100]	**110**	**12000**	--	--	Sheen observed
	TS1-9C	10/2003		**ND [10]**	ND [10]	**260**	**14000**	--	--	0.04 feet LNAPL
	TS1-9C	10/2004		**ND [50]**	ND [50]	**156**	**12000**	--	--	
	TS1-9C	11/2005		**ND [5]**	ND [5]	**126**	**11900**	--	--	
	TS1-9C	10/25/2006		**ND [5]**	ND [5]	ND [5]	**603**	--	--	
	TS1-9C	10/5/2007		**ND [5]**	10.2	**181**	**13200**	--	--	
	TS1-9C	10/22/2008		ND [2.5]	ND [2.5]	ND [2.5]	**212**	--	--	
	TS1-9C	10/15/2009		**ND [50]**	ND [50]	**113**	**9320**	--	--	
	TS1-9C	12/26/2010		ND [0.5]	1.41	**29.6**	**1990**	--	--	
	TS1-9C-0914	9/8/2014		ND [0.4]	16.3	**17.2**	**1840**	--	--	
	SRTS1-9C-1015	10/7/2015		ND [2]	10.8	**19.2**	**2665**	--	--	
	SRF19-TS19C-0917	9/24/2017		ND [0.4]	3.32	5.22	**557**	**Naphthalene 8.58** **1,2,4-Trimethylbenzene 96.3** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 24.2** **Naphthalene 24.7** *Indeno[1,2,3-c,d]pyrene ND [0.252]* All other results ND or detected below cleanup levels.	Sheen and odor
	SRF19-TS19C-0719	7/6/2019		0.247 J	6.16	**22.1**	**2530**	**Naphthalene 31.0** **1,2,4-Trimethylbenzene 417** **1,3,5-Trimethylbenzene 320** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 16.9** **Naphthalene 16.1** All other results ND or detected below cleanup levels.	HC odor, no sheen

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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260B[a] [µg/L]					EPA Method 8270 SIM	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS1-9D	TS1-9D	11/2000		**110**	ND [100]	**220**	**6000**	--	--	Sheen observed
	TS1-9D	11/2000	X	**180**	ND [100]	**340**	**9400**	--	--	
	TS1-9D	11/2001		**150**	ND [100]	**210**	**7000**	--	--	0.3 feet LNAPL
	TS1-9D	11/2002		**ND [100]**	ND [100]	**200**	**6900**	--	--	Sheen observed
	TS1-9D	10/2003		**160**	ND [10]	**650**	**12000**	--	--	Sheen observed
	TS1-9D	10/2004		**114**	ND [25]	**322**	**6760**	--	--	
	TS1-9D	11/2005		**59.7**	ND [25]	**222**	**1950**	--	--	1.5 feet LNAPL
	TS1-9D	10/25/2006		**108**	ND [25]	**386**	**6930**	--	--	
	TS1-9D	10/5/2007		**51**	ND [25]	**91.5**	**540**	--	--	
	TS1-9D	10/22/2008		**159**	ND [50]	**225**	**2880**	--	--	
	TS1-9D	10/15/2009		**109**	ND [25]	**510**	**7230**	--	--	
	TS1-9D	12/26/2010		**125**	3.97	**320**	**3400**	--	--	
	TS1-9D-0914	9/8/2014		**34.4**	ND [1]	**293**	**1715**	--	--	
	SRTS1-9D-1015	10/7/2015		**18.8**	ND [5]	**142**	**586**	--	--	
	--	9/23/2017		--	--	--	--	--	--	LNAPL present
	SRF19-TS19D-0719	7/6/2019		**7.86**	0.359 J	**190**	**728**	**Naphthalene 57.4** **1,2,4-Trimethylbenzene 534** **1,3,5-Trimethylbenzene 301** All other results ND or detected below cleanup levels.	1-Methylnaphthalene 10.1 **Naphthalene 28.6** All other results ND or detected below cleanup levels.	Strong HC odor
	SRF19-TS19DZ-0719	7/6/2019	X	**8.08**	0.356 J	**197**	**757**	**Naphthalene 59.6** **1,2,4-Trimethylbenzene 558** **1,3,5-Trimethylbenzene 318** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 11.4** **Naphthalene 28.5** All other results ND or detected below cleanup levels.	Strong HC odor
TS1-9U	TS1-9U	11/2000		ND [2]	ND [2]	**27**	170	--	--	
	TS1-9U	11/2001		**9**	ND [2]	**28**	**200**	--	--	
	TS1-9U	11/2002		ND [2]	ND [2]	**20**	150	--	--	
	TS1-9U	10/2003		ND [2]	ND [2]	**18**	150	--	--	
	TS1-9U	10/2004		1.11	0.743	**16.1**	77.2	--	--	
	TS1-9U	11/2005		**146**	233	**1990**	**10500**	**--**	**--**	
	TS1-9U	10/20/2006		0	0	0	0	--	--	
	TS1-9U	10/4/2007		0	0	0	0	--	--	
	TS1-9U	10/9/2008		ND [0.5]	ND [0.5]	13.6	44	--	--	
	TS1-9U	10/14/2009		2.86	13.8	**18.9**	66.5	--	--	
	TS1-9U	11/11/2010		1.08	ND [1]	10.5	28.5	--	--	
	TS1-9U-0914	9/7/2014		4.38	0.35 J	5.64	14.75	--	--	
	SRTS1-9U-1015	10/6/2015		2.8	ND [5]	3.25 J	9.35 J	--	--	
	--	9/23/2017		--	--	--	--	--	--	Gauge only
	SRF19-TS19U-0719	7/5/2019		1.48	0.357 J	5.56	10.4	**1,2,4-Trimethylbenzene 64.2** **Naphthalene 11.8** All other results detected below cleanup levels.	**1-Methylnaphthalene 11.5** All other results ND or detected below cleanup levels.	HC odor

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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260B[a] [µg/L]					EPA Method 8270 SIM	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS1-9HH	TS1-HH	11/2002		**6**	4.4	4.4	9.3	--	--	
	TS1-HH	10/2003		4.4	3.6	ND [1]	12	--	--	
	TS1-HH	10/2004		2.41	5.55	1.99	5.95	--	--	
	TS1-HH	11/2005		0.633	5.21	0.506	7.3	--	--	
	TS1-HH	10/20/2006		1.12	4.87	3.14	4.79	--	--	
	TS1-HH	10/4/2007		1.08	ND [0.5]	ND [0.5]	10.8	--	--	
	TS1-HH	10/9/2008		1.04	ND [0.5]	ND [0.5]	5.13	--	--	
	TS1-HH	10/14/2009		0.711	18.5	0.708	9.97	--	--	
	TS1-9HH	11/11/2010		1.02	ND [1]	ND [1]	6.39	--	--	
	TS1-9HH-0914	9/7/2014		0.36 J	ND [1]	ND [1]	ND [2]	--	--	
	SRTS1-9HH-1015	10/6/2015		0.49	ND [1]	ND [1]	ND [3]	--	--	
	--	9/23/2017		--	--	--	--	--	--	Gauge only
	SRF19-TS19HH-0719	7/5/2019		0.257	ND [1]	ND [1]	ND [3]	All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	
TS1-9II	TS1-9II	11/2002		ND [1]	1.1	ND [1]	ND [3]	--	--	
	TS1-9II	10/2003		ND [0.1]	ND [1]	ND [1]	ND [3]	--	--	
	TS1-9II	10/2003		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS1-9II	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-9II	10/20/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-9II	10/4/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-9II	10/9/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-9II	10/14/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-9II	11/11/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	TS1-9II-0914	9/7/2014		ND [0.4]	ND [1]	0.31 J	2.21 J	--	--	
	SRTS1-9II-1015	10/6/2015		ND [0.4]	ND [1]	ND [1]	ND [3]	--	--	
	--	9/23/2017		--	--	--	--	--	--	Gauge only
	--	6/27/2019		--	--	--	--	--	--	Gauge only
FS1-9D	FS1-9D	11/2000		1.4	ND [1]	ND [1]	4.6	--	--	
	FS1-9D	11/2001		**150**	ND [10]	**210**	**7000**	--	--	
	FS1-9D	11/2002		ND [1]	ND [1]	ND [1]	3.6	--	--	
	FS1-9D	10/2003		ND [0.1]	ND [1]	ND [1]	ND [3]	--	--	
	FS1-9D	10/2004		--	--	--	--	--	--	
	FS1-9D	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	2.25	--	--	
	FS1-9D	10/20/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-9D	10/4/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-9D	10/9/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-9D	10/14/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FSI-9D	11/11/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	FSI-9D-0914	9/8/2014		ND [0.4]	1.77	0.54 J	5.11 J	--	--	
	SRFS1-9D-1015	10/7/2015		ND [0.4]	ND [1]	ND [1]	2 J	--	--	
	--	9/23/2017		--	--	--	--	--	--	Gauge only
	SRF19-FS19D-0719	7/5/2019		0.442	0.391 J	0.557 J	2.72 J	All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	Slight HC and metallic odor.

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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260B[a] [µg/L]					EPA Method 8270 SIM	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels [µg/L]				**4.6**	**1100**	**15**	**190**	**--**	**--**	
FS1-9F	FS1-9F	11/2000		**290**	34	**64**	**390**	--	--	1.1 feet LNAPL
	FS1-9F	11/2001		**Sample too emulsified**				--	--	1.3 feet LNAPL
	FS1-9F	11/2002		**110**	13	**38**	**310**	--	--	0.9 feet LNAPL
	FS1-9F	10/2003		**100**	13	**34**	**220**	--	--	1.1 feet LNAPL
	FS1-9F	10/2004		**145**	6.2	**34.1**	**211**	--	--	
	FS1-9F	11/2005		**140**	5.28	**50.8**	**296**	--	--	0.07 feet LNAPL
	FS1-9F	10/25/2006		**193**	5.73	**44.6**	**369**	--	--	
	FS1-9F	10/5/2007		**85.9**	ND [5]	**21.9**	150	--	--	
	FS1-9F	11/17/2008		**114**	3	**22.8**	162	--	--	
	FS1-9F	12/10/2009		**79.2**	20.3	**29.6**	174	--	--	
	FS1-9F	12/26/2010		**68.8**	7.3	**41.3**	176	--	--	
	--	9/8/2014		--	--	--	--	**--**	**--**	LNAPL present
	--	10/7/2015		--	--	--	--	**--**	**--**	1.99 feet LNAPL
	--	9/23/2017		--	--	--	--	**--**	**--**	LNAPL present
	--	6/27/2019		--	--	--	--	--	--	0.05 feet LNAPL present
FS1-9I	FS1-9I	11/2000		ND [1]	ND [1]	ND [1]	ND [2]	--	--	
	FS1-9I	11/2001		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS1-9I	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS1-9I	10/2003		ND [0.1]	ND [1]	ND [1]	ND [3]	--	--	
	FS1-9I	110/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	FS1-9I	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-9I	10/20/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-9I	10/4/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-9I	10/9/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-9I	10/14/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-9I	11/11/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	FS1-9I-0914	9/8/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	SRFS1-9I-1015	10/7/2015		ND [0.4]	ND [1]	ND [1]	1.15 J	--	--	
	--	9/23/2017		--	--	--	--	--	--	Gauge only
	SRF19-FS19I-0719	7/5/2019		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	
FS1-9M	FS1-9M	11/2000		1.4	ND [1]	ND [1]	ND [2]	--	--	
	FS1-9M	11/2001		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS1-9M	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS1-9M	10/2003		ND [0.1]	ND [1]	ND [1]	ND [3]	--	--	
	FS1-9M	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	FS1-9M	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-9M	10/20/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-9M	10/4/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-9M	10/9/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-9M	10/14/2009		0.713	3.73	0.57	ND [1.5]	--	--	
	FS1-9M	11/11/2010		0.53	ND [1]	ND [1]	ND [3]	--	--	
	FS1-9M-0914	9/8/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	FS1-99M-0914	9/8/2014	X	ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	SRFST-9M-1015	10/6/2015		ND [0.4]	ND [1]	ND [1]	ND [3]	--	--	
	--	9/23/2017		--	--	--	--	--	--	Gauge only
	SRF19-FS19M-0719	7/5/2019		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	

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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260B[a] [µg/L]					EPA Method 8270 SIM	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
FS1-9N	FS1-9N	11/2000		**62**	ND [2]	**31**	45	--	--	
	FS1-9N	11/2001		**43**	ND [2]	5.3	7	--	--	
	FS1-9N	11/2002		**25**	ND [2]	**17**	28	--	--	
	FS1-9N	10/2003		**83**	2.2	**42**	70	--	--	
	FS1-9N	10/2004		**19.4**	1.05	10.4	27.4	--	--	
	FS1-9N	11/2005		**54.6**	1.94	**16.4**	59.3	--	--	
	FS1-9N	10/20/2006		**10.5**	ND [0.5]	1.06	12.7	--	--	
	FS1-9N	10/4/2007		**72.2**	0.6	8.67	100	--	--	
	FS1-9N	10/9/2008		**22.4**	ND [0.5]	0.96	39.3	--	--	
	FS1-9N	10/14/2009		**33.6**	5.47	0.883	26.7	--	--	
	FS1-9N	11/11/2010		**21.9**	ND [1]	1.33	58.4	--	--	
	FS1-9N-0914	9/8/2014		**26.3**	ND [1]	ND [1]	6.95	--	--	
	SRFS1-9N-1015	10/7/2015		**5.09**	ND [1]	0.77 J	23.51	--	--	
	SRF19-FS19N-0917	9/24/2017		**4.85**	ND [1]	0.61 J	18.1	**Naphthalene 8.17** All other results ND or detected below cleanup levels.	**Naphthalene 4.78** All other results ND or detected below cleanup levels.	
	SRF19-FS19N-0719	7/5/2019		0.55	ND [1]	ND [1]	1.75 J	All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	Faint HC odor.
	SRF19-FS19NZ-0719	7/5/2019	X	0.51	ND [1]	ND [1]	2.31 J	**Naphthalene 1.90** All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	Faint HC odor.

Notes:

Bold results exceed ADEC cleanup levels.

Italic results are ND with LOQ [in brackets] exceeding cleanup levels.

[a] EPA method 8021B was used for samples dated (11/16/2010 and 12/26/2010).

[b] Groundwater cleanup levels as listed in 18 AAC 75.345, Table C (ADEC 2018).

-- Not analyzed.

Data Flags:

J (±) Result is an estimated value below the PQL or LOQ, or the result is an estimated value biased high/low/indeterminate due to a QC failure.

ND Analyte was not detected. The PQL or LOQ is given [in brackets].

Abbreviations:

µg/L	microgram(s) per liter	HC	hydrocarbon	PAH	polycyclic aromatic hydrocarbons
AAC	Alaska Administrative Code	ID	identification	PQL	practical quantitation limit
ADEC	Alaska Department of Environmental Conservation	LNAPL	light non-aqueous phase liquid	SIM	selected ion monitoring
AK	Alaska	LOQ	limit of quantification	VOC	volatile organic compound
EPA	U.S. Environmental Protection Agency				

Table B3-1: SRF Tank Setting 1-27 Groundwater Elevation Data
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Location	Well ID	Date	Measured Depths		Well Casing		Groundwater Elevation (feet)	Heaving Observed 2019
			To Water (feet btoc)	To Product (feet btoc)	Total Depth (feet btoc)	Top Elevation[a] (feet)		
TS 1-27	TS1-27G	7/3/2019	12.50	--	25.90	259.35	246.85	No
	TS1-27J	7/3/2019	15.89	--	20.8	266.41	250.52	No
	TS1-27K	7/3/2019	13.24	--	25.19	262.10	248.86	No
	TS1-27L	7/3/2019	15.62	--	20.09	267.95	252.33	No
	TS1-27M	7/3/2019	13.93	--	25.49	258.40	244.47	No
	TS1-27N	7/3/2019	17.13	--	24.40	258.67	241.54	Yes
	FS1-27C	7/3/2019	10.69	--	25.10	257.14	246.45	No

Notes:

[a] Top of casing elevation data from a survey conducted by McLane Consulting, Inc. in November 2015. Elevation expressed relative to NAVD88.

-- Not applicable or not measured.

Abbreviations:

btoc	below top of casing (i.e., below measuring point)
ID	identification
NAVD88	North American Vertical Datum of 1988

Table B3-2: SRF Tank Setting 1-27 Field-Measured Groundwater Quality Parameters
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Location	Well ID	Date	Measured Parameters						Qualitative Observations		
			Temperature (°C)	Specific Conductivity (µS/cm)	DO (mg/L)	ORP (mV)	pH	Turbidity (NTU)	Color	Sheen	Odor
TS 1-27	TS1-27G	7/10/2019	10.56	259	3.11	143.7	6.58	11.7	Clear	None	None
	TS1-27K	7/10/2019	10.05	247	0.73	154.7	6.28	3.45	Clear	None	HC
	TS1-27L	7/10/2019	17.24	--	0.51	78.5	6.35	49.8	Yellow tint	None	HC
	TS1-27M	7/10/2019	7.74	170	7.42	295.9	6.2	3.10	Clear	None	None
	FS1-27C	7/10/2019	8.48	56	9.22	231.8	6.02	10.2	Clear	None	None

Abbreviations:

--	not measured/not observed	mg/L	milligram(s) per liter
µS/cm	microSiemen(s) per centimeter	mV	millivolt(s)
°C	degree(s) Celsius	NTU	nephelometric turbidity unit(s)
DO	dissolved oxygen	ORP	oxidation-reduction potential
HC	hydrocarbon	pH	potential of hydrogen
ID	identification		

Table B3-3: SRF Tank Setting 1-27 Groundwater Analytical Results
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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS1-27G	TS1-27G	12/20/2000		**16**	20	**29**	84	--	--	
	TS1-27G	11/28/2001		**26**	17	**63**	**350**	--	--	
	TS1-27G	11/2002		**18**	28	**48**	**330**	--	--	
	TS1-27G	11/2002	X	**15**	15	**26**	**224**	--	--	
	TS1-27G	10/2003		**6.3**	ND [2]	**17**	93	--	--	
	TS1-27G	10/18/2004		**13**	3.44	8.52	68.1	--	--	
	TS1-27G	11/3/2005		**388**	144	**144**	**1940**	--	--	
	TS1-27G	9/28/2006		**18.6**	57.4	**71**	**263**	--	--	
	TS1-27G	9/28/2006	X	**18.3**	19.4	**55.6**	173	--	--	
	TS1-27G	10/3/2007		**6.75**	8.2	**29.4**	124	--	--	
	TS1-27G	10/8/2008		3.6	8.75	**18.7**	63.8	--	--	
	TS1-27G	10/13/2009		1.7	ND [0.5]	1.89	8.12	--	--	
	TS1-27G	11/10/2010		1.54	1.1	4.71	22.1	--	--	
	TS1-27G-0914	9/12/2014		3.4	ND [1]	13.1	29.61	--	--	
	TS1-927G-0914	9/12/2014		2.96	ND [1]	9.98	21.08	--	--	
	SRTS1-27G-1015	10/4/2015		**5.51**	ND [1]	**17.1**	84.13 J	--	--	
	SRF127-TS127G-0917	9/21/2017		**13.4**	ND [1]	**26.7**	**282**	**Naphthalene 17.2 J** **1,2,4-Trimethylbenzene 58.5** All other results ND or detected below cleanup levels.	**Naphthalene 7.45 J-** All other results ND or detected below cleanup levels.	Sulfur odor
	SRF127-TS127GZ-0917	9/21/2017	X	**13.4**	ND [1]	**25.2**	**263**	**Naphthalene 11.3 J** **1,2,4-Trimethylbenzene 55.7** All other results ND or detected below cleanup levels.	**Naphthalene 6.42** All other results ND or detected below cleanup levels.	Sulfur odor
	SRF127-TS127G-0719	7/10/2019		**9.24**	ND [1]	**23.2 J-**	**265 J-**	**Naphthalene 9.94** **1,2,4-Trimethylbenzene 60.6 J-** All other results ND or detected below cleanup levels.	**Naphthalene 7.29** All other results ND or detected below cleanup levels.	
TS1-27J	TS1-27J	12/20/2000		**96**	66	11	**450**	--	--	
	TS1-27J	11/28/2001		**120**	100	**170**	**1970**	--	--	
	TS1-27J	11/2002		**22**	29	**37**	**470**	--	--	
	TS1-27J	10/2003		**35**	10	**16**	**196**	--	--	
	TS1-27J	10/18/2004		**40.4**	40	**96.1**	**421**	--	--	
	TS1-27J	11/3/2005		**9.19**	8.09	**30.5**	**208**	--	--	
	TS1-27J	9/28/2006		**12.8**	5.22	**33.4**	158	--	--	
	TS1-27J	10/3/2007		1.17	ND [0.5]	3.78	18.1	--	--	
	TS1-27J	10/8/2008		2.99	ND [0.5]	2.56	15.5	--	--	
	TS1-27J	10/14/2009		1.92	2.63	2.44	10.9	--	--	
	TS1-27J	11/10/2010		1.38	ND [1]	1.11	3.91	--	--	
	TS1-27I	11/10/2010	X	1.53	ND [1]	1.14	3.89	--	--	
	TS1-27J-0914	9/12/2014		0.74	ND [1]	0.46 J	0.93 J	--	--	
	--	10/4/2015		--	--	--	--	--	--	Gauged only
	--	9/22/2017		--	--	--	--	--	--	Gauged only
	--	7/3/2019		--	--	--	--	--	--	Gauged only

Table B3-3: SRF Tank Setting 1-27 Groundwater Analytical Results
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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				4.6	1100	15	190	--	--	
TS1-27K	TS1-27K	12/20/2000		**350**	510	**900**	**3900**	--	--	
	TS1-27K	11/28/2001		**320**	160	**1000**	**9100**	--	--	
	TS1-27K	11/2002		**340**	72	**1100**	**7700**	--	--	
	TS1-27K	10/2003		**180**	ND [50]	**620**	**5000**	--	--	
	TS1-27K	10/18/2004		**165**	ND [5]	**452**	**1830**	--	--	
	TS1-27K	10/18/2004	X	**162**	ND [5]	**336**	**1620**	--	--	
	TS1-27K	11/3/2005		**115**	ND [10]	**278**	**1450**	--	--	
	TS1-27K	9/28/2006		**182**	ND [5]	**454**	**2540**	--	--	
	TS1-27K	10/3/2007		**113**	ND [10]	**302**	**2110**	--	--	
	TS1-27K	10/3/2007	X	**118**	ND [10]	**286**	**2140**	--	--	
	TS1-27K	10/8/2008		**113**	ND [10]	**263**	**2080**	--	--	
	TS1-27K	10/8/2008	X	**134**	ND [10]	**433**	**2320**	--	--	
	TS1-27K	10/13/2009		**92.4**	ND [10]	**288**	**2140**	--	--	
	TS1-27K	11/10/2010		**75.8**	ND [1]	**378**	**1870**	--	--	
	TS1-27K-0914	9/12/2014		**66.2**	0.31 J	**1120**	**4662**	--	--	
	SRTS1-27K-1015	10/4/2015		**58.8**	0.34 J	**537**	**3006**	--	--	
	SRTS1-27K9-1015	10/4/2015	X	**59.4**	ND [1]	**619**	**3386**	--	--	
	SRF127-TS127K-0917	9/22/2017		**35.1**	1.02	**247**	**1130**	**Naphthalene 193** **1,2,4-Trimethylbenzene 646** **1,3,5-Trimethylbenzene 208** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 34.4** **Naphthalene 107** *Benzo[a]pyrene ND [0.98]* *Benzo[g,h,i]perylene ND [2.45]* *Benzo[k]fluoranthene ND [2.45]* *Chrysene ND [2.45]* *Dibenzo[a,h]anthracene ND [0.98]* *Indeno[1,2,3-c,d]pyrene ND [2.45]* All other results ND or detected below cleanup levels.	Faint HC odor
	SRF127-TS127K-0719	7/10/2019		**36.6**	ND [1]	**664**	**2420**	**Naphthalene 272** **1,2,4-Trimethylbenzene 1190** **1,3,5-Trimethylbenzene 362** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 58** **2-Methylnaphthalene 60.9** **Naphthalene 170** All other results ND or detected below cleanup levels.	HC odor
	SRF127-TS127KZ-0719	7/10/2019	X	**35.7**	ND [1]	**704**	**2590**	**Naphthalene 301** **1,2,4-Trimethylbenzene 1320** **1,3,5-Trimethylbenzene 394** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 56.5** **2-Methylnaphthalene 60** **Naphthalene 172** All other results ND or detected below cleanup levels.	HC odor

Table B3-3: SRF Tank Setting 1-27 Groundwater Analytical Results
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Kenai Peninsula, Alaska

Well ID	Sample ID	Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	**--**	**--**	
TS1-27L	TS1-27L	11/2002		**43**	ND [10]	**240**	**660**	--	--	
	TS1-27L	10/2003		3.5	ND [1]	**27**	73	--	--	
	TS1-27L	10/18/2004		**4.94**	ND [0.5]	4.86	57.3	--	--	
	TS1-27L	10/3/2005		**5.76**	ND [0.5]	**16.7**	24	--	--	
	TS1-27L	9/28/2006		**11.1**	0.733	**29.3**	42.6	--	--	
	TS1-27L	10/3/2007		1.11	1.99	5.71	25	--	--	
	TS1-27L	10/8/2008		**5.19**	ND [0.5]	**84.6**	24.5	--	--	
	TS1-27L	10/14/2009		2.77	3.71	11.4	49.9	--	--	
	TS1-27L	11/10/2010		0.8	ND [1]	4.03	14.5	--	--	
	TS1-27L-0914	9/11/2014		**9.74**	4.18	**99.1**	**464**	--	--	
	SRTS1-27L-1015	10/4/2015		4.4	ND [10]	**55.7**	**248**	--	--	
	SRF127-TS127L-0917	9/22/2017		**4.78**	1.54	**46**	172	**Naphthalene 49.5** **1,2,4-Trimethylbenzene 234** All other results detected below cleanup levels.	**1-Methylnaphthalene 30** **Naphthalene 30.7** *Benzo[a]anthracene ND [0.5]* *Benzo[g,h,i]perylene ND [0.5]* *Indeno[1,2,3-c,d]pyrene ND [0.5]* All other results ND or detected below cleanup levels.	
	SRF127-TS127L-0719	7/10/2019		ND [0.4]	ND [1]	0.67 J	ND [3]	**Naphthalene 2.47** All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	Results are suspected to have been switched with TS1-27M. HC odor.
TS1-27M	TS1-27M	11/2002		**10**	ND [5]	**510**	**780**	--	--	
	TS1-27M	11/1/2003		**5.1**	ND [1]	**130**	**202**	--	--	
	TS1-27M	10/18/2004		1.62	ND [0.5]	**43.2**	32.4	--	--	
	TS1-27M	10/2005		1.5	ND [1]	**160**	24.5	--	--	
	TS1-27M	9/28/2006		1.08	ND [0.5]	**128**	22.5	--	--	
	TS1-27M	10/3/2007		1.03	ND [0.5]	**15.1**	4	--	--	
	TS1-27M	10/8/2008		1.09	ND [0.5]	**87.4**	18.4	--	--	
	TS1-27M	10/13/2009		0.535	4.22	**43.3**	9.24	--	--	
	TS1-27M	11/10/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	TS1-27M-0914	9/12/2014		ND [0.4]	ND [1]	11.2	0.9 J	--	--	
	SRTS1-27M-1015	10/4/2015		ND [0.4]	ND [1]	1.6	1.1 J	--	--	
	SRF127-TS127M-0917	9/22/2017		ND [0.4]	ND [1]	1.44	ND [3]	**Naphthalene 3.77** All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	
	SRF127-TS127M-0719	7/10/2019		3.85	0.33 J	**41.4**	180	**Naphthalene 64.9** **1,2,4-Trimethylbenzene 343** **1,3,5-Trimethylbenzene 99.4** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 15.4** **Naphthalene 26.1** All other results ND or detected below cleanup levels.	Results are suspected to have been switched with TS1-27L

Table B3-3: SRF Tank Setting 1-27 Groundwater Analytical Results
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Well ID	Sample ID	Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	**--**	**--**	
TS1-27N	TS1-27N	11/2002		ND [1]	ND [1]	ND [1]	ND [6]	--	--	
	TS1-27N	10/2003		ND [1]	ND [1]	ND [1]	ND [6]	--	--	
	TS1-27N	10/18/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS1-27N	10/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-27N	9/28/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS1-27N	10/3/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-27N	10/8/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-27N	10/13/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-27N	11/10/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	TS1-27N-0914	9/12/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	--	10/4/2015		--	--	--	--	--	--	Gauged only
	--	9/22/2017		--	--	--	--	--	--	Gauged only
	--	7/3/2019		--	--	--	--	--	--	Gauged only
FS1-27C	FS1-27C	12/21/2000		ND [1]	ND [1]	ND [1]	ND [2]	--	--	
	FS1-27C	11/28/2001		ND [1]	ND [1]	ND [1]	ND [6]	--	--	
	FS1-27C	11/2002		ND [1]	ND [1]	ND [1]	ND [5]	--	--	
	FS1-27C	10/2003		ND [1]	ND [1]	ND [1]	ND [6]	--	--	
	FS1-27C	10/18/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	FS1-27C	11/9/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-27C	9/29/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	FS1-27C	10/4/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-27C	11/17/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-27C	12/10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-27C	11/10/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	FS1-27C-0914	9/12/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	SRFS1-27C-1015	10/4/2015		ND [0.4]	ND [1]	ND [1]	ND [3]	--	--	
	--	9/22/2017		--	--	--	--	--	--	Gauged only
	SRF127-FS127C-0719	7/10/2019		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	

Notes:

Bold results exceed ADEC cleanup levels.

Italic results are ND with LOQ [in brackets] exceeding cleanup levels.

[a] Groundwater cleanup levels as listed in 18 AAC 75.345, Table C (ADEC 2018).

-- Not analyzed.

Data Flags:

J (±) Result is an estimated value below the PQL or LOQ, or the result is an estimated value biased high/low/indeterminate due to a QC failure.

ND Analyte was not detected. The PQL or LOQ is given [in brackets].

Abbreviations:

µg/L	microgram(s) per liter	EPA	U.S. Environmental Protection Agency	PAH	polycyclic aromatic hydrocarbon
AAC	Alaska Administrative Code	HC	hydrocarbon	PQL	practical quantitation limit
ADEC	Alaska Department of Environmental Conservation	ID	identification	SIM	selected ion monitoring
AK	Alaska	LOQ	limit of quantification	VOC	volatile organic compound

Table B4-1: SRF Tank Setting 1-33 Groundwater Elevation Data
2019 Groundwater Monitoring Program Report
Kenai, Alaska

Location	Well ID	Date	Measured Depths		Well Casing		Groundwater Elevation (feet)	Heaving Observed 2019
			To Water (feet btoc)	To Product (feet btoc)	Total Depth (feet btoc)	Top Elevation (feet)		
TS 1-33	TS1-33JJ[a]	7/3/2019	14.00	--	24.91	165.41	151.41	No
	TS1-33KK[a]	7/3/2019	8.71	--	22.06	163.34	154.63	No
	TS1-33N[b]	7/3/2019	20.56	--	28.45	181.89	161.33	No
	TS1-33P[a]	7/3/2019	9.29	--	18.97	162.68	153.39	No
	TS1-33Q[a]	7/3/2019	10.86	--	18.82	163.14	152.28	Yes
	TS1-33O2[a]	7/3/2019	10.90	--	22.68	167.22	156.32	No
	TS1-33UR[b]	7/3/2019	9.11	--	15.57	165.11	156.00	No
	FS1-33F[a]	7/3/2019	28.10	--	45.22	158.94	130.84	No
	FS1-33H[a]	7/3/2019	25.23	--	42.40	159.81	134.58	Yes
	FS1-33O[b]	7/3/2019	29.11	--	47.97	159.40	130.29	No
	FS1-33S[a]	7/3/2019	25.86	--	47.85	159.25	133.39	No
	FS1-33T[b]	7/3/2019	20.93	--	42.88	156.27	135.34	No
	FS1-33W[b]	7/3/2019	23.72	--	30.30	158.14	134.42	No

Notes:

[a] Top of casing elevation data from a survey conducted by McLane Consulting, Inc. in November 2015.
Elevation expressed relative to NAVD88.

[b] Top of casing elevation data from a survey conducted by Brice in October 2017.
Elevation expressed relative to NAVD88.

-- Not applicable or not measured.

Abbreviations:

btoc	below top of casing (i.e., below measuring point)
ID	identification
NAVD88	North American Vertical Datum of 1988

Table B4-2: SRF Tank Setting 1-33 Field-Measured Groundwater Quality Parameters
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Location	Well ID	Date	Measured Parameters						Qualitative Observations		
			Temperature (°C)	Specific Conductivity (µS/cm)	DO (mg/L)	ORP (mV)	pH	Turbidity (NTU)	Color	Sheen	Odor
TS 1-33	TS1-33JJ	7/11/2019	9.27	368	2.15	95.6	6.50	9.57	Clear	None	None
	TS1-33O2[a]	7/11/2019	9.10	331	2.39	95.2	6.58	--	Clear	None	Slight HC
	TS1-33Q	7/11/2019	9.32	297	0.91	145.9	6.4	2.14	Clear	None	Slight HC
	TS1-33UR	7/11/2019	13.02	298	0.49	124.2	6.51	11.5	Yellow tint	Yes	HC
	FS1-33F	7/9/2019	11.01	32	3.90	270.0	5.90	6.04	Clear	None	None
	FS1-33H	7/11/2019	9.22	395	0.93	51	6.49	1.24	Yellow tint	None	HC
	FS1-33S	7/11/2019	10.11	57	4.88	267.8	5.91	4.61	Clear	None	None
	FS1-33W	7/9/2019	8.82	149	9.10	204.8	6.27	7.46	Clear	None	None

Notes:

[a] Turbidity meter equipment malfunction

Abbreviations:

--	not measured/not observed	LNAPL	light non-aqueous phase liquid
µS/cm	microSiemen(s) per centimeter	mg/L	milligram(s) per liter
°C	degree(s) Celsius	mV	millivolt(s)
DO	dissolved oxygen	NTU	nephelometric turbidity unit(s)
HC	hydrocarbon	ORP	oxidation-reduction potential
ID	identification	pH	potential of hydrogen

Table B4-3: SRF Tank Setting 1-33 Groundwater Analytical Results
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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS1-33JJ	TS1-27G	11/2002		3.6	3.2	**38**	58	--	--	LNAPL globules
	TS1-27G	10/2003		1.3	ND [1]	3.1	5.2	--	--	
	TS1-27G	10/2004		2.72	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS1-27G	11/2005		2.4	ND [0.5]	5.16	5.99	--	--	
	TS1-27G	9/2006		0.95	ND [0.5]	0.796	ND [1]	--	--	
	TS1-27G	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-27G	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-27G	10/13/2009		ND [0.5]	1.58	ND [0.5]	ND [1.5]	--	--	
	TS1-33JJ	11/10/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	TS1-33JJ-0914	9/12/2014		ND [0.4]	ND [1]	0.35 J	ND [2]	--	--	
	SRTS1-33JJ-1015	10/4/2015		0.27 J	ND [1]	ND [1]	ND [3]	--	--	
	--	9/23/2017		--	--	--	--	--	--	Gauge only
	SRF133-TS133JJ-0719	7/11/2019		0.58	ND [1]	ND [1]	ND [3]	All other results ND or detected below cleanup levels.	All results ND.	
TS1-33KK	TS1-33KK	11/2002		**17**	1.1	1.9	17	--	--	
	TS1-33KK	10/2003		**15**	ND [1]	1.5	3.1	--	--	
	TS1-33KK	10/2004		4.09	1.78	0.559	2.53	--	--	
	TS1-33KK	11/2005		3.02	0.999	ND [0.5]	ND [1.5]	--	--	
	TS1-33KK	9/2006		1.85	0.534	ND [0.5]	1.03	--	--	
	TS1-33KK	10/2007		4.54	ND [0.5]	ND [0.5]	2.08	--	--	
	TS1-33KK	10/2008		0.53	2.97	ND [0.5]	ND [1.5]	--	--	
	TS1-33KK	10/14/2009		1.58	4.87	ND [0.5]	ND [1.5]	--	--	
	TS1-33KK	11/10/2010		**4.62**	ND [1]	ND [1]	ND [3]	--	--	
	TS1-33KK-0914	9/12/2014		3.64	47	0.75 J	3.56	--	--	
	--	10/4/2015		--	--	--	--	--	--	Gauge only
	--	9/23/2017		--	--	--	--	--	--	Gauge only
	--	7/3/2019		--	--	--	--	--	--	Gauge only
TS1-33N	SRF133-TS133N-1017	10/8/2017		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND or detected below cleanup levels.	Installed 10/6/2017
	SRF133-TS133NZ-1017	10/8/2017	X	ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND or detected below cleanup levels.	Installed 10/6/2017
	--	7/3/2019		**To be decommissioned.**						
TS1-33P	TS1-33P	12/2000		ND [1]	ND [1]	ND [1]	ND [2]	--	--	
	TS1-33P	11/2001		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS1-33P	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS1-33P	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS1-33P	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	1.42	--	--	
	TS1-33P	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-33P	9/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS1-33P	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-33P	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-33P	10/14/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-33P	11/10/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	TS1-33P-0914	9/12/2014		0.32 J	ND [1]	0.38 J	ND [2]	--	--	
	--	10/4/2015		--	--	--	--	--	--	Gauge only
	--	9/23/2017		--	--	--	--	--	--	Gauge only
	--	7/3/2019		--	--	--	--	--	--	Gauge only

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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS1-33Q	TS1-33Q	12/2000		**380**	ND [50]	**970**	**6300**	--	--	
	TS1-33Q	12/2000	X	**370**	ND [50]	**950**	**6200**	--	--	
	TS1-33Q	11/2001		**450**	ND [50]	**1200**	**5700**	--	--	
	TS1-33Q	11/2002		**450**	ND [10]	**1100**	**2300**	--	--	
	TS1-33Q	11/2002	X	**530**	ND [50]	**1500**	**4200**	--	--	
	TS1-33Q	10/2003		**350**	ND [20]	**1100**	**4300**	--	--	
	TS1-33Q	10/2004		**363**	ND [5]	**1150**	**3330**	--	--	
	TS1-33Q	11/2005		**283**	ND [25]	**1160**	**3620**	--	--	
	TS1-33Q	9/2006		**339**	ND [5]	**1320**	**3540**	--	--	
	TS1-33Q	10/2007		**230**	ND [25]	**1090**	**3380**	--	--	
	TS1-33Q	10/2008		**166**	ND [50]	**735**	**1580**	--	--	
	TS1-33Q	10/14/2009		**155**	12.1	**856**	**2080**	--	--	
	TS1-33Q	10/14/2009	X	**141**	10.9	**739**	**1680**	--	--	
	--	11/11/2010		--	--	--	--	--	--	Dry, not sampled
	TS1-33Q-0914	9/11/2014		**22.8**	0.41 J	**255**	**337.1**	--	--	
	TS1-933Q-0914	9/11/2014	X	**22.3**	0.37 J	**245**	**327.9**	--	--	
	SRTS1-33Q-1015	10/4/2015		**27.1**	ND [10]	**292**	**202.4 J**	--	--	
	SRTS1-33Q9-1015	10/4/2015	X	**35.4**	ND [1]	**242**	173.9 J	--	--	
	SRF133-TS133Q-0917	9/23/2017		**35.6**	ND [10]	**515**	**574**	**Naphthalene 8.3 J** **1,2,4-Trimethylbenzene 157** All other results ND or detected below cleanup levels.	**Naphthalene 4.93 J** *Indeno[1,2,3-c,d]pyrene ND [0.2] J-* All other results ND or detected below cleanup levels.	
	SRF133-TS133QZ-0917	9/23/2017	X	**38.9**	ND [10]	**532**	**584**	**Naphthalene 8.31** **1,2,4-Trimethylbenzene 199** **1,3,5-Trimethylbenzene 149** All other results ND or detected below cleanup levels.	**Naphthalene 4.37** *Indeno[1,2,3-c,d]pyrene ND [0.2]* All other results ND or detected below cleanup levels.	
	SRF133-TS133Q-0719	7/11/2019		**45.3 J-**	0.66 J	**1050**	**1760**	**Naphthalene 41.3** **1,2,4-Trimethylbenzene 542** **1,3,5-Trimethylbenzene 345** All other results ND or detected below cleanup levels.	**Naphthalene 17 J+** All other results ND or detected below cleanup levels.	Slight HC odor

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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS1-33U	TS1-33U	12/2000		**730**	ND [10]	**170**	180	--	--	1.1 feet LNAPL
	TS1-33U	12/2001		**880**	13	**260**	**270**	--	--	2.3 feet LNAPL
	TS1-33U	11/2002		**59**	1.1	7	14	--	--	LNAPL film
	TS1-33U	10/2003		**170**	ND [10]	13	ND [30]	--	--	0.2 feet LNAPL
	TS1-33U	10/2004		**42.6**	0.723	3.17	10.4	--	--	Sheen observed
	TS1-33U	11/2005		**151**	2.68	2.63	17.6	--	--	0.5 feet LNAPL
	TS1-33U	9/2006		**152**	ND [0.5]	2.61	3.89	--	--	
	TS1-33U	10/2007		**305**	ND [5]	**16.4**	25.1	--	--	
	TS1-33U	10/2008		**11.2**	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS1-33U	10/16/2009		**212**	6.61	ND [5]	ND [15]	--	--	
	TS1-33U	10/16/2009	X	**214**	6.76	ND [5]	ND [15]	--	--	
	--	11/2010		--	--	--	--	--	--	Damaged casing, cannot sample
	--	9/11/2014		--	--	--	--	--	--	Casing broken, cannot sample
	--	10/5/2015		--	--	--	--	--	--	Obstruction at 8.2 feet btoc, LNAPL observed
	--	10/10/2017		--	--	--	--	--	--	Decommissioned 10/10/2017
TS1-33UR	--	10/10/2017		--	--	--	--	--	--	Installed 10/5/2017; LNAPL present
	SRF133-TS133UR-0719	7/11/2019		**22.4**	0.34 J	**23.6**	1.77 J	**Naphthalene 15.8** All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels	HC odor, yellow tint.
TS1-33O2	TS1-33O2	11/2002		**150**	2.5	**64**	63	--	--	
	TS1-33O2	10/2003		**140**	ND [2]	**72**	39	--	--	
	TS1-33O2	10/2004		**267**	1.91	**93.4**	50.9	--	--	
	TS1-33O2	11/2005		**119**	0.753	**73.9**	50.2	--	--	
	TS1-33O2	9/2006		**77.7**	1.65	**57.8**	43.3	--	--	
	TS1-33O2	10/2007		**629**	ND [5]	**132**	67.3	--	--	
	TS1-33O2	10/2008		**140**	ND [5]	**67**	23.6	--	--	
	TS1-33O2	10/14/2009		**186**	18	**99.3**	60.6	--	--	
	TS1-33O2	11/11/2010		**952**	ND [1]	**198**	82	--	--	
	TS1-33O2-0914	9/11/2014		**865**	1.65	**286**	145.99	--	--	
	SRTS1-33O2-1015	10/4/2015		**584**	ND [10]	**200**	82.6 J	--	--	
	SRF133-TS133O2-0917	9/23/2017		**140**	0.73 J	**58.2**	24	**Naphthalene 12.8** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 18.5** **Naphthalene 12** *Indeno[1,2,3-c,d]pyrene ND [0.202]* All other results ND or detected below cleanup levels.	Faint HC odor
	SRF133-TS133O2-0719	7/11/2019		**192**	0.57 J	**164**	28.9	**Naphthalene 47.3** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 23.7** **Naphthalene 27** All other results ND or detected below cleanup levels.	Slight HC odor
	SRF133-TS133O2Z-0719	7/11/2019	X	**190**	0.61 J	**179**	30.3	**Naphthalene 48.4** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 24.4** **Naphthalene 27.7** All other results ND or detected below cleanup levels.	Slight HC odor

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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
FS1-33F	FS1-33F	12/2000		**290**	ND [5]	**25**	37	--	--	
	FS1-33F	11/2001		**340**	ND [5]	**23**	34	--	--	
	FS1-33F	11/2002		**250**	ND [5]	**15**	23	--	--	
	FS1-33F	10/2003		**180**	ND [5]	11	25	--	--	
	FS1-33F	10/2004		**150**	ND [0.5]	5.59	8.29	--	--	
	FS1-33F	11/2005		**252**	ND [1]	12.1	22.3	--	--	
	FS1-33F	9/2006		**315**	ND [2.5]	12.9	28.1	--	--	
	FS1-33F	10/2007		**186**	ND [0.5]	12.5	23.1	--	--	
	FS1-33F	10/2008		**222**	ND [5]	ND [5]	ND [15]	--	--	
	FS1-33F	10/14/2009		**155**	ND [5]	6.1	ND [15]	--	--	
	FS1-33F	11/11/2010		**119**	ND [1]	4.28	6	--	--	
	FS1-33F-0914	9/11/2014		**396**	ND [1]	7.52	9.62	--	--	
	SRFS1-33F-1015	10/4/2015		**349**	ND [1]	3.12	7.25	--	--	
	SRF133-FS133F-0917	9/23/2017		**250**	ND [1]	3.45	5.1	All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	
	SRF133-FS133F-0719	7/9/2019		**123 J**	ND [1]	0.68 J	3.22 J	All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	
	SRF133-FS133FZ-0719	7/9/2019	X	**73.2 J**	ND [1]	0.42 J	2.17 J	All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	
FS1-33H	FS1-33H	12/2000		**170**	ND [10]	**240**	**350**	--	--	5.5 feet LNAPL
	FS1-33H	12/2001		**750**	ND [10]	**200**	**200**	--	--	5.6 feet LNAPL
	FS1-33H	11/2002		**58**	10	**140**	110	--	--	5.8 feet LNAPL
	FS1-33H	10/2003		**250**	ND [10]	**130**	65	--	--	5.9 feet LNAPL
	FS1-33H	10/2004		**62.4**	2.74	**130**	78.1	--	--	
	FS1-33H	11/2005		**37.1**	5.18	**132**	118	--	--	
	FS1-33H	9/2006		**19.1**	2.29	**99.7**	78.3	--	--	
	FS1-33H	10/2007		**20.4**	2.14	**96.2**	83	--	--	
	FS1-33H	10/2008		**26**	1.76	**81.1**	70.5	--	--	
	FS1-33H	10/16/2009		4.44	24	**50.8**	44.1	--	--	
	FS1-33H	12/26/2010		**45.3**	24.2	**92.3**	50.3	--	--	
	--	9/11/2014		--	--	--	--	--	--	LNAPL present
	SRFS1-33H-1015	10/5/2015		**21.3**	0.38 J	**78.1**	34.3	--	--	
	SRF133-FS133H-0917	9/23/2017		**9.77**	0.53 J	**32.2**	12.9	**Naphthalene 4.23** All other results ND or detected below cleanup levels.	**Naphthalene 3.77** *Indeno[1,2,3-c,d]pyrene ND [0.2]* All other results ND or detected below cleanup levels.	Sheen and HC odor
	SRF133-FS133H-0719	7/11/2019		**9.33**	0.47 J	**35.1**	12.1	**Naphthalene 4.41** All other results ND or detected below cleanup levels.	**Naphthalene 3.77** All other results ND or detected below cleanup levels.	HC odor, yellow tint

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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
FS1-33O	--	12/2000		**Casing kinked; cannot access**						
	--	11/2001		**Casing kinked; cannot access**						
	--	11/2002		**Casing kinked; cannot access**						
	--	10/2003		**Casing kinked; cannot access**						
	--	10/2004		**Casing kinked; cannot access**						
	FS1-33O	11/2005		**92.6**	ND [0.5]	1.2	1.66	--	--	
	FS1-33O	9/2006		**77.2**	ND [0.5]	ND [0.5]	ND [1]	--	--	
	FS1-33O	10/2007		**45.4**	ND [10]	**19.4**	68.2	--	--	
	FS1-33O	10/2008		**118**	ND [5]	ND [5]	ND [15]	--	--	
	FS1-33O	10/14/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-33O	11/11/2010		**15**	ND [1]	ND [1]	ND [3]	--	--	
	FS1-33O-0914	9/11/2014		**92.3**	ND [1]	0.52 J	0.67 J	--	--	
	--	10/5/2015		--	--	--	--	--	--	Gauge only
	--	9/23/2017		--	--	--	--	--	--	Gauge only
	--	7/3/2019		--	--	--	--	--	--	Gauge only
FS1-33S	FS1-33S	12/2000		**30**	2.7	**53**	16	--	--	
	FS1-33S	11/2001		**49**	2.7	**40**	17	--	--	
	FS1-33S	11/2002		1.8	ND [1]	1.9	ND [3]	--	--	
	FS1-33S	10/2003		4.4	ND [1]	**15**	3.4	--	--	
	FS1-33S	10/2004		**6.47**	5.42	7.89	2.96	--	--	
	FS1-33S	11/2005		1.74	2.29	12	3.2	--	--	
	FS1-33S	9/2006		4.09	ND [0.5]	7.08	2.16	--	--	
	FS1-33S	10/2007		**5.48**	ND [0.5]	**22.8**	6.4	--	--	
	FS1-33S	10/2008		0.53	ND [0.5]	0.5	ND [1.5]	--	--	
	FS1-33S	10/14/2009		2.26	11.6	**35.6**	6.64	--	--	
	FS1-33S	11/10/2010		**9.47**	ND [1]	**35**	7.05	--	--	
	FS1-33S-0914	9/11/2014		1.4	ND [1]	**15.3**	2.09	--	--	
	SRTS1-33S-1015	10/4/2015		ND [0.4]	ND [1]	0.85 J	1.51 J	--	--	Note: Lab ID is SRTS1-33S-1015
	SRF133-FS133S-0917	9/23/2017		0.19 J	ND [1]	0.43 J	ND [3]	All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	
	SRF133-FS133S-0719	7/11/2019		0.98	ND [1]	ND [1]	ND [3]	All other results ND or detected below cleanup levels.	All results ND.	
FS1-33T	FS1-33T	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS1-33T	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS1-33T	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	FS1-33T	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-33T	9/2006		ND [0.5]	ND [2]	ND [1]	ND [1.5]	--	--	
	FS1-33T	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-33T	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-33T	10/14/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS1-33T	11/10/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	FS1-33T-0914	9/11/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	--	10/5/2015		--	--	--	--	--	--	Gauge only
	--	9/23/2017		--	--	--	--	--	--	Gauge only
	--	7/3/2019		--	--	--	--	--	--	Gauge only

Table B4-3: SRF Tank Setting 1-33 Groundwater Analytical Results
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Well ID	Sample ID	Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
FS1-33W	SRF133-FS133W-1017	10/8/2017		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	Installed 10/6/2017 as downgradient well
	SRF133-FS133W-0719	7/9/2019		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	

Notes:

Bold results exceed ADEC cleanup levels.

Italic results are ND with LOQ [in brackets] exceeding cleanup levels.

[a] Groundwater cleanup levels as listed in 18 AAC 75.345, Table C (ADEC 2018).

-- Not analyzed

Data Flags:

J (±) Result is an estimated value below the PQL or LOQ, or the result is an estimated value biased high/low/indeterminate due to a QC failure.

ND Analyte was not detected. The PQL or LOQ is given [in brackets].

Abbreviations:

µg/L microgram(s) per liter

AAC Alaska Administrative Code

ADEC Alaska Department of Environmental Conservation

AK Alaska

btoc below top of casing

EPA U.S. Environmental Protection Agency

HC hydrocarbon

ID identification

LNAPL light non-aqueous phase liquid

LOQ limit of quantification

PAH polycyclic aromatic hydrocarbons

PQL practical quantitation limit

SIM selected ion monitoring

VOC volatile organic compound

Table B5-1: SRF Tank Setting 2-15 Groundwater Elevation Data
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Location	Well ID	Date	Measured Depths		Well Casing		Groundwater Elevation (feet)	Heaving Observed 2019
			To Water (feet btoc)	To Product (feet btoc)	Total Depth (feet btoc)	Top Elevation[a] (feet)		
TS 2-15	TS2-15O	7/3/2019	11.55	--	21.28	324.72	313.17	No
	TS2-15P	7/3/2019	12.51	--	27.71	320.61	308.10	No
	TS2-15R	7/3/2019	13.80	--	25.31	327.16	313.36	No
	FS2-15B	7/3/2019	15.56	--	36.20	315.40	299.84	No
	TS2-15Q	7/3/2019	16.67	--	32.88	326.70	310.03	No

Notes:

[a] Top of casing elevation data from a survey conducted by McLane Consulting, Inc. in November 2015. Elevation expressed relative to NAVD88.

-- Not applicable or not measured.

Abbreviations:

btoc	below top of casing (i.e., below measuring point)
ID	identification
NAVD88	North American Vertical Datum of 1988

Table B5-2: SRF Tank Setting 2-15 Field-Measured Groundwater Quality Parameters
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Location	Well ID	Date	Measured Parameters						Qualitative Observations		
			Temperature (°C)	Specific Conductivity (µS/cm)	DO (mg/L)	ORP (mV)	pH	Turbidity (NTU)	Color	Sheen	Odor
TS 2-15	TS2-15O	7/10/2019	8.00	497	1.59	22.0	6.28	4.44	Clear	None	Slight
	TS2-15P	7/10/2019	9.92	123	7.74	284.0	5.61	2.18	Clear	None	None
	TS2-15R	7/10/2019	14.86	178	2.22	314.0	5.93	7.28	Clear	None	None
	FS2-15B	7/10/2019	11.64	406	0.39	60.8	6.53	4.19	Clear	None	None

Abbreviations:

--	not measured/not observed	mg/L	milligram(s) per liter
µS/cm	microSiemen(s) per centimeter	mV	millivolt(s)
°C	degree(s) Celsius	NTU	nephelometric turbidity unit(s)
DO	dissolved oxygen	ORP	oxidation-reduction potential
ID	identification	pH	potential of hydrogen

Table B5-3: SRF Tank Setting 2-15 Groundwater Analytical Results
2019 Groundwater Monitoring Program Report
Kenai, Alaska

Well ID	Sample ID	Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS2-15O	TS2-15O	12/2000		**570**	**1800**	**680**	**6700**	--	--	
	TS2-15O	11/2001		**52**	140	**120**	**850**	--	--	
	TS2-15O	11/2002		**15**	21	**15**	130	--	--	
	TS2-15O	10/2003		**160**	290	**380**	**3200**	--	--	
	TS2-15O	10/2004		**235**	832	**316**	**3100**	--	--	
	TS2-15O	11/2005		**85.9**	443	**209**	**1990**	--	--	
	TS2-15O	9/2006		**225**	1080	**672**	**3890**	--	--	
	TS2-15O	10/2007		--	--	--	--	--	--	Dry, not sampled
	TS2-15O	10/2008		**17.9**	0.89	**28.9**	27.6	--	--	
	TS2-15O	10/2009		**23.9**	136	**168**	**1370**	--	--	
	--	11/2010		--	--	--	--	--	--	Dry, not sampled
	TS2-15O-0914	9/12/2014		**7.08**	64.9	**263**	**1621**	--	--	
	SRTS2-15O-1015[b]	10/3/2015		**6.9**	7.9 J	**80.3**	**436**	--	--	
	SRF215-TS215O-0917	9/21/2017		2.84	2.59	**34.5**	139	**Naphthalene 4.92** **1,2,4-Trimethylbenzene 16.7** All other results ND or detected below cleanup levels.	**Naphthalene 4.82** All other results ND or detected below cleanup levels.	Slight sheen and sulfur odor
	SRF215-TS215OZ-0917	9/21/2017	X	2.99	2.87	**39.2**	158	**Naphthalene 6.14** **1,2,4-Trimethylbenzene 19.1** All other results ND or detected below cleanup levels.	**Naphthalene 3.84** All other results ND or detected below cleanup levels.	Note: Lab sample name is SRF215-TS215O2-0917
	SRF215-TS215O-0719	7/10/2019		**6.44**	1.24	**189**	**633**	**Naphthalene 14.4** **1,2,4-Trimethylbenzene 84.7** All other results ND or detected below cleanup levels.	**Naphthalene 8.64** All other results ND or detected below cleanup levels.	Slight HC odor
	SRF215-TS215OZ-0719	7/10/2019	X	**6.02**	1.19	**179**	**594**	**Naphthalene 13.4** **1,2,4-Trimethylbenzene 76.3** All other results ND or detected below cleanup levels.	**Naphthalene 8.5** All other results ND or detected below cleanup levels.	Slight HC odor

Table B5-3: SRF Tank Setting 2-15 Groundwater Analytical Results
2019 Groundwater Monitoring Program Report
Kenai, Alaska

Well ID	Sample ID	Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				4.6	1100	15	190	--	--	
TS2-15P	TS2-15P	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS2-15P	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS2-15P	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS2-15P	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS2-15P	9/2006		ND [0.5]	ND [2]	ND [1]	ND [1.5]	--	--	
	TS2-15P	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS2-15P	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS2-15P	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS2-15P	11/10/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	TS2-15P-0914	9/12/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	SRTS2-15P-1015[b]	10/3/2015		ND [0.4]	ND [1]	ND [1]	1.03 J	--	--	
	--	9/21/2017		--	--	--	--	--	--	Gauge only
	SRF215-TS215P-0719	7/10/2019		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	
TS2-15Q	TS2-15Q	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS2-15Q	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS2-15Q	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	1.19	--	--	
	TS2-15Q	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS2-15Q	9/2006		ND [0.5]	ND [2]	ND [1]	ND [1.5]	--	--	
	TS2-15Q	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS2-15Q	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS2-15Q	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS2-15Q	11/10/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	TS2-15Q-0914	9/12/2014		ND [0.4]	ND [1]	ND [1]	0.42 J	--	--	
	--	10/6/2015		--	--	--	--	--	--	Gauge only
	--	9/21/2017		--	--	--	--	--	--	Gauge only
	--	7/3/2019		--	--	--	--	--	--	Gauge only
TS2-15R	TS2-15R	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS2-15R	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS2-15R	10/2004		0.61	1.08	ND [0.5]	ND [1]	--	--	
	TS2-15R	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS2-15R	9/2006		ND [0.5]	ND [2]	ND [1]	ND [1.5]	--	--	
	TS2-15R	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS2-15R	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS2-15R	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS2-15R	11/10/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	TS2-15R-0914	9/12/2014		ND [0.4]	ND [1]	ND [1]	2.58 J	--	--	
	SRTS2-15R-1015[b]	10/3/2015		ND [0.4]	ND [1]	ND [1]	1.12 J	--	--	
	--	9/21/2017		--	--	--	--	--	--	Gauge only
	SRF215-TS215R-0719	7/10/2019		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	

Table B5-3: SRF Tank Setting 2-15 Groundwater Analytical Results
2019 Groundwater Monitoring Program Report
Kenai, Alaska

Well ID	Sample ID	Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	**--**	**--**	
FS2-15B	FS2-15B	12/2000		ND [1]	ND [1]	ND [1]	ND [2]	--	--	
	FS2-15B	11/2001		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS2-15B	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	--	10/2003		**Casing melted**				--	--	
	--	10/2004		**Casing melted**				--	--	
	FS2-15B	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS2-15B	9/2006		ND [0.5]	ND [2]	ND [1]	ND [1.5]	--	--	
	FS2-15B	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS2-15B	11/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS2-15B	12/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS2-15B	11/10/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	FS2-15B-0914	9/12/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	SRFS2-15B-1015	10/5/2015		ND [0.4]	ND [1]	ND [1]	ND [3]	--	--	
	--	9/21/2017		--	--	--	--	--	--	Gauge only
	SRF215-FS215B-0719	7/10/2019		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	Non-HC odor.

Notes:

Bold results exceed ADEC cleanup levels.

Italic results are ND with LOQ [in brackets] exceeding cleanup levels.

[a] Groundwater cleanup levels as listed in 18 AAC 75.345, Table C (ADEC 2018).

[b] Collection date in laboratory report is incorrect, stating samples were collected on 4 October 2015.

-- Not analyzed.

Data Flags:

J (±) Result is an estimated value below the PQL or LOQ, or the result is an estimated value biased high/low/indeterminate due to a QC failure.

ND Analyte was not detected. The PQL or LOQ is given [in brackets].

Abbreviations:

µg/L	microgram(s) per liter	HC	hydrocarbon	QC	quality control
AAC	Alaska Administrative Code	ID	identification	SIM	selected ion monitoring
ADEC	Alaska Department of Environmental Conservation	PAH	polycyclic aromatic hydrocarbons	VOC	volatile organic compound
EPA	U.S. Environmental Protection Agency	PQL	practical quantitation limit		

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Table B6-1: SRF Tank Setting 3-4 Groundwater Elevation Data
2019 Groundwater Monitoring Program Report
Kenai, Alaska

Location	Well ID	Date	Measured Depths		Product Thickness (feet)	Well Casing		Groundwater Elevation (feet)	Heaving Observed 2019
			To Water (feet btoc)	To Product (feet btoc)		Total Depth (feet btoc)	Top Elevation[a] (feet)		
TS 3-4	TS3-4D	6/27/2019	15.34	--	Trace	26.18	163.38	148.04	No
	TS3-4P	6/27/2019	10.47	--	--	22.53	158.86	148.39	No
	TS3-4Z	6/27/2019	12.41	--	--	23.98	161.54	149.13	No
	TS3-4CC	6/27/2019	13.13	--	--	20.94	162.51	149.38	No
	TS3-4MM	6/27/2019	8.26	--	--	21.19	154.11	145.85	Yes
	TS3-4NN	6/27/2019	8.87	--	--	27.78	156.77	147.90	Yes
	TS3-4OO	6/27/2019	7.31	--	--	22.94	156.15	148.84	Yes
	TS3-4PP	6/27/2019	7.97	--	--	17.60	158.24	150.27	No
	FS3-4A	6/27/2019	14.20	--	--	37.48	152.75	138.55	Yes
	FS3-4B	6/27/2019	9.04	--	--	30.84	147.55	138.51	Yes
	FS3-4D[b]	6/27/2019	--	10.96	--	Contained LNAPL			Yes
	FS3-4F	6/27/2019	14.03	--	--	25.89	161.54	147.51	No

Notes:

Top of casing elevation data from a survey conducted by McLane Consulting, Inc. in November 2015.

[a] Elevation expressed relative to NAVD88.

[b] Oil/water interface probe lowered 4 feet past depth to product and did not reach water; did not lower any further.

-- Not applicable or not measured.

Abbreviations:

btoc	below top of casing (i.e., below measuring point)
ID	identification
LNAPL	light non-aqueous phase liquid
NAVD88	North American Vertical Datum of 1988

Table B6-2: SRF Tank Setting 3-4 Field-Measured Groundwater Quality Parameters
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Location	Well ID	Date	Measured Parameters						Qualitative Observations		
			Temperature (°C)	Specific Conductivity (µS/cm)	DO (mg/L)	ORP (mV)	pH	Turbidity (NTU)	Color	Sheen	Odor
TS 3-4	TS3-4CC	7/9/2019	12.15	205	0.62	113.4	5.85	6.03	Clear	None	Stagnant
	TS3-4D	6/27/2019	Contained LNAPL								
	TS3-4MM	7/9/2019	9.08	108	2.33	219.1	5.55	10.2	Clear	None	None
	TS3-4OO	7/9/2019	5.97	20	12.40	262.8	5.36	68.6	Slightly cloudy	None	None
	TS3-4P	7/9/2019	7.17	504	1.42	137.9	6.43	5.53	Clear	None	None
	FS3-4A	7/9/2019	8.76	380	1.73	134.0	6.89	7.03	Clear	None	Slight HC
	FS3-4B	7/9/2019	8.84	363	3.40	38.2	6.55	5.05	Clear	None	Stagnant
	FS3-4D	6/27/2019	Contained LNAPL								
	FS3-4F	7/9/2019	13.41	100	8.46	258.5	6.53	1.47	Clear	None	None

Abbreviations:

--	not measured/not observed	LNAPL	light non-aqueous phase liquid
µS/cm	microSiemen(s) per centimeter	mg/L	milligram(s) per liter
°C	degree(s) Celsius	mV	millivolt(s)
DO	dissolved oxygen	NTU	nephelometric turbidity unit(s)
HC	hydrocarbon	ORP	oxidation-reduction potential
ID	identification	pH	potential of hydrogen

Table B6-3: SRF Tank Setting 3-4 Groundwater Analytical Results
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Well ID	Sample ID	Sample Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	**--**	**--**	
TS3-4D	TS3-4D	12/2000		**210**	ND [10]	**150**	**370**	--	--	1.5 feet LNAPL
	TS3-4D	12/2001		**260**	ND [10]	**130**	**400**	--	--	1.5 feet LNAPL
	TS3-4D	11/2002		**200**	ND [10]	**110**	**340**	--	--	1.5 feet LNAPL
	TS3-4D	10/2003		**190**	11	**150**	**460**	--	--	1.5 feet LNAPL
	TS3-4D	10/2004		**130**	4.57	**43.8**	**219**	--	--	Sheen observed
	TS3-4D	11/2005		**152**	ND [2.5]	**87**	**242**	--	--	1.5 feet LNAPL
	TS3-4D	10/2006		**113**	ND [5]	**80.8**	**208**	--	--	
	TS3-4D	10/2007		**91.2**	ND [5]	**149**	**367**	--	--	
	TS3-4D	10/2008		**102**	ND [5]	**78.3**	161	--	--	
	TS3-4D	2009		**81.8**	9.78	**95**	**217**	--	--	
	TS3-4D	11/30/2010		**27.6**	ND [10]	**107**	**340**	--	--	
	--	9/8/2014		--	--	--	--	--	--	LNAPL present
	SRTS3-4D-1015	10/5/2015		**17**	ND [20]	**108**	142.2	--	--	
	--	9/24/2017		--	--	--	--	--	--	LNAPL present
	--	6/27/2019		--	--	--	--	--	--	LNAPL present

Table B6-3: SRF Tank Setting 3-4 Groundwater Analytical Results
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Well ID	Sample ID	Sample Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				4.6	1100	15	190	--	--	
TS3-4P	TS3-4P	12/2000		**1000**	260	**180**	**220**	--	--	
	TS3-4P	12/2000	X	**1200**	350	**190**	**250**	--	--	
	TS3-4P	11/2001		**3500**	470	**270**	**420**	--	--	
	TS3-4P	11/2001	X	**3900**	610	**460**	**780**	--	--	
	TS3-4P	11/2002		**1200**	250	**160**	**200**	--	--	
	TS3-4P	10/2003		**2500**	**1900**	**2800**	**5200**	--	--	
	TS3-4P	10/2003	X	**2200**	**2700**	**4700**	**9600**	--	--	
	TS3-4P	10/2004		**1890**	236	**282**	**345**	--	--	
	TS3-4P	10/2004	X	**2360**	7	**558**	**723**	--	--	
	TS3-4P	11/2005		**867**	137	**164**	156	--	--	
	TS3-4P	11/2005	X	**1120**	179	**184**	185	--	--	
	TS3-4P	10/2006		**777**	103	**174**	135	--	--	
	TS3-4P	10/2006	X	**822**	100	**183**	187	--	--	
	TS3-4P	10/2007		**335**	41.4	**107**	81.8	--	--	
	TS3-4P	10/2007	X	**330**	39.9	**107**	77.5	--	--	
	TS3-4P	10/2008		**135**	9.4	**50.1**	36.6	--	--	
	TS3-4P	10/2009		**3490**	378	**346**	**345**	--	--	
	TS3-4P	11/30/2010		**557**	43.6	**229**	**233**	--	--	
	TS3-4P-0914	9/9/2014		**204**	19.9	**116**	111.4	--	--	
	SRTS3-4P-1015	10/4/2015		**753**	68.9	**99.5**	131.4	--	--	
	SRTS3-4P9-1015	10/4/2015	X	**763**	58.1	**107**	113.3	--	--	
	SRF34-TS34P-0917	9/25/2017		**481**	39.1	**134**	110	**Naphthalene 16.9** All other results ND or detected below cleanup levels.	**Naphthalene 15.3** *Benzo[a]anthracene ND [0.5]* *Benzo[g,h,i]perylene ND [0.5]* *Indeno[1,2,3-c,d]pyrene ND [0.5]* All results ND or detected below cleanup levels.	Sheen and HC odor
	SRF34-TS34P-0719	7/9/2019		**586**	33	**176**	142	**Naphthalene 29.4** All other results ND or detected below cleanup levels.	**Naphthalene 11.6** All results ND or detected below cleanup levels.	
	SRF34-TS34PZ-0719	7/9/2019	X	**595**	32.2	**172**	140	**Naphthalene 30.1** All other results ND or detected below cleanup levels.	**Naphthalene 11.8** All results ND or detected below cleanup levels.	

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Well ID	Sample ID	Sample Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS3-4Z	TS3-4Z	12/2000		ND [1]	ND [1]	ND [1]	ND [1]	--	--	
	TS3-4Z	11/2001		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4Z	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4Z	10/2003		ND [0.5]	ND [0.5]	ND [0.5]	ND [3]	--	--	
	TS3-4Z	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS3-4Z	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4Z	10/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4Z	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4Z	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4Z	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4Z	11/11/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4Z-0914	9/8/2014		ND [0.4]	ND [1]	ND [1]	0.34 J	--	--	
	--	10/6/2015		--	--	--	--	--	--	Gauge only
	--	9/24/2017		--	--	--	--	--	--	Gauge only
	--	6/27/2019		--	--	--	--	--	--	Gauge only
TS3-4CC	TS3-4CC	11/2002		**32**	16	**130**	**280**	--	--	
	TS3-4CC	10/2003		**66**	23	**200**	**450**	--	--	
	TS3-4CC	10/2004		**8.67**	ND [0.5]	**28.7**	38.2	--	--	
	TS3-4CC	11/2005		1.43	ND [0.5]	6.66	16.4	--	--	
	TS3-4CC	10/2006		2.65	ND [0.5]	10.1	16.2	--	--	
	TS3-4CC	10/2007		**62.1**	ND [5]	**193**	**293**	--	--	
	TS3-4CC	10/2008		ND [0.5]	ND [0.5]	3.01	4.76	--	--	
	TS3-4CC	10/2009		**18.9**	4.04	**37.9**	39.7	--	--	
	TS3-4CC	10/2009	X	**20.4**	2.7	**50.7**	47.6	--	--	
	--	--		--	--	--	--	--	--	Insufficient water for sampling
	TS3-4CC-0914	9/9/2014		3.15	2.65	**45.3**	103.65	--	--	
	SRTS3-4CC-1015	10/4/2015		0.61	ND [1]	7.68	18.91	--	--	
	SRF34-TS34CC-0917	9/25/2017		**11**	4.78	**93.9**	172	**Naphthalene 14.7** **1,2,4-Trimethylbenzene 93.8** All other results ND or detected below cleanup levels.	**Naphthalene 9.69** *Indeno[1,2,3-c,d]pyrene ND [0.25]* All results ND or detected below cleanup levels.	Sheen observed
	SRF34-TS34CC-0719	7/9/2019		0.44	ND [1]	11.5	21.5	**Naphthalene 3.08** All other results ND or detected below cleanup levels.	**Naphthalene 6.55** All other results ND or detected below cleanup levels.	Stagnant odor

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Well ID	Sample ID	Sample Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				4.6	1100	15	190	--	--	
TS3-4MM	TS3-4MM	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4MM	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4MM	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS3-4MM	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4MM	10/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4MM	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4MM	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4MM	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4MM	11/11/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4MM-0914	9/8/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	SRTS3-4MM-1015	10/5/2015		**ND [8]**	ND [20]	**ND [20]**	ND [60]	--	--	
	--	9/24/2017		--	--	--	--	--	--	Gauge only
	SRF34-TS34MM-0719	7/9/2019		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	
TS3-4NN	TS3-4NN	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4NN	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4NN	10/2004		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4NN	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS3-4NN	10/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4NN	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4NN	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4NN	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4NN	11/11/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4NN-0914	9/9/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	--	10/6/2015		--	--	--	--	--	--	Gauge only
	--	9/24/2017		--	--	--	--	--	--	Gauge only
	--	6/27/2019		--	--	--	--	--	--	Gauge only
TS3-4OO	TS3-4OO	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4OO	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4OO	10/2004		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4OO	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4OO	10/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4OO	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4OO	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4OO	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4OO	11/11/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4OO-0914	9/9/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	SRTS3-4OO-1015	10/5/2015		ND [0.4]	ND [1]	ND [1]	ND [3]	--	--	
	--	9/24/2017		--	--	--	--	--	--	Gauge only
	SRF34-TS34OO-0719	7/9/2019		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	

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Well ID	Sample ID	Sample Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	**--**	**--**	
TS3-4PP	TS3-4PP	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4PP	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4PP	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS3-4PP	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4PP	10/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4PP	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4PP	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4PP	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-4PP	11/11/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-4PP-0914	9/9/2014		ND [0.4]	ND [1]	0.47 J	ND [2]	--	--	
	--	10/6/2015		--	--	--	--	--	--	Gauge only
	--	9/24/2017		--	--	--	--	--	--	Gauge only
	--	6/27/2019		--	--	--	--	--	--	Gauge only
FS3-4A	FS3-4A	12/2000		ND [1]	ND [1]	ND [1]	ND [2]	--	--	
	FS3-4A	11/2001		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS3-4A	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS3-4A	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS3-4A	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	FS3-4A	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-4A	10/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-4A	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-4A	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-4A	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-4A	11/11/2010		ND [0.5]	ND [1]	ND [1]	ND [3]	--	--	
	FS3-4A-0914	9/9/2014		1.86	ND [1]	1.02	ND [2]	--	--	
	SRFS3-4A-1015	10/5/2015		4 J	ND [20]	**ND [20]**	ND [60]	--	--	
	SRF34-FS34A-0917	9/25/2017		1.47	ND [1]	0.43 J	ND [3]	All other results ND or detected below cleanup levels.	All results ND.	
	SRF34-FS34A-0719	7/9/2019		2.05	ND [1]	0.46 J	ND [3]	All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	Slight HC.

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Well ID	Sample ID	Sample Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	**--**	**--**	
FS3-4B	FS3-4B	12/2000		ND [1]	ND [1]	ND [1]	ND [2]	--	--	
	FS3-4B	11/2001		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS3-4B	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS3-4B	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS3-4B	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	FS3-4B	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-4B	10/2006		0.543	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-4B	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-4B	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-4B	10/2009		0.753	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-4B	11/11/2010		0.72	ND [1]	ND [1]	ND [3]	--	--	
	FS3-4B-0914	9/9/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	SRFS3-4B-1015	10/5/2015		0.94	ND [1]	ND [1]	ND [3]	--	--	
	--	9/24/2017		--	--	--	--	--	--	Gauge only
	SRF34-FS34B-0719	7/9/2019		0.56	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	Stagnant odor.
FS3-4D	FS3-4D	12/2000		**1500**	**1100**	**250**	**4400**	--	--	
	FS3-4D	12/2001		**1500**	1000	**260**	**4500**	--	--	11.6 feet LNAPL
	FS3-4D	11/2002		**1700**	**1200**	**400**	**6000**	--	--	> 23 feet LNAPL
	--	10/2003		**could not sample because casing was full of oil**				--	--	> 22 feet LNAPL
	FS3-4D	10/2004		**1590**	774	**184**	**3060**	--	--	Trace LNAPL
	FS3-4D	11/2005		**1600**	968	**227**	**4000**	--	--	5.6 feet LNAPL
	FS3-4D	11/2005	X	**1540**	952	**221**	**4040**	--	--	5.6 feet LNAPL
	FS3-4D	10/2006		**698**	688	**ND [250]**	**4370**	--	--	
	FS3-4D	10/2007		**1500**	756	**256**	**4090**	--	--	
	FS3-4D	11/2008		**1690**	556	**213**	**3300**	--	--	
	FS3-4D	10/2009		**1850**	791	**280**	**3970**	--	--	
	FS3-4D	12/26/2010		**2150**	764	**294**	**4080**	--	--	
	--	9/8/2014		--	--	--	--	--	--	LNAPL present, former recovery well
	--	10/6/2015		--	--	--	--	--	--	LNAPL present
	--	9/24/2017		--	--	--	--	--	--	LNAPL present
	--	6/27/2019		--	--	--	--	--	--	> 4 feet LNAPL present

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Well ID	Sample ID	Sample Date	Duplicate	EPA Method SW8260 [µg/L]					EPA Method 8270 SIM	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
FS3-4F	FS3-4F	12/2000		**40**	1.7	**57**	39	--	--	
	FS3-4F	12/2001		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS3-4F	11/2002		**8.6**	1.9	**20**	12	--	--	
	FS3-4F	10/2003		**21**	1.7	**46**	27	--	--	
	--	10/2004		--	--	--	--	--	--	Reason for not sampling is unknown
	FS3-4F	11/2005		3.67	0.596	6.08	3.4	--	--	
	FS3-4F	10/2006		**13.9**	2.03	**16.6**	6.1	--	--	
	FS3-4F	10/2007		**13**	ND [0.5]	**15.8**	8.31	--	--	
	FS3-4F	10/2008		**42.1**	ND [0.5]	**58.4**	17.6	--	--	
	FS3-4F	10/2009		ND [0.5]	ND [0.5]	0.658	ND [1.5]	--	--	
	FS3-4F	11/11/2010		2.13	ND [1]	9.51	5.48	--	--	
	FS3-4F-0914	9/9/2014		**54.1**	ND [1]	**163**	95.07	--	--	
	FS3-94F-0914	9/9/2014	X	**66.1**	ND [1]	**149**	92.23	--	--	
	SRFS3-4F-1015	10/4/2015		**28.6**	ND [1]	**48.1**	23.86 J	--	--	Note: Lab ID is SRTS3-4F-1015
	SRF34-FS34F-0917	9/25/2017		**29.6**	ND [10]	**81.8**	23.6 J	**Naphthalene 19.7** **1,2,4-Trimethylbenzene 18.3** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 13.4** **Naphthalene 17.4** *Benzo[a]anthracene ND [0.49]* *Benzo[g,h,i]perylene ND [0.49]* *Indeno[1,2,3-c,d]pyrene ND [0.49] J-* All results ND or detected below cleanup levels.	
	SRF34-FS34FZ-0917	9/25/2017	X	**29.4**	ND [10]	**77.8**	22.4 J	**Naphthalene 19.4** **1,2,4-Trimethylbenzene 17.4** All other results ND or detected below cleanup levels.	**1-Methylnaphthalene 13.4** **Naphthalene 17.7** *Benzo[a]anthracene ND [0.504]* *Benzo[g,h,i]perylene ND [0.504]* *Indeno[1,2,3-c,d]pyrene ND [0.504]* All results ND or detected below cleanup levels.	
	SRF34-FS34F-0719	7/9/2019		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	

Notes:

Bold results exceed ADEC cleanup levels.

Italic results are ND with LOQ [in brackets] exceeding cleanup levels.

[a] Groundwater cleanup levels as listed in 18 AAC 75.345, Table C (ADEC 2018).

-- Not analyzed.

Data Flags

J (±) Result is an estimated value below the PQL or LOQ, or the result is an estimated value biased high/low/indeterminate due to a QC failure.

ND Analyte was not detected. The PQL or LOQ is given [in brackets].

Abbreviations:

µg/L	microgram(s) per liter	EPA	U.S. Environmental Protection Agency	PAH	polycyclic aromatic hydrocarbon
AAC	Alaska Administrative Code	ID	identification	PQL	practical quantitation limit
ADEC	Alaska Department of Environmental Conservation	LNAPL	light non-aqueous phase liquid	SIM	selected ion monitoring
AK	Alaska	LOQ	limit of quantification	VOC	volatile organic compound

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Table B7-1: SRF Tank Setting 3-9 Groundwater Elevation Data
2019 Groundwater Monitoring Program Report
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Location	Well ID	Date	Measured Depths		Product Thickness (feet)	Well Casing		Groundwater Elevation (feet)	Heaving Observed 2019
			To Water (feet btoc)	To Product (feet btoc)		Total Depth (feet btoc)	Top Elevation (feet)		
TS 3-9	TS3-9A[a,b,d]	6/28/2019	17.06	15.74	1.32	--	167.91	149.74	No
	TS3-9CR[c]	6/28/2019	19.43	--	--	27.20	168.89	149.46	No
	TS3-9F[b]	6/28/2019	19.56	--	Trace	30.82	168.50	148.94	No
	TS3-9S[b]	6/28/2019	15.67	--	--	29.62	165.05	149.38	No
	TS3-9T[b]	6/28/2019	17.33	--	Trace	31.23	165.89	148.56	No
	TS3-9U[b]	6/28/2019	16.83	--	--	29.64	165.56	148.73	No
	TS3-9V[b]	6/28/2019	9.21	--	--	24.80	159.04	149.83	No
	TS3-9AA[b]	6/28/2019	16.97	--	--	33.80	165.62	148.65	No
	TS3-9BB[b,e]	6/28/2019	18.22	--	--	37.51	164.87	146.65	No
	TS3-9CC[b]	6/28/2019	9.86	--	--	21.93	158.99	149.13	No
	TS3-9DD[b]	6/28/2019	9.05	--	--	27.20	157.01	147.96	No
	FS3-9B[b]	6/28/2019	14.73	--	--	22.45	163.43	148.70	No
	FS3-9E[a,b]	6/28/2019	12.20	11.91	0.29	--	160.26	147.82	No
	FS3-9G[b]	6/28/2019	11.68	--	--	24.88	159.93	148.25	No

Notes:

[a] Potentiometric surface elevations are corrected for LNAPL thickness assuming a specific gravity of 0.84 g/cm^3 based upon Swanson River Crude having an API gravity of 37 degrees.

[b] Top of casing elevation data from a survey conducted by McLane Consulting, Inc. in November 2015; expressed relative to NAVD88.

[c] Top of casing elevation data from a survey conducted by Brice in October 2017; expressed relative to NAVD88.

[d] Product thickness based on product on measuring tape due to oil/water interface probe inaccuracies.

[e] Groundwater elevation was determined to be anomalous and was not used in groundwater contour modeling.

-- Not applicable or not measured.

Abbreviations:

API	American Petroleum Institute
btoc	below top of casing (i.e., below measuring point)
g/cm^3	gram(s) per cubic centimeter
ID	identification
LNAPL	light non-aqueous phase liquid
NAVD88	North American Vertical Datum of 1988

Table B7-2: SRF Tank Setting 3-9 Field-Measured Groundwater Quality Parameters
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Location	Well ID	Date	Measured Parameters						Qualitative Observations		
			Temperature (°C)	Specific Conductivity (µS/cm)	DO (mg/L)	ORP (mV)	pH	Turbidity (NTU)	Color	Sheen	Odor
TS 3-9	TS3-9A	6/30/2019	Contained LNAPL								
	TS3-9AA	6/30/2019	13.42	172	0.97	-46.0	6.44	1.64	Clear	None	HC
	TS3-9BB	6/30/2019	11.79	310	10.2	-35.8	6.82	2.04	Clear	None	None
	TS3-9DD	6/30/2019	13.30	95	5.12	163.7	6.60	1.55	Clear	None	None
	TS3-9CR	7/1/2019	14.27	1163	0.85	-97.0	6.79	16.3	Clear	None	HC
		7/12/2019[a]	9.51	995	1.02	53.3	6.68	10.80	Clear	None	HC
	TS3-9F	7/4/2019	18.84	657	0.33	-40.4	6.73	14.80	Slightly brown	Yes	HC
		7/12/19[a]	10.38	501	1.42	124.1	6.59	16.70	Clear	None	HC
	TS3-9T	7/4/2019	7.78	312	0.93	-44.5	6.79	1.69	Clear	None	HC
		7/12/2019[a]	5.37	292	1.07	64.9	6.62	2.46	Clear	None	HC
	TS3-9U	7/4/2019	9.38	143	0.51	-49.7	6.33	5.54	Clear	None	Strong HC
		7/12/2019[a]	9.40	153	3.85	75.2	6.66	28.1	Clear	None	HC
	TS3-9V	7/1/2019	9.92	514	1.3	-47.8	6.41	3.35	Clear	None	HC
		7/12/2019[a]	5.51	315	2.6	71.0	6.30	7.36	Clear	None	Slight HC
	FS3-9B	6/30/2019	10.30	184	8.6	59.6	6.47	1.21	Clear	None	None
	FS3-9E	6/30/2019	Contained LNAPL								
	FS3-9G	7/4/2019	8.08	453	1.41	76.6	6.73	1.23	Clear	None	None
		7/12/2019[a]	7.27	355	2.48	217.1	6.05	7.79	Clear	None	None

Notes:

[a] Date and parameters of well re-sampling

Abbreviations:

--	not measured/not observed	LNAPL	light non-aqueous phase liquid
µS/cm	microSiemen(s) per centimeter	mg/L	milligram(s) per liter
°C	degree(s) Celsius	mV	millivolt(s)
DO	dissolved oxygen	NTU	nephelometric turbidity unit(s)
HC	hydrocarbon	ORP	oxidation-reduction potential
ID	identification	pH	potential of hydrogen

Table B7-3: SRF Tank Setting 3-9 Groundwater Analytical Results
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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260[b] [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS3-9A	--	12/2000		--	--	--	--	--	--	Casing kinked; can't access with pump or bailer
	--	12/2001		--	--	--	--	--	--	Casing kinked; can't access with pump or bailer
	TS3-9A	11/2002		**6.7**	1.3	**19**	29	--	--	
	TS3-9A	10/2003		**7.1**	2.2	2	13	--	--	
	TS3-9A	10/2004		**19.7**	0.94	4.92	4.1	--	--	
	TS3-9A	11/2005		**29.2**	3.12	1.34	4.96	--	--	0.01 feet LNAPL
	TS3-9A	10/2006		**13**	0.513	1.36	4.73	--	--	
	TS3-9A	10/2006	X	**13.1**	0.75	2.3	6.09	--	--	
	TS3-9A	10/2007		**5.2**	ND [0.5]	2.22	6.56	--	--	
	TS3-9A	10/2007	X	**5.43**	ND [0.5]	2.32	6.51	--	--	
	TS3-9A	10/2008		3.81	ND [0.5]	4.13	10.5	--	--	
	TS3-9A	10/2009		2.89	8.3	0.781	6.44	--	--	
	TS3-9A	12/26/2010		2.72	4.83	2.85	**3000**	--	--	
	TS3-9A	12/26/2010		2.96	4.92	3.13	--	--	--	
	--	9/5/2014		--	--	--	--	--	--	LNAPL present
	--	10/7/2015		--	--	--	--	--	--	LNAPL present
	--	9/24/2017		--	--	--	--	--	--	LNAPL present
	--	6/28/2019		--	--	--	--	--	--	1.32 feet LNAPL present
TS3-9C	TS3-9C	12/2000		**230**	ND [20]	**250**	**2300**	--	--	0.59 feet LNAPL
	TS3-9C	12/2001		**93**	ND [20]	**56**	**1500**	--	--	1.7 feet LNAPL
	TS3-9C	11/2002		**33**	ND [20]	**49**	**1500**	--	--	Sheen
	TS3-9C	10/2003		**28**	ND [20]	**69**	**680**	--	--	
	TS3-9C	10/2004		**22.7**	5.75	**128**	**1060**	--	--	
	TS3-9C	10/2004	X	**20.8**	4.5	**116**	**941**	--	--	
	TS3-9C	11/2005		**27.5**	ND [5]	**189**	**1790**	--	--	
	TS3-9C	10/2006		**11.2**	ND [5]	**101**	**924**	--	--	
	TS3-9C	10/2007		**11.6**	ND [5]	**150**	**2190**	--	--	
	TS3-9C	10/2008		**19.2**	ND [10]	**169**	**1460**	--	--	
	TS3-9C	10/2009		**20.9**	ND [10]	**232**	**2840**	--	--	
	TS3-9C	12/26/2010		**24.6**	8.43	**229**	**3300**	--	--	
	--	9/5/2014		--	--	--	--	--	--	LNAPL present
	--	10/7/2015		--	--	--	--	--	--	Obstruction in well at 20.2 feet btoc, LNAPL observed just above obstruction
	--	10/10/2017		--	--	--	--	--	--	Decommissioned 10/10/2017
TS3-9CR	SRF39-TS39CR-1017	10/10/2017		**5.77**	1.65	6.71	**1105**	**Naphthalene 21.1** **1,2,4-Trimethylbenzene 439** **1,3,5-Trimethylbenzene 440** All other results ND or detected below cleanup levels.	**Naphthalene 8.57** All results ND or detected below cleanup levels.	Installed 10/5/2017; HC odor
	SRF39-TS39CR-0719	7/12/2019		**8.55**	ND [5]	7.86	**894**	**Naphthalene 21.1** **1,2,4-Trimethylbenzene 424** **1,3,5-Trimethylbenzene 395** All other results ND or detected below cleanup levels.	**Naphthalene 4.62 J-** All results ND or detected below cleanup levels.	HC odor

Table B7-3: SRF Tank Setting 3-9 Groundwater Analytical Results
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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260[b] [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS3-9F	TS3-9F	12/2000		**170**	ND [10]	**70**	**840**	--	--	Sheen observed
	TS3-9F	12/2001		**110**	ND [10]	**61**	**1000**	--	--	Sheen observed
	TS3-9F	12/2001	X	**97**	ND [20]	**57**	**1000**	--	--	
	TS3-9F	11/2002		**100**	ND [10]	**100**	**1900**	--	--	Sheen observed
	TS3-9F	10/2003		**66**	ND [10]	**90**	**1600**	--	--	
	TS3-9F	10/2004		**109**	ND [10]	**165**	**3710**	--	--	
	TS3-9F	11/2005		**97.2**	ND [10]	**325**	**4240**	--	--	
	TS3-9F	11/2005	X	**91**	ND [10]	**323**	**4230**	--	--	
	TS3-9F	10/2006		**52.8**	ND [25]	**385**	**5490**	--	--	
	TS3-9F	10/2007		**54**	ND [25]	**400**	**4520**	--	--	
	TS3-9F	10/2008		**37.6**	ND [10]	**269**	**7740**	--	--	
	TS3-9F	10/2008	X	**37.8**	ND [10]	**271**	**4080**	--	--	
	TS3-9F	10/2009		**44.8**	ND [25]	**377**	**5770**	--	--	
	TS3-9F	12/26/2010		**20.1**	7.76	**377**	**3840**	--	--	
	TS3-9F-0914	9/5/2014		**32.8**	ND [1]	**496**	**1771**	--	--	
	TS3-99F-0914	9/5/2014	X	**32.3**	ND [1]	**480**	**1745**	--	--	
	SRTS3-9F-1015	10/5/2015		**24.5**	ND [50]	**471**	**1551**	--	--	
	--	9/24/2017		--	--	--	--	--	--	LNAPL present
	SRF39-TS39F-0719	7/12/2019		**13.7**	ND [5]	**493**	**1580**	**Naphthalene 89.7** **1,2,4-Trimethylbenzene 536** **1,3,5-Trimethylbenzene 290** All other results ND or detected below cleanup levels.	**Naphthalene 63** **1-Methylnaphthalene 24.2** All results ND or detected below cleanup levels.	HC odor
TS3-9S	TS3-9S	12/2000		**5.9**	3	**19**	36	--	--	
	TS3-9S	12/2001		**89**	1.9	**23**	48	--	--	
	TS3-9S	12/2001	X	**87**	1.8	**22**	47	--	--	
	TS3-9S	11/2002		**14**	2.8	**21**	13	--	--	
	TS3-9S	10/2003		**6.6**	3.6	12	13	--	--	
	TS3-9S	10/2003	X	**6.3**	3.9	11	14	--	--	
	TS3-9S	10/2004		2.7	2.12	3.16	4.19	--	--	
	TS3-9S	11/2005		2.83	4.02	5	7.22	--	--	
	TS3-9S	10/2006		**5.37**	ND [0.5]	3.4	6.09	--	--	
	TS3-9S	10/2007		**6.45**	ND [0.5]	2.24	4.99	--	--	
	TS3-9S	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9S	10/2009		**4.74**	12.2	6.88	17	--	--	
	TS3-9S	11/16/2010		0.925	ND [0.5]	ND [0.5]	2.72	--	--	
	TS3-95-0914	9/5/2014		0.98	ND [1]	1.51	3.66 J	--	--	Note: Lab ID is TS3-95-0914
	--	10/7/2015		--	--	--	--	--	--	Gauge only
	--	6/28/2019		--	--	--	--	--	--	Gauge only

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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260[b] [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS3-9T	TS3-9T	12/2000		**34**	2.9	**100**	12	--	--	Sheen observed
	TS3-9T	12/2001		**30**	3.7	**83**	36	--	--	0.4 feet LNAPL
	TS3-9T	11/2002		**7.7**	1.3	**29**	11	--	--	Sheen observed
	TS3-9T	10/2003		**5.9**	ND [1]	**20**	3.2	--	--	
	TS3-9T	10/2004		**9.55**	0.869	**35.2**	13.2	--	--	
	TS3-9T	11/2005		4.13	3.17	**42**	3.48	--	--	
	TS3-9T	10/2006		**16.3**	0.552	**59**	24.4	--	--	
	TS3-9T	10/2007		**8.7**	ND [0.5]	**69.1**	25.4	--	--	
	TS3-9T	10/2008		**6.07**	ND [0.5]	**21.1**	6.89	--	--	
	TS3-9T	10/2009		**9.05**	11.5	**49.8**	22.5	--	--	
	TS3-9T	12/26/2010		3.25	34.9	**26.2**	24.3	--	--	
	TS3-9T-0914	9/6/2014		3.88	0.45 J	**35.6**	2.32	--	--	
	SRTS3-9T-1015	10/6/2015		**19.8**	ND [5]	**38.1**	4.65 J	--	--	Note: Lab ID is STRS3-9T-1015
	SRF39-TS39T-0917	9/24/2017		**6.42**	ND [1]	**21.4**	1.61 J	**Naphthalene 2.1** All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	Sheen and HC odor
	SRF39-TS39TZ-0917	9/24/2017	X	**6.5**	ND [1]	**21.7**	1.65 J	**Naphthalene 2.3** All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	Sheen and HC odor
	SRF39-TS39T-0719	7/12/2019		3.19	0.341 J	**31.7**	2.55 J	**Naphthalene 3.82** All other results ND or detected below cleanup levels.	**Naphthalene 2** All other results ND or detected below cleanup levels.	HC odor
TS3-9U	TS3-9U	12/2000		**6.9**	1.3	**19**	110	--	--	0.32 feet LNAPL
	TS3-9U	12/2001		**76**	2.4	13	95	--	--	0.6 feet LNAPL
	TS3-9U	11/2002		**5**	1.5	4.9	38	--	--	Sheen observed
	TS3-9U	10/2003		**19**	ND [1]	**37**	**300**	--	--	0.04 feet LNAPL
	TS3-9U	10/2004		1.14	3.32	1.84	8.79	--	--	Trace LNAPL
	TS3-9U	11/2005		ND [0.5]	0.554	ND [0.5]	1.9	--	--	0.01 feet LNAPL
	TS3-9U	10/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9U	10/2007		2.59	ND [0.5]	13.1	47.2	--	--	
	TS3-9U	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9U	10/2009		0.716	12	5.02	19	--	--	
	TS3-9U	12/26/2010		1.94	14.2	0.833	9.44	--	--	
	TS3-9U-0914	9/6/2014		**7.53**	0.48 J	12.8	31.23	--	--	
	SRTS3-9U-1015	10/5/2015		3.95	ND [5]	10.2	25.35 J	--	--	
	--	9/24/2017		--	--	--	--	--	--	Gauge only
	SRF39-TS39U-0719	7/12/2019		1.05	ND [1]	1.73	3.37	All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	HC odor

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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260[b] [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS3-9V	TS3-9V	12/2000		**28**	ND [1]	5.1	11	--	--	
	TS3-9V	12/2001		**5.8**	ND [1]	1.1	ND [1]	--	--	
	TS3-9V	12/2001	X	**6.8**	ND [1]	1.2	ND [1]	--	--	
	TS3-9V	11/2002		**45**	ND [1]	13	20	--	--	
	TS3-9V	10/2003		**46**	ND [1]	11	15	--	--	
	TS3-9V	10/2004		**62.9**	ND [0.5]	**18.7**	21.8	--	--	
	TS3-9V	11/2005		**84.9**	ND [1]	**25.9**	39	--	--	
	TS3-9V	10/2006		**73.2**	1.19	**38.4**	57.4	--	--	
	TS3-9V	10/2007		**39.5**	ND [0.5]	11.4	21.1	--	--	
	TS3-9V	10/2008		**82.1**	ND [0.5]	**33.7**	51	--	--	
	TS3-9V	10/2008	X	**79.5**	ND [0.5]	**32.5**	49.1	--	--	
	TS3-9V	10/2009		**42.3**	2.99	**15.9**	29.3	--	--	
	TS3-9V	11/16/2010		1.51	ND [0.5]	ND [0.5]	1.6	--	--	
	TS3-9V-0914	9/6/2014		**18**	ND [1]	4.52	11.42	--	--	
	SRTS3-9V-1015	10/6/2015		**52.5**	ND [5]	**25.4**	54.3	--	--	Note: Lab ID is STRS3-9V-1015
	SRF39-TS39V-0917	9/25/2017		**26**	ND [1]	6.36	13.4	**Naphthalene 5.7** All other results ND or detected below cleanup levels.	**Naphthalene 10.8** All results ND or detected below cleanup levels.	
	SRF39-TS39V-0719	7/12/2019		**17.5**	ND [1]	2.34	15.9	**Naphthalene 17.1** All other results ND or detected below cleanup levels.	**Naphthalene 7.8** All results ND or detected below cleanup levels.	Slight HC odor
	SRF39-TS39VZ-0719	7/12/2019	X	**17.2**	ND [1]	2.8	15.3	**Naphthalene 17.8** All other results ND or detected below cleanup levels.	**Naphthalene 8.65** All results ND or detected below cleanup levels.	Slight HC odor
TS3-9AA	TS3-9AA	11/2002		4	5.1	**18**	4.3	--	--	
	TS3-9AA	10/2003		3.6	1.6	**19**	3.9	--	--	
	TS3-9AA	10/2004		2.05	0.739	12.7	4.03	--	--	
	TS3-9AA	11/2005		**5.89**	9.12	**23.8**	2.75	--	--	
	TS3-9AA	10/2006		2.73	0.759	**22.8**	3.81	--	--	
	TS3-9AA	10/2007		ND [0.5]	ND [0.5]	7.4	ND [1.5]	--	--	
	TS3-9AA	10/2008		2.46	ND [0.5]	13.1	ND [1.5]	--	--	
	TS3-9AA	10/2009		1.47	36.4	7.04	3.87	--	--	
	TS3-9AA	11/16/2010		ND [1.85]	ND [4.01]	ND [1.7]	1.72	--	--	
	TS3-9AA-0914	9/6/2014		0.76	0.31 J	2.44	ND [2]	--	--	
	SRTS3-9AA-1015	10/6/2015		0.84	ND [1]	1.68	ND [3]	--	--	Note: Lab ID is STRS3-9AA-1015
	--	9/24/2017		--	--	--	--	--	--	Gauge only
	SRF39-TS39AA-0719	6/30/2019		0.786	0.449 J	2.87	ND [3]	All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	HC odor.

Table B7-3: SRF Tank Setting 3-9 Groundwater Analytical Results
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Well ID	Sample ID	Date	Duplicate	EPA Method SW8260[b] [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
TS3-9BB	TS3-9BB	11/2002		3.2	2.1	4.5	3.2	--	--	
	TS3-9BB	10/2003		**4.8**	ND [1]	11	ND [3]	--	--	
	TS3-9BB	10/2004		4.1	ND [0.5]	**15.2**	ND [1]	--	--	
	TS3-9BB	11/2005		3.06	2.01	12.9	ND [1.5]	--	--	
	TS3-9BB	10/2006		4.51	ND [0.5]	**24.3**	ND [1.5]	--	--	
	TS3-9BB	10/2007		1.91	ND [0.5]	7.98	ND [1.5]	--	--	
	TS3-9BB	10/2008		**12.2**	ND [0.5]	**58**	ND [1.5]	--	--	
	TS3-9BB	10/2009		3.99	6.38	**22.3**	ND [1.5]	--	--	
	TS3-9BB	11/16/2010		2.81	ND [0.5]	10.7	1.52	--	--	
	TS3-9BB-0914	9/6/2014		**5.67**	ND [1]	**39.5**	ND [2]	--	--	
	TS3-99BB-0914	9/6/2014	X	**5.51**	ND [1]	**39.6**	ND [2]	--	--	
	SRTS3-9BB-1015	10/6/2015		**7.84**	ND [0.31]	**30.9**	1.41 J	--	--	Note: Lab ID is STRS3-9BB-1015
	SRF39-TS39BB-0917	9/24/2017		**6.9**	ND [10]	**37.1**	ND [30]	**Naphthalene 6.7 J** All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	
	SRF39-TS39BB-0719	6/30/2019		**5.34**	0.388 J	**35.9**	ND [3]	All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	
	SRF39-TS39BBZ-0719	6/30/2019	X	**5.25**	0.383 J	**33.5**	ND [3]	All other results ND or detected below cleanup levels.	All results ND or detected below cleanup levels.	
TS3-9CC	TS3-9CC	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-9CC	10/2003		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9CC	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS3-9CC	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9CC	10/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9CC	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9CC	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9CC	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9CC	11/16/2010		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS3-9CC-0914	9/9/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	--	10/7/2015		--	--	--	--	--	--	Gauge only
	--	9/24/2017		--	--	--	--	--	--	Gauge only
	--	6/28/2019		--	--	--	--	--	--	Gauge only
TS3-9DD	TS3-9DD	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-9DD	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	TS3-9DD	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS3-9DD	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9DD	10/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9DD	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9DD	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9DD	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	TS3-9DD	11/16/2010		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	TS3-9DD-0914	9/6/2014		ND [0.4]	ND [1]	ND [1]	0.71 J	--	--	
	SRTS3-9DD-1015	10/6/2015		ND [0.4]	ND [1]	ND [1]	ND [3]	--	--	
	--	9/24/2017		--	--	--	--	--	--	Gauge only
	SRF39-TS39DD-0719	6/30/2019		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	

Table B7-3: SRF Tank Setting 3-9 Groundwater Analytical Results
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Well ID	Sample ID	Date	Duplicate	EPA Method SW8260[b] [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	--	--	
FS3-9B	FS3-9B	12/2000		1.2	ND [1]	ND [1]	ND [2]	--	--	
	FS3-9B	12/2001		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS3-9B	11/2002		**35**	3.1	**24**	6.2	--	--	
	FS3-9B	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS3-9B	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	FS3-9B	11/2005		ND [0.5]	0.564	ND [0.5]	ND [1.5]	--	--	
	FS3-9B	10/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-9B	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-9B	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-9B	10/2009		ND [0.5]	3.57	ND [0.5]	ND [1.5]	--	--	
	--	11/2010		--	--	--	--	--	--	Dry, not sampled
	FS3-9B-0914	9/6/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	SRFS3-9B-1015	10/5/2015		ND [0.4]	ND [1]	ND [1]	ND [3]	--	--	
	--	9/24/2017		--	--	--	--	--	--	Gauge only
	SRF39-FS39B-0719	6/30/2019		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	
FS3-9E	FS3-9E	12/2000		**560**	26	**130**	**560**	--	--	0.57 feet LNAPL
	FS3-9E	12/2001		**360**	11	**63**	**330**	--	--	1.2 feet LNAPL
	FS3-9E	11/2002		**220**	11	**53**	**280**	--	--	4.2 feet LNAPL
	FS3-9E	10/2003		**400**	15	**130**	**590**	--	--	0.6 feet LNAPL
	FS3-9E	10/2004		**169**	31.7	**35.4**	**218**	--	--	
	FS3-9E	11/2005		**315**	2.76	**71.7**	**355**	--	--	
	FS3-9E	10/2006		**218**	ND [10]	**20.8**	159	--	--	
	FS3-9E	10/2007		**305**	ND [5]	**54.5**	**264**	--	--	
	FS3-9E	10/2008		**176**	ND [5]	**22.4**	106	--	--	
	FS3-9E	10/2009		**282**	ND [25]	**64**	**213**	--	--	
	FS3-9E	10/2009	X	**206**	97	**39.8**	167	--	--	
	FS3-9E	12/26/2010		**276**	78.7	**79.2**	**309**	--	--	
	FS3-9E-0914	9/6/2014		**159**	1.64	**33.9**	121.9	--	--	
	SRFS3-9E-1015	10/6/2015		**185**	2.7 J	**37.6**	134.9	--	--	
	--	9/24/2017		--	--	--	--	--	--	LNAPL present
	--	6/28/2019		--	--	--	--	--	--	0.29 feet LNAPL present

Table B7-3: SRF Tank Setting 3-9 Groundwater Analytical Results
2019 Groundwater Monitoring Program Report
Kenai Peninsula, Alaska

Well ID	Sample ID	Date	Duplicate	EPA Method SW8260[b] [µg/L]					EPA Method 8270 SIM [µg/L]	Comments
				Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Petroleum-Related VOCs	PAH	
ADEC Groundwater Cleanup Levels[a] [µg/L]				**4.6**	**1100**	**15**	**190**	**--**	**--**	
FS3-9G	FS3-9G	12/2000		ND [1]	ND [1]	ND [1]	ND [2]	--	--	
	FS3-9G	12/2001		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS3-9G	11/2002		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS3-9G	10/2003		ND [1]	ND [1]	ND [1]	ND [3]	--	--	
	FS3-9G	10/2004		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	FS3-9G	11/2005		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-9G	10/2006		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-9G	10/2007		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-9G	10/2008		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-9G	10/2009		ND [0.5]	ND [0.5]	ND [0.5]	ND [1.5]	--	--	
	FS3-9G	11/16/2010		ND [0.5]	ND [0.5]	ND [0.5]	ND [1]	--	--	
	FS3-9G-0914	9/6/2014		ND [0.4]	ND [1]	ND [1]	ND [2]	--	--	
	SRFS3-9G-1015	10/6/2015		ND [0.4]	ND [1]	ND [1]	ND [3]	--	--	
	--	9/24/2017		--	--	--	--	--	--	Gauge only
	SRF39-TS39G-0719	7/12/2019		ND [0.4]	ND [1]	ND [1]	ND [3]	All other results ND.	All results ND.	

Notes:

Bold results exceed ADEC cleanup levels.

Italic results are ND with LOQ [in brackets] exceeding cleanup levels.

[a] Groundwater cleanup levels as listed in 18 AAC 75.345, Table C.

[b] EPA method 8021B was used for samples dated 11/16/2010 and 12/26/2010.

-- Not analyzed.

Data Flags:

J (±) Result is an estimated value below the PQL or LOQ, or the result is an estimated value biased high/low/indeterminate due to a QC failure.

ND Analyte was not detected. The PQL or limit of quantitation is given [in brackets].

Abbreviations:

µg/L	microgram(s) per liter	EPA	U.S. Environmental Protection Agency	PAH	polycyclic aromatic hydrocarbons
AAC	Alaska Administrative Code	HC	hydrocarbon	PQL	practical quantitation limit
ADEC	Alaska Department of Environmental Conservation	ID	identification	SIM	selected ion monitoring
AK	Alaska	LNAPL	light non-aqueous phase liquid	VOC	volatile organic compound
btoc	below top of casing	LOQ	limit of quantification		

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APPENDIX C:
PHOTOGRAPHIC LOG

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2019 Groundwater Monitoring Program Report, Swanson River Field, Kenai Peninsula, Alaska
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Photograph 02: 06/29/19, TS 1-4 Bentonite on the end of the probe encountered during gauging at monitoring well TS1-4DD. C-1

Photograph 03: 06/29/19, TS 1-4 Current condition of monitoring well TS1-4DD noted during gauging. Frost jacked and sitting at an angle. C-2

Photograph 04: 06/29/19, TS 1-4 Current condition of monitoring well TS1-4CC. Casing tilted at a 25 degree (°) angle and an obstruction encountered at 4.39 feet below top of casing (btoc) during gauging, looking south. C-2

Photograph 05: 07/02/19, TS 1-4 Current condition of monitoring well TS1-4CC (bent at approximately 25° angle), looking east. C-3

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Photograph 07: 07/02/19, TS 1-4 Monitoring well TS1-4CC with downhole camera equipment set up, looking east. C-4

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Photograph 96: 07/03/19, TS 2-15 Photo of downhole camera screen with camera down monitoring well FS2-15B. The photo shows an adhesive on casing joint within PVC. C-48

Photograph 97: 07/03/19, TS 2-15 Photo of downhole camera screen with camera down monitoring well TS2-15O. The photo shows that the screening interval is not drowned. C-48

Photograph 98: 07/10/19, TS 2-15 Current condition of monitoring well FS2-15B, monument is slightly loose. Photo shows proximity to flare, looking east. C-49

Photograph 99: 07/10/19, TS 2-15 Current condition of monitoring well FS2-15B, looking west. C-49

Photograph 100: 07/10/19, TS 2-15 Current condition of monitoring well TS2-15O..... C-50

Photograph 101: 07/10/19, TS 2-15 Current condition of monitoring well TS2-15R, looking southwest. C-50

Photograph 102: 07/10/19, TS 2-15 Current condition of monitoring well TS2-15R, looking southwest. C-51

Photograph 103: 07/13/19, TS 2-15 Current condition of monitoring well TS2-15P, looking west. C-51

Photograph 104: 07/13/19, TS 2-15 Current condition of monitoring well TS2-15Q, looking northwest. C-52

Photograph 105: 06/27/19, TS 3-4 Condition of monitoring well TS3-4Z observed during gauging, looking east. C-52

Photograph 106: 07/09/19, TS 3-4 Current condition of monitoring well TS3-4P at the completion of sampling. C-53

Photograph 107: 07/09/19, TS 3-4 Condition of monument at monitoring well TS3-4P, looking down. C-53

Photograph 108: 07/09/19, TS 3-4 Current condition of monitoring well TS3-4PP, monument casing is loose..... C-54

Photograph 109: 07/09/19, TS 3-4 Current condition of monitoring well TS3-4OO. Monitoring well is severely heaved and monument casing is loose, looking southwest. C-54

Photograph 110: 07/12/19, TS 3-4 Current condition of monitoring well FS3-4B, looking east. C-55

Photograph 111: 07/12/19, TS 3-4 Current condition of monitoring well TS3-4CC, looking southeast. C-55

Photograph 112: 07/12/19, TS 3-4 Sock placed in monitoring well TS3-4D, looking south. C-56

Photograph 113: 07/12/19, TS 3-4 Current condition of monitoring well TS3-4MM; well is heaved. C-56

Photograph 114: 06/28/19, TS 3-9 Current condition of well TS3-9CC. Was mislabeled TS3-9T last time and corrected to TS3-9CC, looking east. C-57

Photograph 115: 06/28/19, TS 3-9 Current condition of TS3-9CC. Broken collar and lid and cannot be securely locked, looking down. C-57

Photograph 116: 06/28/19, TS 3-9 Current condition of FS3-9E, looking south. C-58

Photograph 117: 06/28/19, TS 3-9 Current condition of TS3-9S, looking east. C-58

Photograph 118: 06/28/19, TS 3-9 Light non-aqueous phase liquid (LNAPL) detection in well TS3-9A. Product thickness was based on tape (1.32 feet), looking down. C-59

Photograph 119: 06/30/19, TS 3-9 Current condition of well FS3-9B, looking south. C-59

Photograph 120: 06/30/19, TS 3-9 Current condition of TS3-9BB, looking east. C-60

Photograph 121: 07/01/19, TS 3-9 Downhole camera assembly with centralizer attached at TS3-9V, looking south. C-60

Photograph 122: 07/01/19, TS 3-9 TS3-9V top of screen through downhole camera. C-61

Photograph 123: 07/01/19, TS 3-9 Downhole camera kit, looking down. C-61

Photograph 124: 07/01/19, TS 3-9 Downhole camera set up at TS3-9V, looking south. C-62

Photograph 125: 07/01/19, TS 3-9 Displaying the downhole centralizer at TS3-9V, looking south. C-62

Photograph 126: 07/01/19, TS 3-9 Trace product on downhole camera lens at TS3-9F, looking down. C-63

Photograph 127: 07/01/19, TS 3-9 Trace product on oil/water interface probe at TS3-9F, looking down. C-63

Photograph 128: 07/04/19, TS 3-9 Trace product on oil/water interface probe at TS3-9F, looking west. C-64

Photograph 129: 07/04/19, TS 3-9 Trace product in purge water while purging well TS3-9F, looking down. C-64

Photograph 130: 07/04/19, TS 3-9 Trace product on groundwater sampling tubing at TS3-9F, looking north. C-65

Photograph 131: 07/04/19, TS 3-9 Current condition of TS3-9F, looking west. C-65

Photograph 132: 07/12/19, TS 3-9 Current condition of FS3-9G, looking south. C-66

Photograph 133: 07/12/19, TS 3-9 Current condition of TS3-9AA, looking east. C-66

Photograph 134: 07/12/19, TS 3-9 Current condition of TS3-9DD, looking east. C-67

Photograph 135: 07/12/19, TS 3-9 Condition of sorbent sock after it had been flipped during 2019 gauging activities at TS3-9F, looking east. C-67

Photograph 136: 07/12/19, TS 3-9 Current condition of TS3-9T, looking east. C-68

Photograph 137: 07/12/19, TS 3-9 Current condition of TS3-9U, looking east. C-68

Photograph 138: 07/13/19, TS 3-9 Condition of LNAPL-sorbent sock at FS3-9E after replacing during gauging activities. Sock was flipped, looking north. C-69
Photograph 139: 07/13/19, TS 3-9 Current condition of TS3-9CR, looking down. C-69
Photograph 140: 7/13/19 Oily waste from TS1-33 in designated oily waste bag, looking down. C-70
Photograph 141: 7/13/19 Oily waste from TS1-4 in designated oily waste bag; looking down. C-70
Photograph 142: 7/13/19 Oily waste from TS1-9 in designated oily waste bag, looking down. C-71
Photograph 143: 7/13/19 Oily waste from TS3-4 in designated oily waste bag; looking down. C-71
Photograph 144: 7/13/19 Used GAC filter fabric in designated oily waste bag, looking down. C-72
Photograph 145: 7/13/19 Oily waste from all SRF units combined into one oily waste bag; looking down. C-72
Photograph 146: 7/13/19 All waste sealed, labeled, and ready to be relinquished for disposal to Hilcorp personnel; looking down. C-73
Photograph 147: 7/13/19 All waste sealed, labeled, and ready to be relinquished for disposal to Hilcorp personnel; looking down. C-73



Photograph 01: 06/29/19, TS 1-4
Arrival at monitoring well TS1-4 for well gauging.



Photograph 02: 06/29/19, TS 1-4
Bentonite on the end of the probe encountered during gauging at monitoring well TS1-4DD.



Photograph 03: 06/29/19, TS 1-4
Current condition of monitoring well TS1-4DD noted during gauging. Frost jacked and sitting at an angle.



Photograph 04: 06/29/19, TS 1-4
Current condition of monitoring well TS1-4CC. Casing tilted at a 25 degree (°) angle and an obstruction encountered at 4.39 feet below top of casing (btoc) during gauging, looking south.



Photograph 05: 07/02/19, TS 1-4
Current condition of monitoring well TS1-4CC (bent at approximately 25° angle), looking east.



Photograph 06: 07/02/19, TS 1-4
Inside monument of monitoring well TS1-4CC, looking down.



Photograph 07: 07/02/19, TS 1-4
Monitoring well TS1-4CC with downhole camera equipment set up, looking east.



Photograph 08: 07/02/19, TS 1-4
Photo of downhole camera screen with camera down monitoring well TS1-4CC. Downhole camera screen displays the break on the inside of the polyvinyl chloride (PVC) casing where PVC has sheared at approximately 4.39 feet btoc.



Photograph 09: 07/03/19, TS 1-4
Photo of downhole camera screen with camera down monitoring well TS1-4E. Downhole camera screen displays a crusted residue encountered beginning at 6 feet btoc.



Photograph 10: 07/03/19, TS 1-4
Using downhole camera at FS1-4E.



Photograph 11: 07/03/19, TS 1-4
Photo of downhole camera screen with camera down monitoring well TS1-4H.



Photograph 12: 07/03/19, TS 1-4
Downhole camera setup at FS1-4H, looking down.



Photograph 13: 07/03/19, TS 1-4
Using downhole camera at FS1-4H, looking north.



Photograph 14: 07/06/19, TS 1-4
Condition of wells in flare pit at the completion of sampling, FS1-4E in the foreground and FS1-4H in the background, looking northwest.



Photograph 15: 07/06/19, TS 1-4
Condition of monitoring well FS1-4H following completion of sampling. Monument is misaligned and cannot securely closed and locked. Locking well plug with log was added to well, looking west.



Photograph 16: 07/06/19, TS 1-4
Photograph shows the proximity of monitoring well FS1-4E to the flare at TS 1-4.



Photograph 17: 07/07/19, TS 1-4
Condition of monitoring well TS1-4EE at completion of sampling.



Photograph 18: 07/07/19, TS 1-4
Distinct, pale orange tint of water from monitoring well TS1-4GR.



Photograph 19: 07/07/19, TS 1-4
Stained paper towel from water at monitoring well TS1-4GR.



Photograph 20: 07/07/19, TS 1-4
Color of water pumped from monitoring well TS1-4GR, looking down.



Photograph 21: 07/07/19, TS 1-4
Sock recovered from TS1-4GR was flipped and replaced at the completion of sampling. Distinct orange staining on sock, looking west.



Photograph 22: 07/07/19, TS 1-4
Sock recovered from TS1-4GR was flipped and replaced at the completion of sampling. Distinct orange staining on sock, looking west.



Photograph 23: 07/07/19, TS 1-4
Condition of monitoring well FS1-4EE at completion of sampling, looking southeast.



Photograph 24: 07/13/19, TS 1-4
Proximity of FS1-4E and FS1-4H to each other and the flare, looking southeast.



Photograph 25: 07/13/19, TS 1-4
Condition of sock at monitoring well TS1-4F during removal, looking south.



Photograph 26: 07/13/19, TS 1-4
Condition of monitoring well TS1-4F upon completion of activities, looking south.



Photograph 27: 07/13/19, TS 1-4
Sock removed from monitoring well TS1-4J and replaced. Well is located within secondary containment, looking west.



Photograph 28: 07/13/19, TS 1-4
Product on probe at monitoring well TS1-4J, looking west.



Photograph 29: 07/18/19, TS 1-4
Condition of monitoring well TS1-4J at the completion of activities, locks in place on lid.



Photograph 30: 07/18/19, TS 1-4
Lock in place on lid of monitoring well FS1-FE, looking west.



Photograph 31: 07/18/19, TS 1-4
Condition of monitoring well FS1-4H, looking northwest.



Photograph 32: 07/18/19, TS 1-4
Current condition of monitoring well FS1-FH. New well cap and lock in place, looking down.



Photograph 33: 06/27/19, TS 1-9
Product on probe from monitoring well TS1-9A.



Photograph 34: 07/02/19, TS 1-9
Downhole camera setup on monitoring well FS1-9I, looking west.



Photograph 35: 07/02/19, TS 1-9
Photo of downhole camera screen with camera down monitoring well FS1-9I. Well screen in good condition.



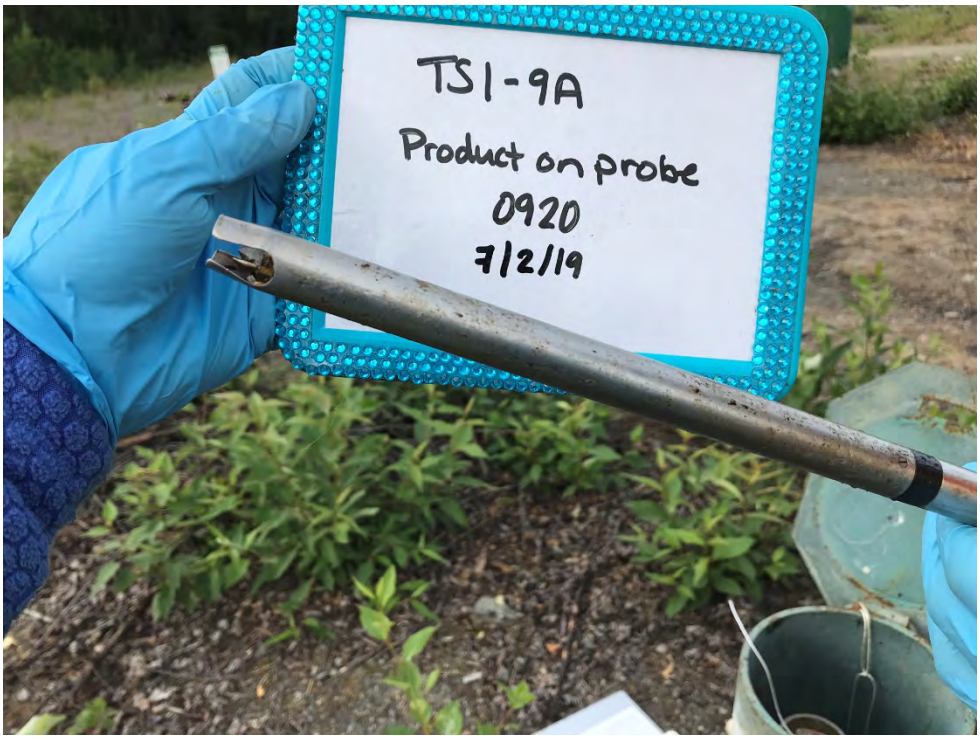
Photograph 36: 07/02/19, TS 1-9
Downhole camera setup on monitoring well FS1-9N, looking northeast.



Photograph 37: 07/02/19, TS 1-9
Downhole camera setup on monitoring well TS1-9U, looking south.



Photograph 38: 07/02/19, TS 1-9
Downhole camera setup on monitoring well TS1-9D, looking down.



Photograph 39: 07/02/19, TS 1-9
Product on probe from monitoring well TS1-9A, did not scope well due to product.



Photograph 40: 07/02/19, TS 1-9
Product on probe from monitoring well TS1-9A, looking down.



Photograph 41: 07/02/19, TS 1-9
Trace product found on probe after gauging TS1-9B, looking down.



Photograph 42: 07/02/19, TS 1-9
Product on probe from monitoring well TS1-9B, strong (petroleum, oil, and lubricant) POL odor noted.



Photograph 43: 07/02/19, TS 1-9
Photo of downhole camera screen with camera down monitoring well TS1-9C. Evidence of product found on the side of the casing but not on the probe.



Photograph 45: 07/02/19, TS 1-9
Downhole camera setup at TS1-9C.



Photograph 46: 07/02/19, TS 1-9
Downhole camera setup at FS1-9D.



Photograph 47: 07/02/19, TS 1-9
Downhole camera setup at FS1-9M.



Photograph 48: 07/05/19, TS 1-9
Condition of monitoring well FS1-9I, looking southeast.



Photograph 49: 07/05/19, TS 1-9
Condition of monitoring well FS1-9D. FS1-9I in the background, looking northwest.



Photograph 50: 07/05/19, TS 1-9
Condition of monitoring well FS1-9N, looking north.



Photograph 51: 07/06/19, TS 1-9
Current condition of monitoring well TS1-9II, looking south.



Photograph 52: 07/06/19, TS 1-9
Current condition of monitoring well TS1-9U, looking south.



Photograph 53: 07/06/19, TS 1-9
Current condition of monitoring well TS1-9HH, looking south.



Photograph 54: 07/06/19, TS 1-9
Well purge and sample setup at monitoring well TS1-9D.



Photograph 55: 07/06/19, TS 1-9
Current condition of monitoring well TS1-9D, looking northwest.



Photograph 56: 07/06/19, TS 1-9
Current condition of monitoring well TS1-9C, looking south.



Photograph 57: 07/06/19, TS 1-9
Current condition of monitoring well TS1-9B, looking north.



Photograph 58: 07/06/19, TS 1-9
Current condition of monitoring well TS1-9A, looking south.



Photograph 59: 07/13/19, TS 1-9
Brice crew checked on status of sock installed during gauging. The bottom 6 inches of the sock at monitoring well FS1-9F was saturated with product, looking northwest.



Photograph 60: 07/03/19, TS 1-27
Well identification for TS1-27J added to monument, looking down.



Photograph 61: 07/03/19, TS 1-27
Current condition of monitoring well TS1-27J, looking south.



Photograph 62: 07/03/19, TS 1-27
Current condition of monitoring well TS1-27N, looking north.



Photograph 63: 07/03/19, TS 1-27
Current condition of monitoring well TS1-27N, looking down.



Photograph 64: 07/03/19, TS 1-27
Photo of downhole camera screen with camera down monitoring well TS1-27C. The photo shows the drowned screening interval.



Photograph 65: 07/03/19, TS 1-27
Downhole camera setup at TS1-27K.



Photograph 66: 07/03/19 TS 1-27
Downhole camera setup at TS1-27G.



Photograph 67: 07/10/19, TS 1-27
Current condition of monitoring well FS1-27C, looking northeast.



Photograph 68: 07/10/19, TS 1-27
Current condition of monitoring well TS1-27G.



Photograph 69: 07/10/19, TS 1-27
Current condition of monitoring well TS1-27K.



Photograph 70: 07/10/19, TS 1-27
Current condition of monitoring well TS1-27M.



Photograph 71: 07/13/19, TS 1-27
Current condition of monitoring well TS1-27L.



Photograph 72: 07/03/19, TS 1-33
Current condition of monitoring well TS1-33N, looking northwest.



Photograph 73: 07/03/19, TS 1-33
Current condition of monitoring well FS1-33W, looking east.



Photograph 74: 07/03/19, TS 1-33
Current condition of FS1-33T, looking down.



Photograph 75: 07/03/19, TS 1-33
Mud encountered in the well casing just below the water level during gauging at FS1-33O.



Photograph 76: 07/03/19, TS 1-33
Mud on old tubing pulled from FS1-33O.



Photograph 77: 07/03/19, TS 1-33
Photo of downhole camera screen with camera down monitoring well FS1-33O. The photo shows the mud on the casing.



Photograph 78: 07/03/19, TS 1-33
Downhole camera setup at monitoring well FS1-33O.



Photograph 79: 07/03/19, TS 1-33
Current condition of monitoring well FS1-33O.



Photograph 80: 07/03/19, TS 1-33
Current condition of monitoring well TS1-33P, looking east.



Photograph 81: 07/03/19, TS 1-33
Visible product on sock removed from monitoring well FS1-33H during gauging. Product on top portion due to product on sidewall of casing, looking west.



Photograph 82: 07/03/19, TS 1-33
Downhole camera setup at FS1-33F.



Photograph 83: 07/03/19, TS 1-33
Photo of downhole camera screen with camera down monitoring well TS1-33Q. The photo shows that the water level is deeper than the top of the screened interval.



Photograph 84: 07/03/19, TS 1-33
Downhole camera setup at monitoring well TS1-33Q.



Photograph 85: 07/06/19, TS 1-33
Current condition of monitoring well TS1-33O2, unable to lock plug due to destroyed monument. Monitoring well in poor condition, looking down.



Photograph 86: 07/11/19, TS 1-33
Current condition of monitoring well FS1-33F.



Photograph 87: 07/11/19, TS 1-33
Product recovery efforts conducted at FS1-33H due to visible product seen on sock. Clear water with black sediment and a strong POL odor was encountered in the bailer, looking south.



Photograph 88: 07/11/19, TS 1-33
Removing old sock at monitoring well FS1-33H prior to sampling, sock then replaced, looking west.



Photograph 89: 07/11/19, TS 1-33
Current condition of monitoring well FS1-33H.



Photograph 90: 07/11/19, TS 1-33
Current condition of monitoring well FS1-33S, monument smashed.



Photograph 91: 07/11/19, TS 1-33
Current condition of monitoring well TS1-33JJ.



Photograph 92: 07/11/19, TS 1-33
Current condition of monitoring well TS1-33Q, looking southwest.



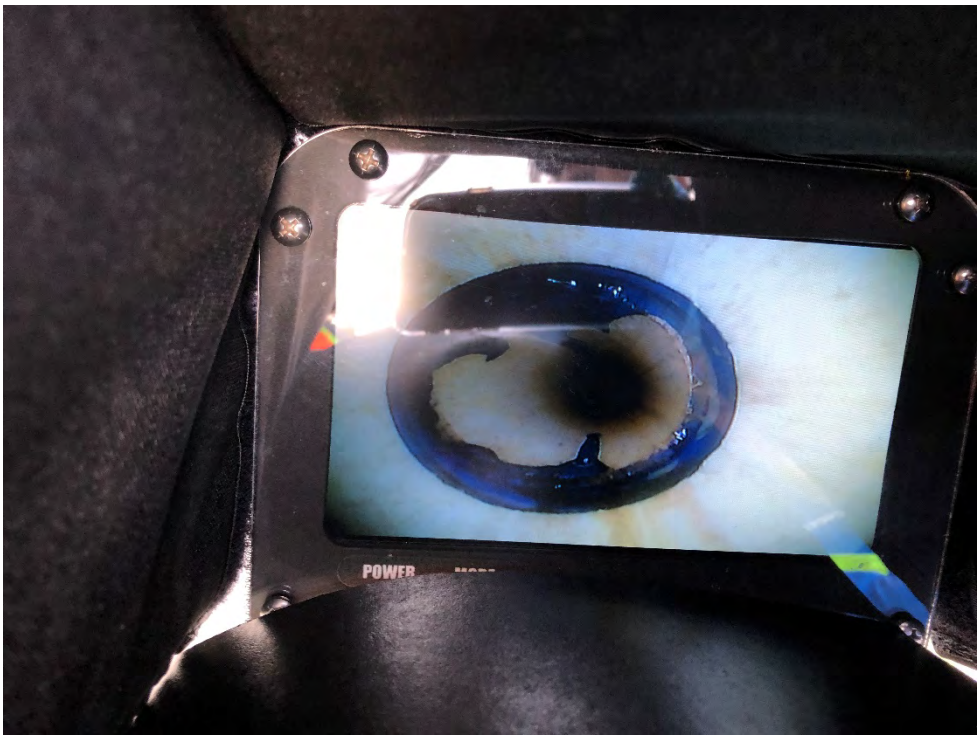
Photograph 93: 07/11/19, TS 1-33
Removing sock at TS1-33UR to replace, looking north.



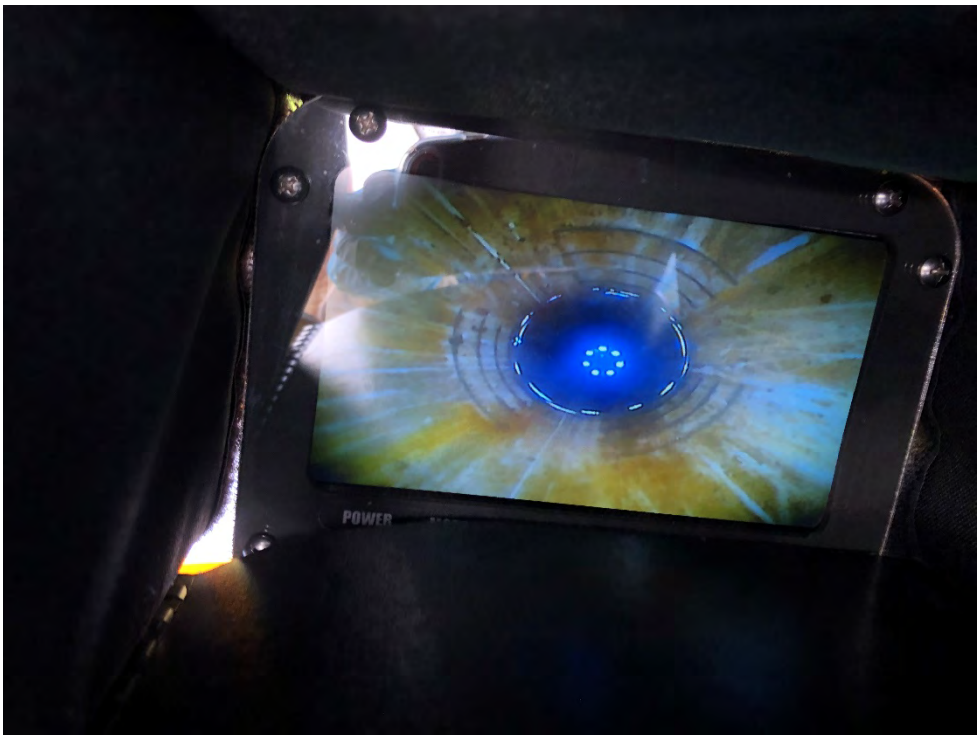
Photograph 94: 07/11/19, TS 1-33
Current condition of monitoring well TS1-33UR, looking northeast.



Photograph 95: 07/18/19, TS 1-33
Current condition of TS1-33KK after lock placed on lid, looking northeast.



Photograph 96: 07/03/19, TS 2-15
Photo of downhole camera screen with camera down monitoring well FS2-15B. The photo shows an adhesive on casing joint within PVC.



Photograph 97: 07/03/19, TS 2-15
Photo of downhole camera screen with camera down monitoring well TS2-15O. The photo shows that the screening interval is not drowned.



Photograph 98: 07/10/19, TS 2-15
Current condition of monitoring well FS2-15B, monument is slightly loose. Photo shows proximity to flare, looking east.



Photograph 99: 07/10/19, TS 2-15
Current condition of monitoring well FS2-15B, looking west.



Photograph 100: 07/10/19, TS 2-15
Current condition of monitoring well TS2-15O.



Photograph 101: 07/10/19, TS 2-15
Current condition of monitoring well TS2-15R, looking southwest.



Photograph 102: 07/10/19, TS 2-15
Current condition of monitoring well TS2-15R, looking southwest.



Photograph 103: 07/13/19, TS 2-15
Current condition of monitoring well TS2-15P, looking west.



Photograph 104: 07/13/19, TS 2-15
Current condition of monitoring well TS2-15Q, looking northwest.



Photograph 105: 06/27/19, TS 3-4
Condition of monitoring well TS3-4Z observed during gauging, looking east.



Photograph 106: 07/09/19, TS 3-4
Current condition of monitoring well TS3-4P at the completion of sampling.



Photograph 107: 07/09/19, TS 3-4
Condition of monument at monitoring well TS3-4P, looking down.



Photograph 108: 07/09/19, TS 3-4
Current condition of monitoring well TS3-4PP, monument casing is loose.



Photograph 109: 07/09/19, TS 3-4
Current condition of monitoring well TS3-4OO. Monitoring well is severely heaved and monument casing is loose, looking southwest.



Photograph 110: 07/12/19, TS 3-4
Current condition of monitoring well FS3-4B, looking east.



Photograph 111: 07/12/19, TS 3-4
Current condition of monitoring well TS3-4CC, looking southeast.



Photograph 112: 07/12/19, TS 3-4
Sock placed in monitoring well TS3-4D, looking south.



Photograph 113: 07/12/19, TS 3-4
Current condition of monitoring well TS3-4MM; well is heaved.



Photograph 114: 06/28/19, TS 3-9
Current condition of well TS3-9CC. Was mislabeled TS3-9T last time and corrected to TS3-9CC, looking east.



Photograph 115: 06/28/19, TS 3-9
Current condition of TS3-9CC. Broken collar and lid and cannot be securely locked, looking down.



Photograph 116: 06/28/19, TS 3-9
Current condition of FS3-9E, looking south.



Photograph 117: 06/28/19, TS 3-9
Current condition of TS3-9S, looking east.



Photograph 118: 06/28/19, TS 3-9
Light non-aqueous phase liquid (LNAPL) detection in well TS3-9A. Product thickness was based on tape (1.32 feet), looking down.



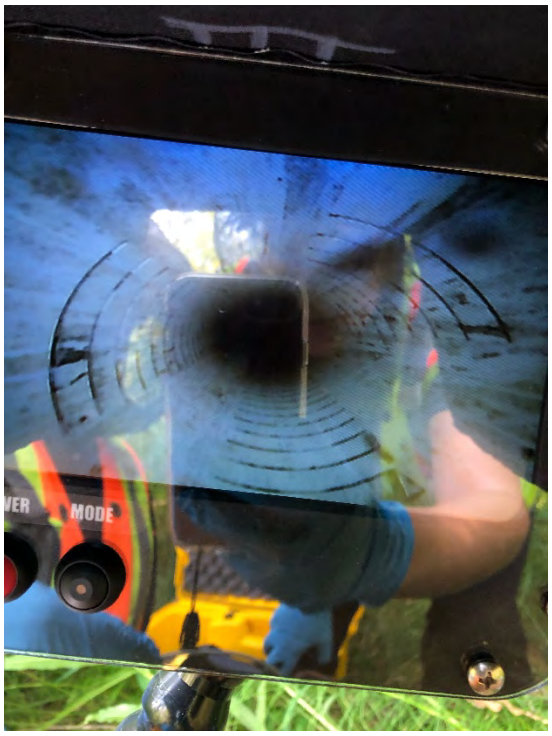
Photograph 119: 06/30/19, TS 3-9
Current condition of well FS3-9B, looking south.



Photograph 120: 06/30/19, TS 3-9
Current condition of TS3-9BB, looking east.



Photograph 121: 07/01/19, TS 3-9
Downhole camera assembly with centralizer attached at TS3-9V, looking south.



Photograph 122: 07/01/19, TS 3-9
TS3-9V top of screen through downhole camera.



Photograph 123: 07/01/19, TS 3-9
Downhole camera kit, looking down.



Photograph 124: 07/01/19, TS 3-9
Downhole camera set up at TS3-9V, looking south.



Photograph 125: 07/01/19, TS 3-9
Displaying the downhole centralizer at TS3-9V, looking south.



Photograph 126: 07/01/19, TS 3-9
Trace product on downhole camera lens at TS3-9F, looking down.



Photograph 127: 07/01/19, TS 3-9
Trace product on oil/water interface probe at TS3-9F, looking down.



Photograph 128: 07/04/19, TS 3-9
Trace product on oil/water interface probe at TS3-9F, looking west.



Photograph 129: 07/04/19, TS 3-9
Trace product in purge water while purging well TS3-9F, looking down.



Photograph 130: 07/04/19, TS 3-9
Trace product on groundwater sampling tubing at TS3-9F, looking north.



Photograph 131: 07/04/19, TS 3-9
Current condition of TS3-9F, looking west.



Photograph 132: 07/12/19, TS 3-9
Current condition of FS3-9G, looking south.



Photograph 133: 07/12/19, TS 3-9
Current condition of TS3-9AA, looking east.



Photograph 134: 07/12/19, TS 3-9
Current condition of TS3-9DD, looking east.



Photograph 135: 07/12/19, TS 3-9
Condition of sorbent sock after it had been flipped during 2019 gauging activities at TS3-9F, looking east.



Photograph 136: 07/12/19, TS 3-9
Current condition of TS3-9T, looking east.



Photograph 137: 07/12/19, TS 3-9
Current condition of TS3-9U, looking east.



Photograph 138: 07/13/19, TS 3-9
Condition of LNAPL-sorbent sock at FS3-9E after replacing during gauging activities. Sock was flipped, looking north.



Photograph 139: 07/13/19, TS 3-9
Current condition of TS3-9CR, looking down.



Photograph 140: 7/13/19
Oily waste from TS1-33 in designated oily waste bag, looking down.



Photograph 141: 7/13/19
Oily waste from TS1-4 in designated oily waste bag; looking down.



Photograph 142: 7/13/19
Oily waste from TS1-9 in designated oily waste bag, looking down.



Photograph 143: 7/13/19
Oily waste from TS3-4 in designated oily waste bag; looking down.



Photograph 144: 7/13/19
Used GAC filter fabric in designated oily waste bag, looking down.



Photograph 145: 7/13/19
Oily waste from all SRF units combined into one oily waste bag; looking down.



Photograph 146: 7/13/19

All waste sealed, labeled, and ready to be relinquished for disposal to Hilcorp personnel; looking down.



Photograph 147: 7/13/19

All waste sealed, labeled, and ready to be relinquished for disposal to Hilcorp personnel; looking down.

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APPENDIX D:
FIELD FORMS

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WELL GAUGING FORM

SITE ID: SRF Tank Setting 1-4 **SHEET** 1 **OF** 1

PROJECT NAME 2019 Kenai Contaminated Sites GWM **DATE** 10/29/19 **START TIME** 0955

CLIENT Hilcorp Alaska, LLC **END TIME** 1113

SAMPLER(S) AS, NM **WEATHER / TEMPERATURE** Sunny, 75-80°F

GAUGING DATA

WELL ID	TIME	PRODUCT PRESENT			DTW (feet)	TD (feet)	WELL CONDITION (lock, cap/plug, heave, etc.)	ODOR / PID (ppm)
		DTP (feet)	THICKNESS (feet)	REMOVED (gallons)				
TS1-4CC	1022	—	—	—	NM	NM	Bad, Stickup ht: ~~NM~~ 1.5ft to soil	N/A
TS1-4DD	1015	—	—	—	5.69	16.50	Fair, stickup ht: 3.0ft	none
TS1-4EE	1009	—	—	—	6.30	15.70	Good, Stickup ht: 2.5ft	none
TS1-4F	1040	11.14	0.01		11.15	24.36	Good, Stickup ht: 2.3ft	POL
TS1-4GR	1034	—	—	—	14.45	20.50	Good, Stickup ht: 2.4ft	Distinct Petroleum
TS1-4J	1102	—	—	—	10.20	22.28	Altered condn, extended	POL
FS1-4E	0955	—	—	—	9.33	17.63	Fair, Stickup ht: 3.5ft	none
FS1-4H	0959	—	—	—	14.27	20.38	Fair, Stickup ht: 2.8ft	none

OTHER NOTES:

FS1-4E: Eroded ground around monument. Scoping 1046. Slots: 7ft Crusted residue ~6ft

FS1-4H: Scoping 1052 Slots: 9.5ft

TS1-4EE: No well cap, tubing inside monument. Much bentonite on probe (~2.5 inches). Added well cap - Scoped to TD 7/2/19 - no evidence of casing break confirmed top of screen at 6.5ft bgs

TS1-4DD: Frost jacked, well cap, lock, bentonite on end of probe.

TS1-4CC: Casing tilted at ~25°, Cannot get probe down. Obstruction at 4.39ft. Tubing. No well cap. Ran over by snow plow. Dirt/Dust on probe. Tubing is below obstruction. Lid and collar not secure on monument. Scoped 7/2/20 - casing dented.

TS1-4GR Well plug, lock. Gauged w/ sock in place. Flip sock.

TS1-4F: Gauged w/ sock in place. Sock was above water level. Well cap, Lock, Removed and replaced sock.

TS1-4J: Gauged w/ sock in place. Stickup height: 1.5ft. Located w/in secondary containment. Some product on probe. Sock removed and replaced.

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-4 **WELL ID:** TS1-4EE **SHEET** 1 **OF** 1

PROJECT NAME	2019 SRF Contaminated Sites GWM	WELL CONDITION	Good
CLIENT	Hilcorp Alaska, LLC	DAMAGE PRESENT	None
SAMPLER(S)	NM	HEIGHT OF STICKUP (ags)	2.5 ft
		TOTAL DEPTH (btoc)	15.70 ft
WEATHER / TEMPERATURE	Sunny, ~65°F	DEPTH TO WATER (btoc)	6.71 ft
		HEIGHT OF WATER COLUMN (feet)	9.00 ft
DATE	7/7/19	1 WELL VOLUME (gal)	1.53
START TIME	0700	3 WELL VOLUMES (gal)	4.59
END TIME	0935	DROWNED SCREEN?	NO

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW

COLLECTION METHOD (PUMP TYPE, OTHER): Low-Flow Bladder Pump

SAMPLING APPARATUS: QED 1.75" Pneumatic Bladder S/N 12055

TUBING SIZE / TYPE: Teflon-lined Poly tubing

IF PRODUCT IS PRESENT DESCRIPTION: N/A

DEPTH TO PRODUCT (btoc) N/A THICKNESS OF PRODUCT (feet) N/A

EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 100 mL/min	Depth at Purge: 7.75 ft
Max sample rate: 150 mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	7.73	330	53.6	1.5	3.52	N/A
Average	9.045	413	-19.25	2.46	2.81	N/A
Highest Observed	10.36	496	53.6	3.42	3.52	N/A
Lowest Observed	7.73	330	-92.1	1.5	2.1	N/A

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH ± 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0715-0745	Stabilizing drawdown and achieving correct flowrate on controller (pressure slightly adjusted)										
0745	0.80	6.75	0.05	11.97	6.25	630	125.6	2.43%	5.70	clear	none
0748	1.00	6.77	0.07	11.19	6.12	597	135.0	10.4%	6.28	"	"
0751	1.10	6.77	0.07	10.98	5.99	585	143.2	6.8%	5.42	"	"
0754	1.20	6.77	0.07	10.91	6.03	592	142.7	6.1%	2.92	"	"
0757	1.30	6.75	0.05	10.92	6.12	578	136.1	6.0%	2.79	"	"
0800	1.40	6.80	0.10	10.89	6.24	585	116.7	7.0%	1.96	"	"
0803	1.50	6.76	0.06	11.01	6.37	571	102.1	7.6%	1.61	"	"
0806	1.60	6.80	0.10	11.06	6.50	575	90.5	5.0%	1.69	"	"
0809	1.70	6.78	0.08	11.17	6.57	576	78.3	0.49 mg/L	1.42	"	"
0813	1.80	6.78	0.08	11.28	6.65	565	62.5	0.45	1.74	"	"
0816	1.90	6.79	0.09	11.34	6.71	543	53.8	0.45	1.45	"	"
0819	2.00	6.77	0.07	11.39	6.72 ✓	533	57.6 ✓	0.44 ✓	1.35 ✓	"	"

FINAL PURGE DATA: START TIME: 0715 END TIME: 0820 CUMULATIVE VOLUME: 2.5 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 100 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) Clear, no sheen, no odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	Ethylene Glycol	PAH SW8270D SIM						Remarks
SRF14-TS14EE-0719	7/7/19	0825	GW	24	MS/MSD	9	9	6						

SAMPLING NOTES: Screened interval starts ~5.5 ft btoc. Previous flowrate ~500 mL/min
Dedicated tubing tied to ; plug in well, combo lock.

PURGE & DECON CONTAINERIZED & STORED @ G&I FOR DISPOSAL.

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 04008025 Turbidimeter 156052 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-4 WELL ID: TS1-4GR = painful! very slow, stinky well. SHEET 1 OF 2

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): AS
WEATHER / TEMPERATURE: 60°S, sunny
DATE: 7/7/2019
START TIME: 0700
END TIME: 1230

WELL CONDITION: Good
DAMAGE PRESENT: none
HEIGHT OF STICKUP (ags): 2.4 ft
TOTAL DEPTH (btoc): 20.50 ft
DEPTH TO WATER (btoc): 14.00 ft
HEIGHT OF WATER COLUMN (feet): ~~to~~ +5 6.5 ft
1 WELL VOLUME (gal): 1.1
3 WELL VOLUMES (gal): 3.3
DROWNED SCREEN?: NO

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): Groundwater
COLLECTION METHOD (PUMP TYPE, OTHER): SS 1.75" QED bladder pump
SAMPLING APPARATUS: with teflon-lined bladder (dedicated), low flow method
TUBING SIZE / TYPE:
EQUIPMENT DECON PROCEDURE:

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA
THICKNESS OF PRODUCT (feet): NA

FLOW RATE (mL/min)
Max purge rate with stable drawdown: <15 mL/min
Max sample rate: ~15 mL/min
1 L = 0.264 gal 1 gal = 3.785 L

SAMPLE PORT DEPTH (btoc)
Depth at Purge: 15.0 → 15.3
Depth at Sample: 15.3 → 15.6
VOA PAH

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	5.3	2624	40.2	9.8	21	N/A
Average	5.3	2624	40.2	9.8	21	N/A
Highest Observed	5.3	2624	40.2	9.8	21	N/A
Lowest Observed	5.3	2624	40.2	9.8	21	N/A

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0720	0	13.91		check Fosee whether pump displaced head							
0722	0	13.91		start pumping - very low pressure							
0735	0.105	14.38	0.38	Hook up YSI ~90 mL/min, will try to reduce rate - water clear, tinted							
0738	0.05+	14.43	0.43								
0747	0.1	14.46	0.49	flow through cell full - currently pulling ~15 mL/min (!)							
				→ ~30 min for complete change of water in flow through cell (!)							
0.09				→ still drawing down at this rate							
				→ 20 minutes ~2/3 volume exchange = interval for readings							
0755	0.18	14.53	0.53	15.13	5.48	5158	34.8	1.07	12.7	pale orange tint	stinky
0815	0.26	14.69	0.64	16.93	5.50	5401	32.0	0.64	11.9	"	"
Recharge?	0.26 gal	10.7 gal/1in ft		= 1.53 ft, drawdown = 0.64 < 1.5, therefore recharge. Good.							
0835	0.34	14.75	0.75	18.16	5.61 ✓	5591	29.8 ✓	0.38	12.2 ✓	"	"
0839	drop pump in lake			to 15.3 ft btoc - ~0.5 ft of water over intake							

FINAL PURGE DATA: START TIME: 0720 END TIME: 0915 CUMULATIVE VOLUME: ~0.6 MAX FLOWRATE WITH STABLE DRAW DOWN: <15 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) orange-tinted, staining liquid, occasional small chunk of something, STINKY!

Sample ID	Date	Time	Matrix	Containers	QC	VOA Preserved 1:1 8260 HCl	PAH 8270 DEM	Ethylene Glycol							Remarks
SRF14-TS14GR-0719	7/7	0930	GW	8	~	X	X	X							
SRF14-TS14GR2-0719	7/7	0830	GW	8	DUP	X	X	X							Dup taken on EG, VOA

SAMPLING NOTES: Screened interval 10.5-20.5 ft. Previous event minimum flowrate still drew well down. Expect a very slow recharge - water came up as bladder pump displaced it. Start pumping lake @ 15 ft btoc - sock removed right before gauging - "drawdown" observed. PURGE & DECON CONTAINERIZED & STORED @ GRI FOR DISPOSAL

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 11H101295 Turbidimeter 11741 Other

Line water nearby is loud - bring hearing protection.

FIELD WATER QUALITY PARAMETERS

SHEET 2 OF 2

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or ±1 NTU	Color	Odor
copy → 0755	0.18	14.53	0.53	15.13	5.48	5158	34.8	1.07	12.7	pale grey/brn	stnky
copy → 0815	0.26	14.64	0.64	16.93	5.50	5401	32.0	0.64	11.9	"	"
copy → 0835	0.34	14.75	0.75	18.16	5.51✓	5591	29.8✓	0.38	12.2✓	"	"
0855	0.42	14.85	0.85	18.96	5.51✓	5722	28.0✓	0.41	9.45	"	"
0915	0.50	14.96	0.86	19.96	5.49✓	5865	21.2✓	0.38✓	11.0	"	"
		Three parameters stable - sample 0930									
Sampled VOAs (12) at 15.34 ft btoc ~ 0.5 ft bt W											
Dropped pump for PAH (4x250mL) to 15.6 ft btoc to keep up w/ drawdown (~1 ft btoc)											
Flow rate has not changed significantly											
1136	0.50	15.08	1.08	on #2 of 4 PAH 250mL jars							
1147	0.50	15.20	1.20	on #3 of 4 PAH 250mL jars							
1157	0.50	15.22	1.22	on #4 of 4 PAH 250mL jars							
1215	0.50	15.25	1.25	Complete sampling, took 2.75 hours							
Stnk is not a PAL stnk.											

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-4 WELL ID: FS1-4E SHEET 1 OF 2

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): AS
WEATHER / TEMPERATURE: 70's, sunny, dust
DATE: 7/6/2019
START TIME: 1010
END TIME: 1245

WELL CONDITION: Good - no lock
DAMAGE PRESENT: none at surface
HEIGHT OF STICKUP (ags): 3.5 ft
TOTAL DEPTH (btoc): 17.63 ft
DEPTH TO WATER (btoc): 9.61 ft
HEIGHT OF WATER COLUMN (feet): 8.02 ft
1 WELL VOLUME (gal): 1.4
3 WELL VOLUMES (gal): 4.2
DROWNED SCREEN?: NO

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): Groundwater
COLLECTION METHOD (PUMP TYPE, OTHER): GS 1.75" QED bladder pump
SAMPLING APPARATUS: with dedicated teflon-lined bladder, TUBING IN low flow method
TUBING SIZE / TYPE: 0.25 x 3/8" teflon lined poly-bonded
EQUIPMENT DECON PROCEDURE: Alconox and DI

IF PRODUCT IS PRESENT: DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA
THICKNESS OF PRODUCT (feet): NA

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: <150 mL/min	Depth at Purge: ~10.7 ft
Max sample rate: <150 mL/min	Depth at Sample: ~10.7 ft

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	8.48	450	-78.3	0.45	N/A	N/A
Average	7.66	581.5	-68.1	0.475	5.51	N/A
Highest Observed	8.48	713	-57.9	0.5	5.51	N/A
Lowest Observed	6.84	450	-78.3	0.45	5.51	N/A

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1028	0	9.61	0	start pump - water immediately							
1029	min	9.78	0.17	drawdown below pump intake - lower pump to 10.6 and							
				reduce pressure - orange tinted water							
1034		10.30	0.69	adjusting pressure down to trickle - water falls below intake							
				adjust pressure seems to be							
1039		10.18	0.57	seems to be relatively slow drawdown - Hook up YSI							
1046	0.15	10.19	0.57	YSI half full ~70mL/min?							
1051	0.15+	10.12	0.51	YSI nearly full... low pressure/rate allows recharge							
1059	0.28	10.09	0.48	21.32	6.51	329	57.7	1.09	33.5	cloudy, orange tint	slight metallic/POL
1106	0.41	10.11	0.50	21.13	6.44	309	17.8	0.92	29.3	"	"
1113	0.51	10.12	0.51	21.62	6.43	334.	-11.9	0.65	27.2	"	"
1120	0.61	10.10	0.49	22.30	6.41 ✓	339	-27.3	0.58	27.7	"	"
1127	0.71	10.01	0.39	22.89	6.41 ✓	343 ✓	-36.6	0.52	25.3	"	"

FINAL PURGE DATA: START TIME: 1028 END TIME: 1210 CUMULATIVE VOLUME: 0.9 gal MAX FLOWRATE WITH STABLE DRAW DOWN: <150 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) cloudy orange tint, slight POL/ metallic odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC, Metals list, 8260C, HG	PAH, 8270D SIM							Remarks
SRF14-FS14E-0719	7/6	1215	GW	5	-	X	X							Not Stabilized

SAMPLING NOTES: Screened ~7.5-17.5 (10ft screen). Previous flowrate ~170 mL/min. rusty bits on probe after first WL measurement. orange-tinted water at purge start with no input. Many small bubbles inside flow-through cell. ft flowrates <100mL/min, highly variable considering turb. takes 5 cycles. Using 7 minute intervals due to extremely low flow - allows majority turnover of flowthrough cell volume.)

BOTTLE LOT NUMBER(S): PURGE & DECON GAC'D & DISCHARGED

EQUIPMENT SERIAL NUMBERS: YSI 04D8023 Turbidimeter 15652 Other

* Due to likelihood of further flame activity, samples were collected immediately after being allowed to return to the flame pit without further stabilization to minimize personnel exposure.

FIELD WATER QUALITY PARAMETERS

SHEET 2 OF 2

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or ±1 NTU	Color	Odor
1120	0.61	10.10	0.44	22.30	6.41v	339v	-27.3	0.58	27.7	cloudy grey brown	slight sulfide
1127	0.71	10.01	0.39	22.89	6.41v	343v	-36.6	0.52	25.3	"	"
1134	0.81	9.97	0.36	23.80	6.41v	334v	-46.8	0.49	24.5	"	"
1141	0.85	9.95		24.60	6.41v	382	-55.9	0.49v		"	"
1145 – asked to leave Plant pit for pressure build up at plant -> stop pump											
1202 – return to wells, restart pump											
1203	0.85	9.85	0.76	– allow change of water in flow through cell - just one							
1210	0.85+	9.95	0.26	27.21	6.41	456	-74.9	0.43		"	"

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-4 WELL ID: FS1-4H SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: Sunny, ~85°F
DATE: 7/6/19
START TIME: 1000
END TIME: 1315

WELL CONDITION: Fair
DAMAGE PRESENT: tilted, lid can't close
HEIGHT OF STICKUP (agx): 2.8 ft
TOTAL DEPTH (btoc): 20.38
DEPTH TO WATER (btoc): 14.70
HEIGHT OF WATER COLUMN (feet): 5.68
1 WELL VOLUME (gal): 0.97
3 WELL VOLUMES (gal): 2.91
DROWNED SCREEN?: NO

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low-Flow Bladder Pump
SAMPLING APPARATUS: QED 1.75" S/N
TUBING SIZE / TYPE: Teflon-lined Poly tubing
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

IF PRODUCT IS PRESENT: DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A THICKNESS OF PRODUCT (feet): N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: <25 mL/min	Depth at Purge: 15.85
Max sample rate: 35 mL/min	Depth at Sample: 15.90

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	8.43	387	-8.7	0.53		
Average	7.20	393	-35	1.43	2.40	1.27
Highest Observed	8.43	792	-8.7	3.55	2.4	1.27
Lowest Observed	6.44	0.688	-68.7	0.22	2.4	1.27

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1057	0.25	14.96	0.26	19.71	6.17	321	106.7	1.01	8.01	clear	POL
1100	0.26	14.99	0.29	19.82	6.18	321	76.8	1.50	10.10	"	"
1105	0.27	14.97	0.27	20.90	6.20	344	41.3	1.28	9.91	"	"
1119	0.28	15.00	0.30	23.15	6.25	384	-2.6	1.20	7.13	"	"
1123	0.29	15.03	0.33	22.08	6.30	408	-19.5	1.26	7.58	"	"
1131	0.30	15.07	0.37	19.45	6.40	430	-33.4	3.61	9.85	"	"
1138	0.31	15.05	0.35	20.17	6.37	428	-33.5	1.03	9.80	"	"
1145	0.35	15.03	0.33	21.79	6.36	440	-35.4	0.80	7.90	"	"
1207	0.40	14.95	0.25	26.10	6.34	480	-51.4	0.56	19.9	clear/yellow	"
1214	0.50	14.97	0.27	27.00	6.36	494	-54.3	0.61	13.5	"	"

FINAL PURGE DATA: START TIME: 1036 END TIME: 1220 CUMULATIVE VOLUME: 0.75 gal MAX FLOWRATE WITH STABLE DRAW DOWN: < 25 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, POL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	PAH SW8270D SIM							Remarks
SRF14-FS14H-0719	7/6/19	1220	GW	5	—	3	2							*not stabilized

SAMPLING NOTES: Screened interval ~10.3-20.3. Previous flowrate ~300

PURGE & DECON GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 11H101295 Turbidimeter 11741 Other

* Due to the likelihood of further flare activity, sample was collected immediately after being allowed to return to the flare pit without further stabilization to minimize personnel exposure

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WELL GAUGING FORM

SITE ID: SRF Tank Setting 1-9 **SHEET** 1 **OF** 1

PROJECT NAME 2019 Kenai Contaminated Sites GWM
CLIENT Hilcorp Alaska, LLC
SAMPLER(S) AS | NM | MD | KL

DATE 6/27/19
WEATHER / TEMPERATURE Sunny, 70° F

START TIME 1320
END TIME 1410

GAUGING DATA

WELL ID	TIME	PRODUCT PRESENT DTP (feet)	PRODUCT PRESENT THICKNESS (feet)	PRODUCT PRESENT REMOVED (gallons)	DTW (feet)	TD (feet)	WELL CONDITION (lock, cap/plug, heave, etc.)	ODOR / PID (ppm)
TS1-9A	1320	—	—	—	22.73	29.64	SV. 2.3' has lock, cap	none
TS1-9B	1410	—	—	—	22.31	26.39	SV 2.3' combolock, cap	none
TS1-9C	1400	—	—	—	22.61	27.00	SV. 1.7' keyed lock, cap	none
TS1-9D	1335	—	—	—	21.91	27.40	SV 2.5' lock, cap	slight HC
TS1-9U	1320	—	—	—	23.87	29.59	SV 1.8' lock, cap	none
TS1-9HH	1325	—	—	—	20.92	30.70	SV 2.2' lock, cap	none
TS1-9II	1325	—	—	—	12.36	30.95	SV 2.3 lock, cap	none
FS1-9D	1345	—	—	—	14.03	19.90	SV 2.2' lock, cap	none
FS1-9F	1350	~~12.64~~	NM	trace	~~12.64~~	NM		
FS1-9I	1330	—	—	—	13.70	19.58	SV 3.4 cap, lock - tubing rusty	none
FS1-9M	1350	—	—	—	20.52	25.92	SV 2.3' combolock, cap, tilted	none
FS1-9N	1340	—	—	—	17.03	25.00	SV. ~2' keyslock, cap	none

OTHER NOTES:

TS1-9A - concrete disintigrating from around casing - product on tape and probe after tagging TD - installed sock 7/2/2019 ~~scoped TD scoped~~ AS not scoped due to product on ~~tape/probe~~ casing, not on probe. Bailer in monument.

TS1-9C - evidence of product on ~~tape/probe after tagging TD~~

TS1-9B - steel casing repaired with some sort of pipe jacket - Sock installed in 2017 2/3 saturated with product - replaced with new sock - slight product trace on probe, no product signal - soft and sticky mit at TD - removed sock before gauging

TS1-9D - slight trace of product on sock - flipped sock

FS1-9F - DTP 12.64 T=0.05' DTW 12.69 - removed bailer and saturated sock before gauging - attempted product recovery, but only traces and blobs recovered

FS1-9M: Well cap replaced.
FS1-9N: Tubing removed.

TS1-9H: Fished out cut well casing and well caps from monument
FS1-9I - Removed 2015 tubing.
FS1-9D - Removed tubing.

NM: NOT MEASURED

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-9 **WELL ID:** TS1-9C **SHEET** 1 **OF** 1

PROJECT NAME	2019 SRF Contaminated Sites GWM	WELL CONDITION	Good
CLIENT	Hilcorp Alaska, LLC	DAMAGE PRESENT	None
SAMPLER(S)	NM	HEIGHT OF STICKUP (ags)	1.7 ft
		TOTAL DEPTH (btoc)	26.76 ft
WEATHER / TEMPERATURE	Sunny, 75°F	DEPTH TO WATER (btoc)	22.75 ft
		HEIGHT OF WATER COLUMN (feet)	4.01 ft
DATE	7/16/19	1 WELL VOLUME (gal)	0.668
START TIME	0705	3 WELL VOLUMES (gal)	2.04
END TIME	0905	DROWNED SCREEN?	No

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW

COLLECTION METHOD (PUMP TYPE, OTHER): Low-Flow Bladder Pump

SAMPLING APPARATUS: TEFLON TUBING

TUBING SIZE / TYPE: 0.25" x 0.375" FEP

IF PRODUCT IS PRESENT	DESCRIPTION: N/A	
DEPTH TO PRODUCT (btoc) N/A		THICKNESS OF PRODUCT (feet) N/A

EQUIPMENT DECON PROCEDURE: ALCONOX SCRUB + D.I. RINSE

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 145 mL/min	Depth at Purge: 23.25 ft
Max sample rate: 225 mL/min	Depth at Sample: ✓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	5.61	158	42.5	2.99	16.3	N/A
Average	5.48	84.4	56.5	1.37	21.5	0.01
Highest Observed	5.73	158	88.6	2.99	26.7	0.01
Lowest Observed	5.09	0.171	38.4	0.55	16.3	0.01

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0759	0.25	22.75	—	11.35	5.92	105	154.0	1.87	11.6	Clear	AOC
0802	0.50	22.75	—	11.30	5.94	110	142.6	1.78	18.4	clear	AOC
0805	0.75	22.76	0.01	11.34	5.97	114	155.2	1.70	10.7	"	"
0808	1.00	22.75	—	11.31	5.99	117	134.0	1.65	9.95	"	"
0811	1.25	22.75	—	11.43	6.01	119	132.5	1.58	9.42	"	"
0814	1.50	22.76	0.01	11.34	6.03	122	130.0	1.60	11.0	"	"
0817	1.75	22.75	—	11.11	6.04	126	124.5	1.55	8.52	"	"
0820	2.00	22.75	—	11.16	6.06	129	121.7	1.52	8.45	"	"
0823	2.25	22.75	—	10.99	6.07	132	119.5	1.49	8.18	"	"
					STABILIZED						

FINAL PURGE DATA: START TIME: 0740 END TIME: 0830 CUMULATIVE VOLUME: 2.50 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 225 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, no sheen, AOC odor

Sample ID	Date	Time	Matrix	Containers	QC	SW8260C (VOC) HCl	SW8270D (SVOC) Sizr (GRO)							Remarks
SRF19-TS19C-0719	7/16/19	0835	GW	5	—	3	2							

SAMPLING NOTES: Top of Screen ~16.5 ft btoc – sampling target ~17.5 ft btoc

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-9 WELL ID: TS1-9D SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): AS
WEATHER / TEMPERATURE: 70's Sunny and boggy, calm
DATE: 7/6/2019
START TIME: 0730
END TIME: 0910

WELL CONDITION: Good
DAMAGE PRESENT: none
HEIGHT OF STICKUP (ags): 2.5 ft
TOTAL DEPTH (btoc): 27.40 ft
DEPTH TO WATER (btoc): 22.04 ft
HEIGHT OF WATER COLUMN (feet): 5.36 ft
1 WELL VOLUME (gal): 0.91 gal
3 WELL VOLUMES (gal): 2.7 gal
DROWNED SCREEN? no

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): Groundwater
COLLECTION METHOD (PUMP TYPE, OTHER): 1.75" QED bladder pump
SAMPLING APPARATUS: with teflon-lined dedicated bladder - low flow method
TUBING SIZE / TYPE: 0.25 x 3/8" tef-lined poly int. bonded

IF PRODUCT IS PRESENT: DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA
EQUIPMENT DECON PROCEDURE: Alconox and DI Spray

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 120 mL/min	Depth at Purge: 23 ft
Max sample rate: 120 mL/min	Depth at Sample: 23 ft

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.09	549	6.3	6.09	101	N/A
Average	6.25	275	-32.2	3.315	101	0.02
Highest Observed	6.41	549	6.3	6.09	101	0.02
Lowest Observed	6.09	0.813	-70.7	0.54	101	0.02

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
~~1554~~ AS 0730	0	22.04	0	Start pumping - water right away							
0735	0.00	22.09	0.04	adjusted pressure down - 120mL/min							
0740	0.20	22.05	0.01	Took YSI - water clear, POL odor							
0745	0.36	22.00	0.06	10.73	6.45	252	60.9	5.56	6.92	Clear	POL
0750	0.52	22.04	0.05	10.39	6.03	211	57.6	1.39	8.55	"	"
0755	0.68	22.08	0.04	10.09	6.21	260	55.6 ✓	0.89	8.62	"	"
0800	0.84	22.07	0.03	10.08	6.22	262	46.2	0.58	9.18	"	"
0805	1.0	22.10	0.06	9.99	6.20 ✓	269	49.0 ✓	0.48	10.4	"	"
0810	1.16	22.07	0.03	10.13	6.16 ✓	274	40.0 ✓	0.41	9.24	"	"
0815	1.32	22.05	0.01	10.16	6.18 ✓	279	40.3 ✓	0.36	11.0	"	"
0820	1.48	22.06	0.02	10.34	6.19 ✓	244	34.1 ✓	0.34	9.93	"	"
0825	1.64	22.06	0.02	10.35	6.24 ✓	294	32.3 ✓	0.36 ✓	7.73	"	"
0830	1.70	22.09	0.04	10.48	6.28 ✓	296	36.9 ✓	0.35 ✓	7.70 ✓	"	"

0.16

Stabilized Sample

FINAL PURGE DATA: START TIME: 0730 END TIME: 0830 CUMULATIVE VOLUME: 1.75 MAX FLOWRATE WITH STABLE DRAW DOWN: 120 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) Clear, Strong POL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC Attpk 1st 8260C list	PAH 8270D SIM							Remarks
SRF19-TS19D-0719	7/6	0835	GW	5	-	x	x							Hot
SRF19-TS19DZ-0719	7/6	0735	GW	5	Dup	x	x							Hot

SAMPLING NOTES: Top of screened interval ~17.5 ft btoc. Target 23 ft btoc for intake. Combo lock. Formerly an LNAPL well - expect hot sample. Tiny bubbles forming in YSI flow-through cell. Sock removed from well while sampling, replaced. Tubing discarded to allow sock. PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 04D8023 Turbidimeter 11741 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-9 WELL ID: TS1-9HH SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): AS, NM
WEATHER / TEMPERATURE: Sunny, 85°F
DATE: 7/5/19
START TIME: 1650
END TIME: 1740

WELL CONDITION: Fair, Monument jacked
DAMAGE PRESENT: gap between concrete and grout
HEIGHT OF STICKUP (ags): 2.2 ft
TOTAL DEPTH (btoc): 30.70 ft
DEPTH TO WATER (btoc): 21.09 ft
HEIGHT OF WATER COLUMN (feet): 9.61 ft
1 WELL VOLUME (gal): 1.63
3 WELL VOLUMES (gal): 4.90
DROWNED SCREEN?: No

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low-Flow Bladder Pump
SAMPLING APPARATUS: SS 1.75" QED Bladder pump w/ teflon-lined bladder (dedicated) / teflon lined poly tubing
TUBING SIZE / TYPE: 0.25 x 5/8" ptfe lined poly int. bonded
EQUIPMENT DECON PROCEDURE: Alconox and DI Spray

IF PRODUCT IS PRESENT DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A
THICKNESS OF PRODUCT (feet): N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 200 mL/min	Depth at Purge: 22.0 ft
Max sample rate: 140 (vol) 200 mL/min	Depth at Sample: 22.0 ft

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	9.5	113	-178.3	0.74	38.3	N/A
Average	7.86	56.6	-102	0.545	38.3	0.01
Highest Observed	9.5	113	-25.7	0.74	38.3	0.01
Lowest Observed	6.22	0.158	-178.3	0.35	38.3	0.01

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1650	0	21.09	0	Start pumping							
1655	0.25	21.10	0.01	no flowrate adjustment needed							
0.22 1658	0.47	21.11	0.02	8.54	6.59	95	109.4	6.62	13.0	clear	none
1701	0.69	21.10	0.01	7.81	6.70	100	96.4	6.12	10.3	clear	none
1704	0.91	21.10	0.01	7.55	6.74	106	89.8	5.76	8.04	clear	"
1707	1.13	21.10	0.01	7.05	6.77 ✓	107	84.6	5.69	8.74	"	"
1710	1.35	21.09	0.00	7.02	6.77 ✓	108 ✓	81.2 ✓	5.47 ✓	7.45 ✓	"	"
		four stable parameters, turbidity <10 - sample									

FINAL PURGE DATA: START TIME: 1655 END TIME: 1710 CUMULATIVE VOLUME: 1.5 MAX FLOWRATE WITH STABLE DRAW DOWN: 200 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear with some floating chunks no odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC HCl	DRO HCl								Remarks
SRF19-TS19HH-0714	7/5	1715	GW	5	-	X	X								

SAMPLING NOTES: Top of Screened interval ~21 ft btoc. Left dedicated tubing in well. Keyed American lock.

PURGE & DECON GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-9 WELL ID: TS1-9U SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): AS/NM
WEATHER / TEMPERATURE: 80 °F, sunny
DATE: 7/5/19
START TIME: ~~0747~~ 1600
END TIME: ~~1800~~ 1645

WELL CONDITION: Good
DAMAGE PRESENT: none - history of jacking
HEIGHT OF STICKUP (ags): 1.9 ft
TOTAL DEPTH (btoc): 29.59 ft
DEPTH TO WATER (btoc): 23.98 ft
HEIGHT OF WATER COLUMN (feet): 5.61 ft
1 WELL VOLUME (gal): 1.0
3 WELL VOLUMES (gal): 3.0
DROWNED SCREEN?: No

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low-Flow Bladder Pump
SAMPLING APPARATUS: QED 1.75" Pneumatic Bladder Pump
TUBING SIZE / TYPE: Teflon-Lined Poly-Tubing
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

IF PRODUCT IS PRESENT: DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A THICKNESS OF PRODUCT (feet): N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 165 mL/min	Depth at Purge: 24.5
Max sample rate: 165 mL/min	Depth at Sample: 24.5

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	8.87	195	-112.2	1	0.92	N/A
Average	7.32	97.7	-63.1	0.875	0.92	0.03
Highest Observed	8.87	195	-14	1	0.92	0.03
Lowest Observed	5.77	0.31	-112.2	0.75	0.92	0.03

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2°C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1554	0	23.98	0	Start pumping						clear	—
1556	0.25	24.10	0.12	reduce rate to decrease drawdown							—
1604	0.30	24.04	0.06	160 mL/min - flowthrough cell full							slight
1607	0.43	24.04	0.06	9.06	6.71	129	109.2	2.11	2.65	clear	"
1610	0.56	24.05	0.07	8.69	6.47	127	114.9	1.31	2.74	clear	"
1613	0.69	24.03	0.05	9.97	6.40	129	112.0	1.08	3.05	clear	"
1616	0.82	24.05	0.07	9.75	6.41 ✓	128 ✓	114.7 ✓	~~0.8~~ 0.91	3.06 ✓	"	"
1619	0.95	24.04	0.06	9.39	6.36	127	113.8	0.87	2.69	"	"
—				—	STABILIZED	—					—

0.13

FINAL PURGE DATA: START TIME: ~~1547~~ 1554 END TIME: 1645 CUMULATIVE VOLUME: 1.0 MAX FLOWRATE WITH STABLE DRAW DOWN: 165 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) Clear, no sheen, PDL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	PAH SW8270D SIM							Remarks
SRF19-TS19U-0719	7/5/19	1630	GW	5	—	3	2							

SAMPLING NOTES: Top of screen ~ 19.5-20 ft btoc. Left dedicated tubing in well.
Combo lock

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-9 **WELL ID:** FS1-9D **SHEET** 1 **OF** 1

PROJECT NAME	2019 SRF Contaminated Sites GWM	WELL CONDITION	Good
CLIENT	Hilcorp Alaska, LLC	DAMAGE PRESENT	none
SAMPLER(S)	AS	HEIGHT OF STICKUP (ags)	2.2 ft
		TOTAL DEPTH (btoc)	19.90 ft
WEATHER / TEMPERATURE	70's Sunny	DEPTH TO WATER (btoc)	14.18 ft
		HEIGHT OF WATER COLUMN (feet)	5.72 ft
DATE	7/5/2019	1 WELL VOLUME (gal)	1.0 gal
START TIME	0930	3 WELL VOLUMES (gal)	3.0 gal
END TIME	1045	DROWNED SCREEN?	No

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
(2" Sch40)	2.375	2.067	(0.17)
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER):	Groundwater	IF PRODUCT IS PRESENT	DESCRIPTION: NA
COLLECTION METHOD (PUMP TYPE, OTHER):	SS 1.75" Bladder pump	DEPTH TO PRODUCT (btoc) NA	THICKNESS OF PRODUCT (feet) NA
SAMPLING APPARATUS:	Teflon-lined bladder, Teflon-lined poly tubing intermittent bonded		
TUBING SIZE / TYPE:	0.25 x 3/8"	EQUIPMENT DECON PROCEDURE:	Alconox and DI spray

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 210 mL/min	Depth at Purge: 15.0
Max sample rate: 115 mL/min (VOA) 210 PAH	Depth at Sample: 15.0

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	4.57	43	115.3	5.69	5.57	N/A
Average	5.175	21.6	76.05	2.94	5.57	0.03
Highest Observed	5.78	43	115.3	5.69	5.57	0.03
Lowest Observed	4.57	0.117	36.8	0.19	5.57	0.03

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0946	0	14.18	0	Start pumping							
0947		14.18	0.0	water - clear, hook up SS - 210 mL/min							
0955	0.5	14.18	0.00								
0958	0.67	14.18	0.00	8.72	5.97	59	138.9	1.17	1.85	clear	metallic PDL slight
1001	0.84	14.18	0.00	8.19	5.87	58	129.0	0.88	2.51	"	"
1004	1.04	14.19	0.01	8.00	5.78	58	124.8	0.70	1.73	"	"
1007	1.24	14.18	0.00	8.21	5.75 ✓	59 ✓	118.7	0.62	1.81 ✓	"	"
1010	1.44	14.19	0.01	8.22	5.71 ✓	59 ✓	117.5 ✓	0.58	1.74 ✓	"	"
		four stable parameters - Sample 1015									

250 mL/min 0.2

FINAL PURGE DATA: START TIME: 0946 END TIME: 1010 CUMULATIVE VOLUME: 1.5 gal MAX FLOWRATE WITH STABLE DRAW DOWN: >210 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, slight metallic/PDL odor
no sheen

Sample ID	Date	Time	Matrix	Containers	QC	4°C Preserved VOC SW8260C/D	PAH SIM 8270D	Remarks
SRFA1-FS19D-0719	7/5	1015	GW	5	—	X	X	

SAMPLING NOTES: Top of screen ~15.0 ft btoc. ~~7/2 FMW2 0.01 btoc~~ AS
left dedicated bonded tubing in well Keyed Master Lock - requires key to re lock
PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 04D8023 Turbidimeter 11741 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-9 WELL ID: FS1-9I SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): AS
WEATHER / TEMPERATURE: 70s sunny, buggy
DATE: 7/5/19
START TIME: 0650
END TIME: 0820

WELL CONDITION: Good
DAMAGE PRESENT: none - filling around
HEIGHT OF STICKUP (ags): 3.4 ft
TOTAL DEPTH (btoc): 19.58 ft
DEPTH TO WATER (btoc): 13.83 ft
HEIGHT OF WATER COLUMN (feet): 5.75 ft
1 WELL VOLUME (gal): 0.98 gal
3 WELL VOLUMES (gal): 2.9 gal
DROWNED SCREEN?: NO

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): Groundwater
COLLECTION METHOD (PUMP TYPE, OTHER): SS 1.75" QED bladder pump
SAMPLING APPARATUS: with Teflon-lined bladder (dedicated)
TUBING SIZE / TYPE: dedicated 0.25 x 3/8" teflon lined poly
EQUIPMENT DECON PROCEDURE: Alconox and DI Spray

IF PRODUCT IS PRESENT: DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 200 ~~45~~ / 180 mL/min	Depth at Purge: 14.7 ft
Max sample rate	Depth at Sample

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	5.34	24	115.9	8.7	2.96	N/A
Average	5.54	12.0	112.45	9.155	2.96	0.01
Highest Observed	5.74	24	115.9	9.61	2.96	0.01
Lowest Observed	5.34	0.039	109	8.7	2.96	0.01

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0715	0	13.83	0	Start pumping							
0720		13.88	0.05	check rate ~ 200 mL/min				sustaining			
0724		1		Hook up YSI - water clear							
0730	0.4	13.88	0.05	7.87	2.70	35	479.0	12.12	5.86	clear	none
0732	0.55	13.89	0.06	7.63	4.33	32	386.0	11.27	3.07	"	"
0736	0.70	13.89	0.06	7.59	5.19	31	337.8	10.97	3.55	"	"
0739	0.85	13.89	0.06	7.58	5.79	29	302.4	10.83 ✓	2.81 ✓	"	"
0742	1.0	13.88	0.05	7.67	5.80	28	298.8	10.59 ✓	1.55 ✓	"	"
0745	1.15	13.89	0.06	7.48	5.80 ✓	28	296.0 ✓	10.69 ✓	2.29 ✓	"	"
0748	1.30	13.88	0.05	7.40	5.78 ✓	27	300.3 ✓	10.52 ✓	1.68 ✓	"	"
		Pow	Parameters	stable -	sample						

FINAL PURGE DATA: START TIME: 0715 END TIME: 0748 CUMULATIVE VOLUME: 1.5 MAX FLOWRATE WITH STABLE DRAW DOWN: 180 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, no odor, no sheen

Sample ID	Date	Time	Matrix	Containers	QC	VOC Acetone 8260C LCL	PAH 8270D SIM						Remarks
SRF19-FS1-9I-0719	7/5	0750	GW	5	-	X	X						

SAMPLING NOTES: screened interval ~9.5 - 19.5 ft btoc 1 ft dedicated bonded tubing in well
keyed Master Lok - requires key to relock
PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 04D8023 Turbidimeter 11741 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-9 WELL ID: FS1-9M SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: Sunny, ~75°F
DATE: 7/5/19
START TIME: 0700
END TIME: 0915

WELL CONDITION: Good
DAMAGE PRESENT: Rusted
HEIGHT OF STICKUP (ags): 2.3 ft
TOTAL DEPTH (btoc): 25.92 ft
DEPTH TO WATER (btoc): 20.68 ft
HEIGHT OF WATER COLUMN (feet): 5.24 ft
1 WELL VOLUME (gal): 0.89
3 WELL VOLUMES (gal): 2.67
DROWNED SCREEN?: No

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low-Flow Bladder Pump
SAMPLING APPARATUS: QED 1.75" Pneumatic Bladder Pump S/N 12055
TUBING SIZE / TYPE: Teflon-lined Poly tubing

IF PRODUCT IS PRESENT: DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A THICKNESS OF PRODUCT (feet): N/A
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 188 mL/min	Depth at Purge: 21.0 ft
Max sample rate: 210 mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	5.71	67	66.4	10.55	2.7	
Average	5.62	33.6	91.15	8.105	2.7	
Highest Observed	5.71	67	115.9	10.55	2.7	
Lowest Observed	5.53	0.11	66.4	5.66	2.7	

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0740	0.25	20.68	—	10.26	5.30	106	241.3	9.53	3.82	clear	none
0744	0.45	20.66	—	8.83	5.45	95	227.6	8.47	2.47	"	"
0747	0.65	20.68	—	8.34	5.53	89	230.7	8.22	2.20	"	"
0750	0.85	20.68	—	8.05	5.56	86	235.3	8.04	1.38	"	"
0753	1.00	20.66	—	7.93	5.64	83	235.2	7.91	1.70	"	"
0756	1.25	20.68	—	7.80	5.68	82	234.6	7.67	1.66	"	"
0759	1.50	20.66	—	7.75	5.72	81	233.6	7.90	0.98	"	"
					STABILIZED						

FINAL PURGE DATA: START TIME: 0732 END TIME: 0803 CUMULATIVE VOLUME: 2.5 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 210 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) Clear, no sheen, no odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	PAH SW8270D SIM							Remarks
SRF19-FS19M-0719	7/5/19	0810	GW	5	—	3	2							
SRF19-FS19M-0719	7/5/19	0810	GW	10	MS/MSD	6	4							Added volume for MS/MSD

SAMPLING NOTES: screened interval ~15.5-25.5 ft left dedicated tubing combo lock

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 11H101295 Turbidimeter 15652 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-9 WELL ID: FS1-9N SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: Sunny, ~75°F - 80°F
DATE: 7/5/19
START TIME: 0945
END TIME: 1100

WELL CONDITION: Good
DAMAGE PRESENT: Heaved against monument
HEIGHT OF STICKUP (ags): 2.0 ft
TOTAL DEPTH (btoc): 25.00 ft
DEPTH TO WATER (btoc): 17.18
HEIGHT OF WATER COLUMN (feet): 7.82
1 WELL VOLUME (gal): 1.33
3 WELL VOLUMES (gal): 3.99
DROWNED SCREEN? NO

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low-Flow Bladder Pump
SAMPLING APPARATUS: QED 1.75" Pneumatic Bladder Pump S/N 12055
TUBING SIZE / TYPE: Teflon-lined Interm. tend bond Poly EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

IF PRODUCT IS PRESENT DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc) N/A THICKNESS OF PRODUCT (feet) N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 210 mL/min	Depth at Purge: 18.50 ft
Max sample rate: 190 mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.02	86	54.2	1.03	1.14	N/A
Average	5.88	55.0	59.0	0.66	6.32	
Highest Observed	6.02	86	83.1	1.03	11.5	
Lowest Observed	5.69	0.134	39.8	0.37	1.14	

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2°C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1003	0.25	17.18	—	13.52	5.50	56	167.2	5.34	31.1	orange/brown	Faint
1007	0.50	17.18	—	10.60	5.49	43	153.7	2.40	12.3	yellow	"
1010	0.65	17.18	—	9.70	5.70	42	138.1	1.88	6.69	"	"
1013	0.85	17.18	—	9.41	5.88	42	128.1	1.75	15.3	"	"
1016	0.95	17.18	—	9.06	5.97	42	122.7	1.64	9.59	"	"
1019	1.00	17.18	—	8.49	6.02	41	116.3	1.50	6.30	"	"
1023	1.25	17.18	—	8.51	6.05	42	117.4	1.50	3.50	clear	"
				SAMPLED							

FINAL PURGE DATA: START TIME: 0955 END TIME: 1025 CUMULATIVE VOLUME: 1.75 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 250 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, no sheen, faint PCL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	PAH SW8270D SIM	Remarks
SRF19-FS19N-0719	7/5/19	1035	GW	5	—	3	2	
SRF19-FS19NE-0719	7/5/19	0935	GW	5	DUP	3	2	

SAMPLING NOTES: Top of Screened interval ~15 ft btoc
Orange flakes in purge water.
Lock requires key to lock AND unlock.
PURGE & DECON GRAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 11H101295 Turbidimeter 15652 Other

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WELL GAUGING FORM

SITE ID: SRF Tank Setting 1-27 **SHEET** 1 **OF** 1

PROJECT NAME 2019 Kenai Contaminated Sites GWM
CLIENT Hilcorp Alaska, LLC
SAMPLER(S) AS, NM

DATE 7/3/19
START TIME 0750
END TIME 0858
WEATHER / TEMPERATURE Sunny, ~65°F

GAUGING DATA

WELL ID	TIME	PRODUCT PRESENT			DTW (feet)	TD (feet)	WELL CONDITION (lock, cap/plug, heave, etc.)	ODOR / PID (ppm)
		DTP (feet)	THICKNESS (feet)	REMOVED (gallons)				
TS1-27G	0850	—	—	—	12.50	25.90	Good, stickup height: 1.75ft	none
TS1-27J	0750	—	—	—	15.89	20.83	Good; cut PVC in monument (~0.5" bgs)	PCL
TS1-27K	0855	—	—	—	13.24	25.19	Good, stickup height: 2.0ft	~~None~~ PCL
TS1-27L	0834	—	—	—	15.62	20.09	Good, no cap, hard hit@bottom	PCL
TS1-27M	0843	—	—	—	13.93	25.49	Good, medium hit @bottom	none
TS1-27N	0801	—	—	—	17.13	24.40	Good, well on mound ~2ft	none
FS1-27C	0813	—	—	—	10.69	25.10	Good, well in flare pit	none

OTHER NOTES:

TS1-27J: Well cap in monument. Hard hit @ bottom. Stickup height: 2.0ft

TS1-27N: Stickup height: 2.25 ft ags. Stickup measured to top of mound. PVC is against monument

FS1-27C: Stickup height: ~2.80 ft ags. Hard hit @ bottom. Removed 2015 tubing. Drowned screen. Top of screen ~15.25' btoc

TS1-27L: Stickup height: 2.5 ft ags. Gray sediment on probe end. Orange globs on probe.

TS1-27M: Stickup height: 2.0 ft ags.

TS1-27K: Obstruction @~6ft. Hard hit @ bottom. Scoping @ 0726. Tubing confirmed in well at about 10ft bgs. Removed.

TS1-27L Scoping: 0908 - Tubing found w/camera @ ~ 2ft bgs - tubing fished and removed

TS1-27K: Scoping 0934. Staining at 8-10.5ft in PVC. DTW: 12.95 ft bgs. Slots: ~15 ft bgs. PCL odor on tubing fished from well. No odor on probe

TS1-27G: Scoping 0952. Tubing found at about 2 ft. Water ~12ft btoc. Fished tubing. Screened interval starts at ~19.5ft btoc

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-27 WELL ID: TS1-27G SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: low clouds 70°F
DATE: 7/10/19
START TIME: 1120
END TIME: 1315

WELL CONDITION: Good
DAMAGE PRESENT: none
HEIGHT OF STICKUP (ags): 1.75'
TOTAL DEPTH (btoc): 25.90 ft
DEPTH TO WATER (btoc): 12.89'
HEIGHT OF WATER COLUMN (feet): 13.01'
1 WELL VOLUME (gal): 2.2
3 WELL VOLUMES (gal): 6.6
DROWNED SCREEN? YES

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40 (circled)	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low flow bladder
SAMPLING APPARATUS: QED 1.75"
TUBING SIZE / TYPE: Teflon lined tubing

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
175	
Max purge rate with stable drawdown: 175 mL/min	Depth at Purge: 18.0'
Max sample rate: 175 mL/min	Depth at Sample: 18.0'

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.55	276	-37.7	0.84	10.4	N/A
Average	6.835	300.0	-51.3	0.775	10.4	N/A
Highest Observed	7.12	324	-37.7	0.84	10.4	N/A
Lowest Observed	6.55	276	-64.9	0.71	10.4	N/A

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3%	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1141	—	12.50		began pumping							
1142	—	13.89	1.0	water at surface					50.2	clear	None
1146	.5	13.70	0.81	10.10	5.97	243 ✓	249.5	5.20	2 KT	"	"
1149	1.1	14.05	1.16 ✓	10.61 ✓	6.34	245 ✓	238.2	2.87	29.7 ✓	"	"
1152	1.6	14.25	1.26 ✓	10.43 ✓	6.47 ✓	245 ✓	219.2	2.69 ✓	24.3 ✓	"	"
1155	2.1	14.15	1.26 ✓	10.43 ✓	6.51 ✓	247 ✓	205.4	2.75 ✓	23.1 ✓	"	"
1158	2.6	14.20	1.31 ✓	10.40 ✓	6.54 ✓	249 ✓	189.2	2.80 ✓	20.5 ✓	"	"
1201	3.2	14.25	1.36 ✓	10.46 ✓	6.56 ✓	252 ✓	174.4	3.01 ✓	17.7 ✓	"	"
1204	3.8	14.27	1.38 ✓	10.50 ✓	6.57 ✓	258 ✓	158.2	3.09 ✓	15.0 ✓	"	"
1207	4.5L	14.25	1.36 ✓	10.56 ✓	6.58 ✓	259 ✓	143.7	3.11 KT ✓	11.7 ✓	"	"
—		—	—	Stability	—	—					

FINAL PURGE DATA: START TIME: 1141 END TIME: 1225 CUMULATIVE VOLUME: 1.4 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 175 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, none, none

Sample ID	Date	Time	Matrix	Containers	QC	VOC HCL	PAH							Remarks
SRF27-TS127G-071	7/10	1210	GW	15	MS/MSD	9	6							MS/MSD

SAMPLING NOTES: Scoped 7/3. Top of screen ~16 ft btoc. PTW 7/3 = 12.50 ft btoc. Likely drowned screen. Target 16-17 ft btoc for pump intake. Previous flowrate ~250 mL/min.

PURGE & DECON GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-27 WELL ID: TS1-27K SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: overcast, ~60°F
DATE: 7/10/19
START TIME: 1130
END TIME: 1250

WELL CONDITION: Good
DAMAGE PRESENT: None
HEIGHT OF STICKUP (ags): 2.0 ft
TOTAL DEPTH (btoc): 25.19 ft
DEPTH TO WATER (btoc): 13.66
HEIGHT OF WATER COLUMN (feet): 11.53
1 WELL VOLUME (gal): 1.96
3 WELL VOLUMES (gal): 5.88
DROWNED SCREEN?: Yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low Flow Bladder Pump
SAMPLING APPARATUS: QED 1.75"
TUBING SIZE / TYPE: Teflon lined tubing

IF PRODUCT IS PRESENT — DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A
THICKNESS OF PRODUCT (feet): N/A
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 110 mL/min	Depth at Purge: 16.5 ft
Max sample rate: 150 mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.22	447	-54.9	0.82	5.03	
Average	6.76	263.9	-53.9	0.97	5.03	0.08
Highest Observed	7.52	447	-40.5	1.77	5.03	0.08
Lowest Observed	6.22	0.557	-66.3	0.32	5.03	0.08

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ±0.2°C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1145	0.15	14.09	0.43	10.81	5.94	255	129.5	3.20	7.58	clear	POL
1148	0.20	14.11	0.45	10.37	6.06	246	133.7	2.08	7.10	"	"
1151	0.30	14.16	0.50	10.14	6.21	237	136.7	1.21	6.27	"	"
1154	0.35	14.21	0.55	9.75	6.25	230	147.2	1.00	6.13	"	"
1157	0.40	14.07	0.41	10.09	6.26	232	146.8	0.84	4.48	"	"
1200	0.50	14.12	0.46	10.03	6.26 ✓	265	151.5 ✓	0.81	2.42 ✓	"	"
1203	0.60	14.11	0.45	10.05	6.28 ✓	247	154.7 ✓	0.73	3.45 ✓	"	"
					STABILIZED						

FINAL PURGE DATA: START TIME: 1140 END TIME: 1206 CUMULATIVE VOLUME: 1.0 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 150 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, no sheen, POL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC 8260D w/ SW5030C HCl	PAH 8270D SIM							Remarks
SRF127-TS127K-0719	7/10/19	1210	GW	5	—	3	2							
SRF127-TS127K2-0719	7/10/19	1110	GW	5	DUP	3	2							

SAMPLING NOTES: Scoped 7/3. Screened interval starts ~15 ft bgoc. DTW 7/5 = 13.94 ft btoc, likely drained screen. Try 100 mL/min as a starting flowrate. 470 mL/min resulted in 2' of drawdown.

PURGE & DECON GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-27 WELL ID: TS1-27L SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: sunny, ~75°F
DATE: 7/10/19
START TIME: 1720
END TIME: 1848

WELL CONDITION: Good
DAMAGE PRESENT: Tilted PVC
HEIGHT OF STICKUP (ags): 2.5 ft
TOTAL DEPTH (btoc): 20.09 ft
DEPTH TO WATER (btoc): 16.02
HEIGHT OF WATER COLUMN (feet): 4.07
1 WELL VOLUME (gal): 0.69
3 WELL VOLUMES (gal): 2.07
DROWNED SCREEN?: No

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Bladder
SAMPLING APPARATUS: QED 1.75" S/N 12055
TUBING SIZE / TYPE: Teflon-lined

IF PRODUCT IS PRESENT DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A THICKNESS OF PRODUCT (feet): N/A
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: < 50 mL/min	Depth at Purge: 18.5 ft
Max sample rate: 75 mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.51	284	-69.8	0.88	5.9	
Average	6.42	130.1	-68.5	0.79	6.215	2.72
Highest Observed	6.63	284	-9.3	1.1	6.53	2.72
Lowest Observed	6.13	0.3	-126.4	0.38	5.9	2.72

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1735	0.10	16.57	0.55	13.46	6.32	203	184.0	2.34	34.9	clear	POL
1738	0.15	16.80	0.78	12.09	6.37	240	163.4	1.27	23.5	slight yellow w/ floatings	"
1741	0.20	16.90	0.88	12.21	5.75	242	185.3	0.96	16.2	"	"
1744	0.25	17.00	0.98	12.51	6.04	237	153.0	0.78	14.0	"	"
1747	0.30	17.07	1.05	12.81	6.29	243	132.7	0.69	13.4	"	"
1750	0.35	17.11	1.09	13.20	6.35	190	122.4	0.64	10.6	clear	"
1757	0.40	17.09	1.07	14.05	6.39	253	109.0	0.58	10.6	slight yellow clear flakes	"
1800	0.45	17.19	1.17	15.33	6.38 ✓	258	107.2	0.63 ✓	12.7	"	"
1805	0.50	17.19	1.17	15.73	6.37 ✓	268	106.5 ✓	0.60 ✓	35.6	suddenly turbid sediment, clear	"
1815	0.55	17.19	1.17	16.23	6.36	274	90.5	0.53	94.0	very turbid	"
1818	0.60	17.30	1.28	16.79	6.36 ✓	274 ✓	84.5	0.51	62.8	turbid	"
1822	0.65	17.31	1.29	17.00	6.36 ✓	—	82.1 ✓	0.50 ✓	58.2	turbid	"
1826	0.75	17.31	1.29	17.24	6.35	—	78.5	0.51	49.8	"	"

FINAL PURGE DATA: START TIME: 1725 END TIME: 1843 CUMULATIVE VOLUME: 1.0 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 50 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) Yellow tint, floating bits, some sediment, turbid, POL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C HCl	PAH SW8270D SIM							Remarks
SRF127-TS127L-0719	7/10/19	1830	GW	5	—	3	2							Turbid water

SAMPLING NOTES: Installation report states screened 7-17 ft bgs - 10 ft screen. Assume top of screen at ~10 ft btoc. DTW 7/3 = 15.62. Likely not drowned screen. Target top 1 ft of water column. Start flow rate at ~100 mL/min. 340 mL/min historically drew well down. Water became turbid suddenly @ end of purge w/ very slow flow rates. PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 04D8023 Turbidimeter 15652 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-27 WELL ID: TS1-27M SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: Sunny 75°F
DATE: 7/10
START TIME: 1720
END TIME: 1830

WELL CONDITION: good
DAMAGE PRESENT: none
HEIGHT OF STICKUP (ags): 2.00 ft
TOTAL DEPTH (btoc): 25.49 ft
DEPTH TO WATER (btoc): 14.24'
HEIGHT OF WATER COLUMN (feet): 11.25'
1 WELL VOLUME (gal): 1.9
3 WELL VOLUMES (gal): 5.7
DROWNED SCREEN?: yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
(2" Sch40)	2.375	2.067	(0.17)
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low flow bladder pump
SAMPLING APPARATUS: QED 1.75"
TUBING SIZE / TYPE: Teflon lined tubing
EQUIPMENT DECON PROCEDURE: Alconox and DI Water Rinse

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA
THICKNESS OF PRODUCT (feet): NA

FLOW RATE (mL/min): 180
Max purge rate with stable drawdown: 180 mL/min
Max sample rate: 180 mL/min
SAMPLE PORT DEPTH (btoc)
Depth at Purge: 17.0'
Depth at Sample: 17.0'
1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	5.82	224	143	2.53	1.37	N/A
Average	6.84	193.1	-57.9	1.35	1.37	4.68
Highest Observed	7.78	355	143	2.53	1.37	4.68
Lowest Observed	5.82	0.326	-336.3	0.29	1.37	4.68

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1735	—			Started pumping					10.4	clear	none
1740	—	.67	14.91	Issue w/ pump							
1746	1.1L	1.26	15.50	9.04	5.83	172	301.9 ✓	7.59	16.6	clear	none
1750	1.8L	1.51	15.75	8.22	5.97	169 ✓	300.7 ✓	7.42 ✓	10.0	"	✓
1753	2.4L	1.71	15.95	7.94	6.10 ✓	168 ✓	299.0 ✓	7.44 ✓	5.95	"	✓
1756	2.9L	1.61	15.85	7.87	6.15 ✓	170 ✓	297.6 ✓	7.44 ✓	4.64	"	✓
1759	3.42	1.63	15.87	7.74	6.20 ✓	170 ✓	295.9 ✓	7.42 ✓	3.10	"	✓
				Stabilization							

FINAL PURGE DATA: START TIME: 1735 END TIME: 1807 CUMULATIVE VOLUME: 1.2 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 180 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, none, none

Sample ID	Date	Time	Matrix	Containers	QC	VOA	HCl							Remarks
SRF127-TS127M-0719	7/10	1800	GW	5	—	3	2							

SAMPLING NOTES: Installation report states screened interval 13-23 ft bgs, 10 ft screen. Assume top of screen at ~15.5 ft btoc. DTW 13.93 ft btoc on 7/3. Likely drowned screen. Target 15.5-16.5 ft btoc for pump intake. Historic flowrate ~195 mL/min.

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-27 WELL ID: FS1-27C In flare pit & call Car 12. SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT & NM
WEATHER / TEMPERATURE: overcast 70°F
DATE: tot 7/10/19 KT
START TIME: 1520
END TIME: 1625

WELL CONDITION: good
DAMAGE PRESENT: none
HEIGHT OF STICKUP (ags): 2.8 ft
TOTAL DEPTH (btoc): 25.10 Ft
DEPTH TO WATER (btoc): 11.28 ft
HEIGHT OF WATER COLUMN (feet): 13.82
1 WELL VOLUME (gal):
3 WELL VOLUMES (gal):
DROWNED SCREEN?

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low Flow bladder Pump
SAMPLING APPARATUS: Teflon lined tubing
TUBING SIZE / TYPE: QED 1.75"

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
275	
Max purge rate with stable drawdown: 275 mL/min	Depth at Purge: 16.5'
Max sample rate: 275 mL/min	Depth at Sample: 16.5'

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.67	87	-238.5	5.85	N/A	N/A
Average	7.155	43.6	-72.1	6.515	N/A	0.04
Highest Observed	7.64	87	94.3	7.18	N/A	0.04
Lowest Observed	6.67	0.105	-238.5	5.85	N/A	0.04

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1529	—	—	—	Water to surface							
1530	-	11.82	.54	Attached YSI							
1534	1.1L	11.81	.53	10.61	5.32 ✓	129	236.9	11.98	36.2 ✓	clear	None
1537	1.9L	11.50	.22	9.75	5.42 ✓	110	246.3	9.62 ✓	33.3 ✓	"	"
1540	2.75L	11.60	.32	8.49	3.91	84	337.2	9.32 ✓	25.8 ✓	"	"
1543	3.6L	11.55	.27	8.77	4.40	75	319.2	9.18 ✓	19.2 ✓	"	"
1546	4.4L	11.50	.22	8.69	4.99	68	286.0	9.07 ✓	18.2 ✓	"	"
1549	5.2L	11.58	.30	8.44 ✓	5.45	64	264.0	9.06 ✓	17.0 ✓	"	"
1552	6L	11.55	.27	8.53 ✓	5.72 ✓	58 ✓	253.8	9.46 ✓	14.7	"	"
1555	6.8L	11.59	.31	8.50 ✓	5.84	57 ✓	240.9 ✓	9.22 ✓	KT 12.7	"	"
1558	7.6L	11.60	.32	8.50 ✓	5.97	56 ✓	233.5 ✓	9.14 ✓	14.5	"	"
1601	8.5L	11.58	.30	8.48 ✓	6.02	56 ✓	231.8 ✓	9.22 ✓	10.2	"	"
					Stabelized						

FINAL PURGE DATA: START TIME: 1529 END TIME: 1610 CUMULATIVE VOLUME: 2.4 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 275

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, none, none

Sample ID	Date	Time	Matrix	Containers	QC	VOC HCL	PAH							Remarks
SRF127-FS127C-0719	7/10	1610	GW	5	—	3	2							
							~~2~~	KT						

SAMPLING NOTES: Scoped 7/3. Top of screen ~15 ft btoc. DTW 7/3 = 10.69 ft btoc. Likely drowned screen. Target 15-16 ft btoc for pump intake. No flowrate information

PURGE & DECON GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL GAUGING FORM

SITE ID: SRF Tank Setting 1-33 **SHEET** 1 **OF** 1

PROJECT NAME 2019 Kenai Contaminated Sites GWM **DATE** 7/3/19 **START TIME** 1242

CLIENT Hilcorp Alaska, LLC **END TIME**

SAMPLER(S) AS, NM **WEATHER / TEMPERATURE** Sunny, 85°F

GAUGING DATA

WELL ID	TIME	PRODUCT PRESENT			DTW (feet)	TD (feet)	WELL CONDITION (lock, cap/plug, heave, etc.)	ODOR / PID (ppm)
		DTP (feet)	THICKNESS (feet)	REMOVED (gallons)				
TS1-33JJ	1346	—	—	—	14.00	24.91	Good, SU~2.4' hard hit TD	none
TS1-33KK	1402	—	—	—	8.71	22.06	Good, needs lock SU~3.0ft	~~septic~~ AS
TS1-33N	1242	—	—	—	20.56	28.45	Good. Stickup ht: 2.75ft	none
TS1-33O2	1419	—	—	—	10.70	22.68	Bad - monument destroyed	none
TS1-33P	1411	—	—	—	9.29	18.97	Good SU~1.25ft hard hit TD	none
TS1-33Q	1354	—	—	—	10.86	18.82	Good SU~2.0' hard hit TD	none
TS1-33UR	1438	—	—	—	9.11	15.57	Good SU~ hard hit TD	none
FS1-33F	1332	—	—	—	28.10	45.72	Good SU~2.75' soft hit TD	none
FS1-33H	1429	—	—	—	25.23	42.40	Good. Gauged around sock.	none
FS1-33O	1314	—	—	—	29.11	47.97	Good. Stickup ht: 2.75 ft	none
FS1-33S	1304	—	—	—	25.86	47.85	Bad. Lid broken off monument	none
FS1-33T	1257	—	—	—	20.93	42.88	Good. Stickup ht: 2.75ft	none
FS1-33W	1251	—	—	—	23.72	30.30	Tree fallen on lock - bent but	none
FS1-33S:	Sloping @1520. Difficulty getting scope centralizer (1.25" diameter) past broken joint. DTW: 25.0ft, drowned screen. Slots: ~ 37ft.							
FS1-33AF:	Sloping @1541. DTW: 25.5ft. Slots: ~39.5ft							
FS1-33O:	Sloping @1549. Smears of brown residue all up + down casing. 4ft ~ below 17ft btoc, thick, wet goop is stuck on casing. Presumed cause of "weak intermittent signal" on probe during gauging.							
TS1-33O:	Sloping @1605 Top of screen: 8.5 ft. Not a drowned screen.							

OTHER NOTES:

FS1-33W: Lock still functions. Hard hit @ bottom of well. Stickup ht: 2.0 ft. Tubing removed.

FS1-33T: Tubing removed.

FS1-33S: Lid knocked ~~off~~ monument. Monument ran over at some point, bent in middle. Does not close of lock. Stickup height: 1.5ft, cap missing.

FS1-33O: Mud on tape and probe (not product) @ 29.2 ft, was made weak intermittent signal.

FS1-33F - removed old tubing.

TS1-33Q - removed old tubing - plug very close to monument lid - may still be jacking

TS1-33JJ - removed old tubing

TS1-33KK - soft hit TD removed old tubing needs lock, orange gasket on probe, orange stain and septic odor on tubing

TS1-33P - removed old tubing - PVC pressed hard against monument - cap knocked off as found

TS1-33O2 - monument destroyed. No lid, could lock plug. Soft hit TD, removed old tubing. SU~2.0ft gray seds probe

FS1-33H: 2 bailers in monument. SU ~2.5 ft sock.

TS1-33UR - flipped sock. No trace of product on probe. gauge around sock

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-33 **WELL ID:** TS1-33JJ **SHEET** 1 **OF** 1

PROJECT NAME	2019 SRF Contaminated Sites GWM	WELL CONDITION	Good
CLIENT	Hilcorp Alaska, LLC	DAMAGE PRESENT	None
SAMPLER(S)	NM & KT	HEIGHT OF STICKUP (ags)	2.4 Ft
		TOTAL DEPTH (btoc)	24.91 ft
WEATHER / TEMPERATURE	Cloudy, ~55°F	DEPTH TO WATER (btoc)	14.18
		HEIGHT OF WATER COLUMN (feet)	10.73
DATE	7/11/19	1 WELL VOLUME (gal)	1.8
START TIME	1100	3 WELL VOLUMES (gal)	5.5
END TIME	1234	DROWNED SCREEN?	Yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER):	GW	IF PRODUCT IS PRESENT	DESCRIPTION: NA
COLLECTION METHOD (PUMP TYPE, OTHER):	1.75" QED BLADDER	DEPTH TO PRODUCT (btoc) NA	THICKNESS OF PRODUCT (feet) NA
SAMPLING APPARATUS:	TUBING		
TUBING SIZE / TYPE:	0.25" x 0.375" FEP	EQUIPMENT DECON PROCEDURE:	ALCONOX SCRUB + D.I. RINSE

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
130	
Max purge rate with stable drawdown: 130	Depth at Purge: 16ft
Max sample rate: 130	Depth at Sample:

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.57	284	56.9	7.81	N/A	N/A
Average	6.57	284	56.9	7.81	N/A	N/A
Highest Observed	6.57	284	56.9	7.81	N/A	N/A
Lowest Observed	6.57	284	56.9	7.81	N/A	N/A

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1130	1.0									Reddish cloudy	
1135	1.1	14.91	.73						53.1	cloudy	none
1140	1.3	15.05	.87						25.7	slightly cloudy	"
1143	1.4	15.18	1.0	8.69	6.44	340	147.7	3.51	14.8	clear	"
1146	1.6	15.20	1.02	8.86	6.45	342	130.4	2.55	11.2	"	"
1149	1.8	15.27	1.09	9.16	6.46	351	112.8	2.36	12.2	"	"
1152	2.0	15.30	1.12	9.25	6.47	358	107.9	2.29	10.8	"	"
1155	2.25	15.32	1.14	9.21	6.48	361	100.7	2.26	10.6	"	"
1159	2.5	15.40	1.22	9.27	6.50 ✓	368 ✓	95.6	2.15 ✓	9.57	"	
					STABILIZED						

FINAL PURGE DATA: START TIME: 1111 END TIME: 1215 CUMULATIVE VOLUME: 2.5 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 130

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) Clear, no sheen, no odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SUBCLOOC	PAH SUBCONTRACTED							Remarks
SRF33-TS33JJ-071	7/11/19	1210	GW	5	—	3	2							

SAMPLING NOTES: Installation report states Screened interval 12-22 ft bgs = 10ft screen. Assume top of screen at ~15 ft btoc. DTW 7/3 = 14.00ft btoc - possibly drowned screen. Target 15-16 ft btoc for pump intake unless water level is lower. No historic flowrate information.

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-33 | WELL ID: TS1-3302 | No lid | SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: cloudy 70°F
DATE: 7/11/19
START TIME: 1415
END TIME: 1530

WELL CONDITION: good
DAMAGE PRESENT: casing damaged
HEIGHT OF STICKUP (ags): 2.0 ft
TOTAL DEPTH (btoc): 22.68 ft
DEPTH TO WATER (btoc): 11.30'
HEIGHT OF WATER COLUMN (feet): 11.38
1 WELL VOLUME (gal): 1.9
3 WELL VOLUMES (gal): 5.8
DROWNED SCREEN?: YES

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): 1.75" QED BLADDER
SAMPLING APPARATUS: TUBING
TUBING SIZE / TYPE: 0.25" x 0.375" FEP

IF PRODUCT IS PRESENT | DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA | THICKNESS OF PRODUCT (feet): NA

EQUIPMENT DECON PROCEDURE: Alconox and DI water Rinse

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
225	
Max purge rate with stable drawdown: 225 mL/min	Depth at Purge: 15.0'
Max sample rate: 175 mL/min	Depth at Sample: 15.0'

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.64	534	-59.9	0.93	2.92	N/A
Average	6.68	319	-54.2	0.80	2.92	0.03
Highest Observed	6.92	534	-47.1	1.04	2.92	0.03
Lowest Observed	6.47	0.593	-59.9	0.42	2.92	0.03

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal) L	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1429		11.32	.02	Began pumping			turbidity meter malfunction				
1432		11.34	.04	attached YSI							
1439	0.8	11.35	.05	10.44	6.27	360	181.0	2.93	—	cloudy	Slight
1442	1.7	11.35	.05	9.79	6.41	352	150.2	2.83	—	"	"
1445	2.5	11.35	.05	9.56	6.47	345	134.0	2.59	—	"	"
1448	3.4	11.37	.07	9.31	6.52	338	120.2	2.39	—	slightly cloudy	"
1451	4.3	11.40	.10	9.22	6.55	336	109.6	2.26	—	"	"
1454	4.6	11.39	.09	9.14	6.57	333	100.9	2.44	—	clear	"
1457	5.2L	11.35	.05	9.10	6.58	331	95.2	2.39	—	clear	"
				Stability							
				KT							

FINAL PURGE DATA: START TIME: 1429 | END TIME: ~~1530~~ 1510 | CUMULATIVE VOLUME: 1.75gal | MAX FLOWRATE WITH STABLE DRAW DOWN: 225

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) CLEAR, SLIGHT HC ODOR

Sample ID	Date	Time	Matrix	Containers	QC	VOC HCL	PAH							Remarks
SRF133-TS13302-0719	7/11	1500	GW	5	—	3	2							
SRF133-~~TS13302~~-0719	7/11	~~1500~~	GW	5	DUP	3	2							Duplicate
TS13302KT		1400 KT												

SAMPLING NOTES: Installation report states screened interval 10-20 ft bgs = 10ft screen. Assume top of screen at ~12.7 ft btoc. DTW 7/3 = 10.90, possibly drowned screen. Target 12.7-13.7 ft btoc for pump intake.
Historic flowrate ~430mL/min. PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI | Turbidimeter | Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-33 WELL ID: TS1-33Q SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: cloudy 65°F
DATE: ~~1045~~ 7/11/19
START TIME: 1045
END TIME: 1200

WELL CONDITION: good
DAMAGE PRESENT: None
HEIGHT OF STICKUP (ags): 2.0 ft
TOTAL DEPTH (btoc): 18.82 ft
DEPTH TO WATER (btoc): 11.50
HEIGHT OF WATER COLUMN (feet): 7.32
1 WELL VOLUME (gal): 1.2
3 WELL VOLUMES (gal): 3.7
DROWNED SCREEN? NO

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): 1.75" QED BLADDER
SAMPLING APPARATUS: TUBING
TUBING SIZE / TYPE: 0.25"x0.375" FEP

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA

EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 200 mL/min	Depth at Purge: 14.0'
Max sample rate: 200 mL/min	Depth at Sample: 14.0'

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	4.93	502	13.2	1.34	1.58	
Average	5.98	287	-14.2	1.1	1.58	0.37
Highest Observed	6.62	502	13.2	1.56	1.58	0.37
Lowest Observed	4.93	0.681	-33.7	0.4	1.58	0.37

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1054				Began pumping							
1055		11.28	.22	water at surface						cloudy	slight
KT ~~to~~ 1100		11.48	.42	YSI filled							
1102		11.62	0.12	10.42	6.10	301 ✓	164.4 ✓	2.50	9.82	clear	slight
1105		11.73	.23	10.10	6.23 ✓	299 ✓	156.9 ✓	1.57	6.62	"	"
1108		11.75	.25	9.77	6.31 ✓	300 ✓	152.2 ✓	1.24	2.69 ✓	"	"
1111		11.83	.33	9.62	6.35 ✓	300 ✓	149.3 ✓	1.05	2.23 ✓	"	"
1114	4L	11.89	.36	9.32	6.40 ✓	297 ✓	145.9 ✓	0.91	2.14 ✓	"	"
				Stability							
			KT								

FINAL PURGE DATA: START TIME: 1054 END TIME: ~~1128~~ 1145 CUMULATIVE VOLUME: 1.5gal MAX FLOWRATE WITH STABLE DRAW DOWN: 200 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, none, slight POC odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	PAH SW8270D SIM							Remarks
SRF33-TS33Q-0719	7/11/19	1115	GW	15	MS/MSD	3	2							Added volume for MS/MSD
				5 NM		3 NM	2 NM							~~duplicate left~~

SAMPLING NOTES: Scoped 7/3. Top of screen ~8.5-9 ft btoc. DTW 7/3 = 10.86 ft btoc. Likely not a drowned screen. Target 1ft below top of water for pump intake.

Historic flowrate 400 mL/min.

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-33 WELL ID: TS1-33UR SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: overcast, ~65°F
DATE: 7/11/19
START TIME: 1430
END TIME: 1555

WELL CONDITION: Good
DAMAGE PRESENT: None
HEIGHT OF STICKUP (ags): 2.3 ft
TOTAL DEPTH (btoc): 15.57 ft
DEPTH TO WATER (btoc): 9.42
HEIGHT OF WATER COLUMN (feet): 6.15
1 WELL VOLUME (gal): 1.05
3 WELL VOLUMES (gal): 3.15
DROWNED SCREEN?: NO

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Bladder
SAMPLING APPARATUS: QED 1.75"
TUBING SIZE / TYPE: Teflon-lined
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

IF PRODUCT IS PRESENT DESCRIPTION: ~~N/A~~ Sheen observed
DEPTH TO PRODUCT (btoc): N/A THICKNESS OF PRODUCT (feet): N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 130 mL/min	Depth at Purge: 11.5 ft
Max sample rate: 130 mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	N/A	N/A	N/A	N/A	N/A	N/A
Average	N/A	N/A	N/A	N/A	N/A	N/A
Highest Observed	N/A	N/A	N/A	N/A	N/A	N/A
Lowest Observed	N/A	N/A	N/A	N/A	N/A	N/A

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1454	0.05	9.55	0.13	12.94	6.37	384	190.3	1.74	55.8	yellow	strong POL
1457	0.15	9.66	0.23	12.69	6.46	307	169.0	1.14	13.6	yellow tint	POL
1501	0.25	9.80	0.38	12.63	6.37	307	152.8	0.66	8.95	"	"
1504	0.45	9.85	0.43	12.79	6.40	306	141.8	0.61	6.91	"	"
1507	0.605	9.90	0.48	12.94	6.48	271	133.6	0.50	7.70	"	"
1510	0.85	9.97	0.55	13.05	6.49	290	127.8	0.47	8.45	"	"
1513	1.00	10.07	0.65	13.02	6.51	298	124.2	0.49	11.5	"	"
				STABILIZED							

FINAL PURGE DATA: START TIME: 1452 END TIME: 1525 CUMULATIVE VOLUME: 1.50 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 125 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) yellow tint, sheen, POL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC 8260C/D	PAH 8270D SIM							Remarks
SRF133-TS133UR-0119	7/11/19	1520	GW	5	—	3	2							

SAMPLING NOTES: Installation Diagram states screened interval 3-13 ft bgs. Assume screened interval begins ~5.3 ft btoc. DTW 7/3 = 9.11 ft btoc. Not a drowned screen. Target top 1 ft of water column for pump intake. No historic flowrate information. SOCK REPLACED PURGE & DECON GAL'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-33 WELL ID: FS1-33F SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: Smokey 75°F
DATE: 7/9/18
START TIME: 1615
END TIME: 1745

WELL CONDITION: good
DAMAGE PRESENT: none
HEIGHT OF STICKUP (ags): 2.75 ft
TOTAL DEPTH (btoc): 45.22 ft
DEPTH TO WATER (btoc): 28.30'
HEIGHT OF WATER COLUMN (feet): 16.92
1 WELL VOLUME (gal): 2.9
3 WELL VOLUMES (gal): 8.6
DROWNED SCREEN?: YES

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low Flow Bladder pump
SAMPLING APPARATUS: QED 1.75" Stainless steel
TUBING SIZE / TYPE: Teflon lined Poly

IF PRODUCT IS PRESENT: DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA
EQUIPMENT DECON PROCEDURE: Alconox + DI Rinse

FLOW RATE (mL/min): 200
Max purge rate with stable drawdown: 200 mL/min
Max sample rate: 200 mL/min
SAMPLE PORT DEPTH (btoc)
Depth at Purge: 34'
Depth at Sample: 34'
1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.88	995	-56	1.69	2.29	
Average	6.64	714	-143	1.19	2.29	0.8
Highest Observed	6.88	1146	-56	1.69	2.29	0.8
Lowest Observed	6.25	1.663	-317.4	0.51	2.29	0.8

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1638	—	27.80	—	began pumping							
1643	—	28.79	.45	water flowing							
1645		29.35	1.25	Attached YSI					12.6	clear	None
1649	0.3	29.57	1.27		5.18	32	299.7	11.0 KT	10.3	"	"
1652	0.5	29.77	1.47	12.07	5.18	29	308.8	7.40	9.00	"	"
1655	0.8	29.80	1.5	11.53	5.44	27 ✓	296.5 ✓	6.40	6.13	" ✓	" ✓
1658	1.0	29.93	1.63	11.23	5.59 ✓	27 ✓	296.6 ✓	5.44	5.99	" ✓	" ✓
1701	1.3	29.96	1.66	11.16 ✓	5.74 ✓	28 ✓	291.2 ✓	4.79	5.84	" ✓	" ✓
1704	1.5	29.98	1.68	11.13	5.85	30	276.0	4.05	6.06	" ✓	" ✓
1707	1.6	29.99	1.69	11.01	5.90	32	270.0	3.90	6.04		
					✓	✓	✓		✓		
				Stability							

FINAL PURGE DATA: START TIME: 1638 END TIME: 1721 CUMULATIVE VOLUME: 1.6 MAX FLOWRATE WITH STABLE DRAW DOWN: 200

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, none

Sample ID	Date	Time	Matrix	Containers	QC	VOC HCl	PAH							Remarks
FS133F-0714	7/9	1710	GW	3	—	X								
FS133F-0714	"	1720	"	2	—		X							
FS133FZ-0714	"	1720	"	3	DUP	X								
FS133FZ-0714	↓	1720	↓	2	DUP		X							

SAMPLING NOTES: Scoped 7/3. Screened interval starts ~40 ft btoc. DTW 7/3 = 28.10 Ft btoc, likely drowned screen. Target 40-41 Ft btoc for pump intake. Historic flowrate <120 mL/min.

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-33 **WELL ID:** FS1-33H **SHEET** 1 **OF** 1

PROJECT NAME	2019 SRF Contaminated Sites GWM	WELL CONDITION	Good -
CLIENT	Hilcorp Alaska, LLC	DAMAGE PRESENT	Slightly jacked
SAMPLER(S)	KT + NM	HEIGHT OF STICKUP (ags)	2.5 ft
		TOTAL DEPTH (btoc)	42.40 ft
WEATHER / TEMPERATURE	Cloudy	DEPTH TO WATER (btoc)	25.50 ft
		HEIGHT OF WATER COLUMN (feet)	16.90'
DATE	7/11/19	1 WELL VOLUME (gal)	2.9
START TIME	1600	3 WELL VOLUMES (gal)	8.10
END TIME	1625	DROWNED SCREEN?	UNKNOWN

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER):	GW	IF PRODUCT IS PRESENT	DESCRIPTION: N/A
COLLECTION METHOD (PUMP TYPE, OTHER):	Peri pump	DEPTH TO PRODUCT (btoc) N/A	THICKNESS OF PRODUCT (feet) N/A
SAMPLING APPARATUS:	Peri pump + Hydrasleeve for VOC's		
TUBING SIZE / TYPE:	0.17 x 0.25	EQUIPMENT DECON PROCEDURE:	N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 130 mL/min (170)	Depth at Purge: 35 ft
Max sample rate: 170	Depth at Sample: 35

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.69	417	-63.3	1.1	N/A	N/A
Average	7.22	383	-181	1.1	N/A	N/A
Highest Observed	7.75	417	-63.3	1.1	N/A	N/A
Lowest Observed	6.69	349	-298.7	1.1	N/A	N/A

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1615				began pumping							
		25.86							4.80		
1623		25.98									
1624	0.10	26.02	0.52	10.43	6.06	264	171.5	3.21	3.65	Clear Yellow	POL
1627	0.20	26.02	0.52	10.00	6.15	268	152.3	2.26	2.33	"	"
1630	0.30	26.02	0.52	9.69	6.23	307	118.4	1.65	2.28	"	"
1633	0.40	26.11	0.61	9.21	6.31	333	108.2	1.46	2.30	"	"
1636	0.50	26.13	0.63	9.26	6.39	354	90.8	1.28	1.90	"	"
1639	0.60	26.11	0.61	9.19	6.42	364	79.5	1.10	1.36	"	"
1641	0.70	26.11	0.61	9.32	6.44	372	72.6	1.06	4.78	"	"
1644	0.80	26.13	0.63	9.34	6.47	383	64.8	1.05	2.08	"	"
1647	0.95	26.13	0.063	9.20	6.48	389	58.6	1.00	1.50	"	"
1650	1.05	26.13	0.63	9.22	6.49	395	51.0	0.93	1.24	"	"

FINAL PURGE DATA: START TIME: 1615 END TIME: 1658 CUMULATIVE VOLUME: 1.05 MAX FLOWRATE WITH STABLE DRAW DOWN: 170

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) CLEAR W/YELLOW TINT, POL ODOR

Sample ID	Date	Time	Matrix	Containers	QC	VOC HCL	PAH							Remarks
SRF133-TS13BH-0719	7/11	1655	GW	5		3	2							

SAMPLING NOTES: Do not know screened interval and did not scope due to presence of product on inside of casing. No product signal at gauging no product on probe. Nearby wells screened at 37 and 40 ft btoc, 5ft screen would start ~ 37.5 ft btoc, 10ft around 32.5 ft btoc. 37.5 ft btoc more in line with nearby wells - target 37.5 ft btoc for pump intake. Historic flowrate < 200 mL/min.

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-33 WELL ID: FS1-33S SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: misting, ~55°F
DATE: 7/11/19
START TIME: 0915
END TIME: 1030

WELL CONDITION: Poor
DAMAGE PRESENT: Monument severely damaged
HEIGHT OF STICKUP (ags): 1.5 ft
TOTAL DEPTH (btoc): 47.85 ft
DEPTH TO WATER (btoc): 26.20 ft
HEIGHT OF WATER COLUMN (feet): 21.65'
1 WELL VOLUME (gal): 3.7
3 WELL VOLUMES (gal): 11.0
DROWNED SCREEN?: YES

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Peri Pump
IF PRODUCT IS PRESENT DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A THICKNESS OF PRODUCT (feet): N/A
SAMPLING APPARATUS: HYDRASLEEVE FOR VOC, TEFLON TUBING FOR PAH
TUBING SIZE / TYPE: 0.17" x 0.25" FEP EQUIPMENT DECON PROCEDURE: N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 50 mL/min	Depth at Purge: 32.5 ft
Max sample rate ↓	Depth at Sample ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	7.05	244	-52.8	1.85		
Average	6.81	111.4	-12.1	3.40		10.7
Highest Observed	7.05	244	56.9	8.19		10.7
Lowest Observed	6.56	0.294	-52.8	0.17		10.7

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0932	0.25	27.70	1.50	7.61	1.68	56	505.7	6.54	3.86	clear	none
0936	0.50	28.25	2.05	7.91	2.42	56	468.2	6.14	6.39	"	"
0940	0.75	28.76	2.56	7.90	3.78	56	395.0	5.85	4.77	"	"
0945	1.00	29.15	2.95	8.09	4.34	56 ✓	369.0	5.74 ✓	4.89 ✓	"	"
0949	1.15	29.40	3.20	8.40	4.87	55	342.0	5.59	5.15	"	"
0952	1.25	29.38	3.18	8.75	5.11	55	325.2	5.38	3.65	"	"
0955	1.35	29.39	3.19	9.38	5.39	56	313.1	5.56	4.15	"	"
0959	1.45	29.34	3.14	9.57	5.60	56	297.0	5.32	3.90	"	"
1002	1.50	29.32	3.12	9.84	5.73	56	286.6	5.14	4.76	"	"
1006	1.65	29.30	3.10	10.02	5.83	57	275.5	5.03	4.18	"	"
1010	1.75	29.30	3.10	10.09	5.91	57	269.3	4.95	5.15	"	"
1013	1.85	29.25	3.05	10.11	5.91 ✓	57 ✓	267.8 ✓	4.88	4.61 ✓	"	"
				STABILIZED							

FINAL PURGE DATA: START TIME: 0930 END TIME: 1034 CUMULATIVE VOLUME: 2.25 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 50 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, no sheen, no odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	PAH SW8270D SIM							Remarks
SRFTS3-FS1335-0719	7/11/19	1015	GW	5	—	3	2							

SAMPLING NOTES: Scoped 7/3. Top of screen at ~ 37.5 ft btoc. DTW 7/3 25.86 ft btoc - drowned screen. Target 37.5-38.5 ft btoc for intake/collection. PVC tilted against monument (compressed). Historic flowrate <100 mL/min. ~~SOCK REPLACED~~ NM 11/22/19 PURGE & DECON GAC'D & DISCHARGED
* Due to monument damage, a bladder pump probably cannot fit down this well. Use peri/hydrasleeve.

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 1-33 **WELL ID:** FS1-33W **SHEET** 1 **OF** 1

PROJECT NAME	2019 SRF Contaminated Sites GWM	WELL CONDITION	Good
CLIENT	Hilcorp Alaska, LLC	DAMAGE PRESENT	None
SAMPLER(S)	AJM	HEIGHT OF STICKUP (ags)	2.0 Ft
		TOTAL DEPTH (btoc)	30.30 ft
WEATHER / TEMPERATURE	Sunny / hazy (due to nearby forest fire)	DEPTH TO WATER (btoc)	24.00 ft
		HEIGHT OF WATER COLUMN (feet)	6.30
DATE	7/9/19	1 WELL VOLUME (gal)	1.1
START TIME	1620	3 WELL VOLUMES (gal)	3.2
END TIME	1745	DROWNED SCREEN?	No

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER):	GW	IF PRODUCT IS PRESENT	DESCRIPTION: N/A
COLLECTION METHOD (PUMP TYPE, OTHER):	1.75" QED TEFLON	DEPTH TO PRODUCT (btoc) N/A	THICKNESS OF PRODUCT (feet) N/A
SAMPLING APPARATUS:	TUBING		
TUBING SIZE / TYPE:	0.25" x 0.375" FEP	EQUIPMENT DECON PROCEDURE:	ALCONOX SCRUB + D.I. RINSE

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 185 mL/mn	Depth at Purge: 25.5 Ft
Max sample rate: 200 mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.49	112	93.7	64	5.69	N/A
Average	6.49	112	93.7	64	5.69	N/A
Highest Observed	6.49	112	93.7	64	5.69	N/A
Lowest Observed	6.49	112	93.7	64	5.69	N/A

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1653	0.25	24.05	0.05	9.68	5.17	169	278.6	11.00	18.9	clear	none
1656	0.50	24.03	0.03	9.28	4.91	165	284.3	9.86	10.8	"	"
1659	0.75	24.05	0.05	9.06	5.16	1161	267.0	9.27	8.90	"	"
1702	1.00	24.01	0.01	9.17	5.68	157	237.0	9.02	8.55	"	"
1705	1.25	24.02	0.02	9.24	6.05	154	216.0	8.95	8.37	"	"
1708	1.50	24.02	0.02	9.05	6.27	151	202.8	8.97	8.97	"	"
1711	1.75	24.02	0.02	8.82	6.27 ✓	149 ✓	204.0	9.10 ✓	7.46 ✓		
					STABILIZED						

FINAL PURGE DATA: START TIME: 1638 END TIME: 1715 CUMULATIVE VOLUME: 2.5 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 185mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) Clear, no sheen, no odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	PAH SW8270D SIM							Remarks
SRF-133-FS133W-0719	7/9/19	1720	GW	5	—	3	2							

SAMPLING NOTES: Installation report states 10 Ft screen - assume top of screen at 20.3 ft btoc. DTW 7/3 = 23.72 Ft btoc. Not a drowned screen. Target top 1 Ft of water column for pump intake.

Historic flowrate >300mL/min. PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

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WELL GAUGING FORM

SITE ID: SRF Tank Setting 2-15 SHEET 1 OF 1

PROJECT NAME 2019 Kenai Contaminated Sites GWM
CLIENT Hilcorp Alaska, LLC
SAMPLER(S) AS, NM

DATE ~~7/2~~ 7/3/19
START TIME 0602
END TIME 0702
WEATHER / TEMPERATURE Clear skies, sunny, ~65°F

GAUGING DATA

WELL ID	TIME	PRODUCT PRESENT			DTW (feet)	TD (feet)	WELL CONDITION (lock, cap/plug, heave, etc.)	ODOR / PID (ppm)
		DTP (feet)	THICKNESS (feet)	REMOVED (gallons)				
TS2-15O	0652	—	—	—	11.55	21.28	Fair, pierced monument at middle	faint POL
TS2-15P	0636	—	—	—	12.51	27.71	Good, hard hit @ bottom	none
TS2-15Q	0628	—	—	—	16.67	32.88	Good, soft hit @ bottom	none
TS2-15R	0645	—	—	—	13.80	25.31	Fair, hard hit @ bottom	none
FS2-15B	0602	—	—	—	15.56	36.20	Good, slightly loose monument	yes, not HC

OTHER NOTES:

FS2-15B: *Scoped @ 0608. Tubing removed. Soft hit @ bottom. Stickup height: 3.0 ft ags. Black residue cleaned off probe. Odor present, but not HC odor. (see photo)
*Scoping: Observable adhesive on casing joint inside PVC @ ~1.2 ft. DTW: 14.8 ft. Water appears to be turbid above screen. Slots start: ~25.0 ft. Drowned screen. At ~26.5 ft, casing appears to be black w/ floating white particles in water. Black sediment @ bottom. Well cap found on ground surface and in deteriorated condition.

TS2-15Q: Stickup height: 2.25 ft ags. Small amount of brown residue on probe. Tubing removed.
TS2-15P: Stickup height: 2.50 ft ags. Tubing removed.
TS2-15R Stickup height: 2.25 ft ags. Broken lid - not able to be locked, Tubing removed.
TS2-15O: Stickup height: 1.50 ft ags. *Scoped at 0705. Tubing found at ~1-2 feet btoc. Tubing removed. While scoping. Top of screening: ~11.0 ft btoc. Screen is confirmed to not be drowned. Tubing removed. Lid did not close - hammered into place and now closes/locks.

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 2-15 WELL ID: TS2-15O SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: Foggy 65°F
DATE: 7/10/19
START TIME: 0915
END TIME: 1013

WELL CONDITION: good
DAMAGE PRESENT: none
HEIGHT OF STICKUP (ags): 1.5 ft
TOTAL DEPTH (btoc): 21.28 ft
DEPTH TO WATER (btoc): 11.90'
HEIGHT OF WATER COLUMN (feet): 9.38'
1 WELL VOLUME (gal): 1.6
3 WELL VOLUMES (gal): 4.8
DROWNED SCREEN?: No

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low Flow Bladder Pump
SAMPLING APPARATUS: QED 1.75"
TUBING SIZE / TYPE: Teflon lined tubing
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

IF PRODUCT IS PRESENT: DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA
THICKNESS OF PRODUCT (feet): NA

FLOW RATE (mL/min): 250
Max purge rate with stable drawdown: 250 mL/min
Max sample rate: 250 mL/min
SAMPLE PORT DEPTH (btoc)
Depth at Purge: 13.0'
Depth at Sample: 13.0'
1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.06	782	-37.5	1.02	2.98	
Average	7.3	955.4	-70.7	0.82	3.575	0.33
Highest Observed	8.11	2084	51.9	1.02	4.17	0.33
Lowest Observed	6.06	0.258	-226.4	0.45	2.98	0.33

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3%	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0945	—	11.85	—	Began pumping						clear	Slight
0946	.25	12.01	.11'	water to surface					7.28	clear	- "
0948	.75	12.25	.35	Attached YSI						"	- "
0951	1.5	12.20	.30	8.70	6.11	473	105.0	4.36	6.10	- "	- "
0954	2.25	12.29	.39	8.43	6.21	479	70.5	~~20.2~~ 2.24	5.89	- "	- "
0957	3	12.34	.44	8.05	6.26	489	39.1	1.72	4.56	- "	- "
1000	3.75	12.35	.45	8.03	6.28	492	30.0	1.65	4.44	- "	- "
1003	~~4.50~~ 4.5	12.34	.44	8.00	6.28	497	22.0	1.59		- "	- "
				Stability							

FINAL PURGE DATA: START TIME: 0945 END TIME: 1013 CUMULATIVE VOLUME: 1.5 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 250 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, none, slight odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC	1/2 AG							Remarks
SRF2S-TS2S0E-0719	7/10/19	0920	GW	5	DUP	3	2							
SRF2S-TS2SD-0719	7/10/19	1020	GW	5	—	3	2							

SAMPLING NOTES: Scoped 7/3. Top of screen ~11.5 ft btoc. DTW 7/3 = 11.5 ft btoc, but slots were still just above water. Target 11.5-12.5 ft btoc for pump intake. Historic flowrate 250mL/min (try a little lower).

PURGE & DECON WATER GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 2-15 **WELL ID:** TS2-15P **SHEET** 1 **OF** 1

PROJECT NAME	2019 SRF Contaminated Sites GWM	WELL CONDITION	Good
CLIENT	Hilcorp Alaska, LLC	DAMAGE PRESENT	PVC slightly tilted
SAMPLER(S)	NM	HEIGHT OF STICKUP (ags)	2.5 ft
		TOTAL DEPTH (btoc)	27.71 ft
WEATHER / TEMPERATURE	Foggy, ~50°F, misting	DEPTH TO WATER (btoc)	12.87 ft
		HEIGHT OF WATER COLUMN (feet)	14.84
DATE	7/10/19	1 WELL VOLUME (gal)	2.52
START TIME	0815	3 WELL VOLUMES (gal)	7.57
END TIME	0930	DROWNED SCREEN?	Yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER):	GW	IF PRODUCT IS PRESENT	DESCRIPTION: N/A
COLLECTION METHOD (PUMP TYPE, OTHER):	Low Flow Bladder	DEPTH TO PRODUCT (btoc) N/A	THICKNESS OF PRODUCT (feet) N/A
SAMPLING APPARATUS:	QED 1.75" S/N 12055		
TUBING SIZE / TYPE:	Teflon-lined tubing	EQUIPMENT DECON PROCEDURE:	Alconox and DI Rinse

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 150 mL/min	Depth at Purge: 18.0 ft
Max sample rate: 175mL/min	Depth at Sample: 18.0 ft

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.81	106	-207.1	6.82	N/A	N/A
Average	7.3	53.1	-73.45	6.945	N/A	0.65
Highest Observed	7.69	106	60.2	7.07	N/A	0.65
Lowest Observed	6.81	0.191	-207.1	6.82	N/A	0.65

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0841	0.50	13.97	1.10	10.19	4.18	154	271.2	8.67	8.11	clear	none
0846	0.75	14.20	1.33	9.97	4.51	137	356.0	8.24	5.53	"	"
0850	1.00	14.45	1.58	9.93	5.09	130	319.0	7.90	4.24	"	"
0853	1.25	14.55	1.68	9.96	5.29	126	307.4	7.96	3.47	"	"
0856	1.50	14.60	1.73	9.93 ✓	5.45	124	299.8	7.87 ✓	3.52 ✓	"	"
0900	1.75	14.70	1.85	9.92 ✓	5.61	123 ✓	289.0	7.74 ✓	2.18 ✓	"	"
				STABILIZED							

FINAL PURGE DATA: START TIME: 0835 END TIME: 0904 CUMULATIVE VOLUME: 2.0 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 150 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, no sheen, no odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	PFAS SW8327D SIM	Remarks
SRF215-TS215P-071919	7/10/19	~~0910~~ NM 0910	GW	15	MS/MSD	9	6	Added Volume for MS/MSD

SAMPLING NOTES: Historic report on installation States screened interval 15-25 ft bgs = 10 ft screen. Top of screen assumed to be 17.71 ft btoc. DTW on 7/3 = 12.51 ft btoc, likely drowned screen. Target 17.7-18.7 ft btoc for pump intake.

PURGE & DECON WATER GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 04D 8023 Turbidimeter 15652 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 2-15 WELL ID: TS2-15R SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: Foggy 65°F
DATE: 7/10/19
START TIME: 0810
END TIME: 0930

WELL CONDITION: good
DAMAGE PRESENT: None
HEIGHT OF STICKUP (ags): 2.25 ft
TOTAL DEPTH (btoc): 25.31 ft
DEPTH TO WATER (btoc): 14.14'
HEIGHT OF WATER COLUMN (feet): 11.17
1 WELL VOLUME (gal): 1.9
3 WELL VOLUMES (gal): 5.7
DROWNED SCREEN?: YES

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low Flow Bladder Pump
SAMPLING APPARATUS: QED 1.75"
TUBING SIZE / TYPE: Teflon lined Tubing

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA
EQUIPMENT DECON PROCEDURE: Alconox and DI water Rinse

FLOW RATE (mL/min): 250
Max purge rate with stable drawdown: 250 mL/min
Max sample rate: 250 mL/min
SAMPLE PORT DEPTH (btoc)
Depth at Purge: 16.5'
Depth at Sample: 16.5'
1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	7.82	137	-219.7	6.93	N/A	N/A
Average	7.7	68.6	-91.4	4.59	N/A	0.06
Highest Observed	7.82	137	37.0	6.93	N/A	0.06
Lowest Observed	7.66	0.187	-219.7	2.25	N/A	0.06

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal) L	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0826	—	14.14	—	Started Pumping							
0829	KT 3.	14.23	.09	water to surface							
0830	KT 4 3.5	14.24	.15						27.2	clear	No odor
0835	4.75	14.25	0.11	15.13	5.60	183	324.5	4.25	11.6	"	
0838	5.5	14.28	0.14	15.00	5.83 J	180 J	329.0 J	2.76	9.25	"	"
0841	6.25	14.31	0.17	14.92	5.86 J	178 J	327.2 J	2.36 J	8.59	"	"
0844	7	14.30	0.16	14.88	5.88 J	179 J	323.4 J	2.21 J	8.67	"	"
0847	7.75	14.28	0.14	14.88	5.89 J	179 J	320.1 J	2.14 J	8.23	"	"
0850	8.5 L	14.26	0.12	14.86	5.93 J	178 J	314.0 J	2.22 J	7.28	"	"
—			—	stability							
							2.5 gal	KT			

FINAL PURGE DATA: START TIME: 0826 END TIME: 0900 CUMULATIVE VOLUME: 2.25 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 250 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, none, no oder

Sample ID	Date	Time	Matrix	Containers	QC	VOC	VOC	IPA							Remarks
SRF2019-TS2-15R-0719	7/10	0850	GW	5		3	2								

SAMPLING NOTES: Installation report states screened interval 12-22 ft bgs = 10 ft screen. Top of screen assumed to be at 15.3 ft btoc. DTW 7/3 = 13.80 ft btoc. Likely drowned screen. Target 15.3-16.3 ft btoc for pump intake.

PURGE & DECON WATER GAC'D & DISCARDED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 2-15 **WELL ID:** FS2-15B **SHEET** 1 **OF** 1

PROJECT NAME	2019 SRF Contaminated Sites GWM	WELL CONDITION	Good
CLIENT	Hilcorp Alaska, LLC	DAMAGE PRESENT	None
SAMPLER(S)	KT, NM	HEIGHT OF STICKUP (ags)	3.0 ft
		TOTAL DEPTH (btoc)	36.20 ft
WEATHER / TEMPERATURE	overcast, ~65°F	DEPTH TO WATER (btoc)	15.73
		HEIGHT OF WATER COLUMN (feet)	20.47
DATE	7/10/19	1 WELL VOLUME (gal)	3.48
START TIME	~~0[illegible]~~ 1400	3 WELL VOLUMES (gal)	10.44
END TIME	~~1615~~ KT 1515	DROWNED SCREEN?	Yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER):	GW	IF PRODUCT IS PRESENT	DESCRIPTION: N/A
COLLECTION METHOD (PUMP TYPE, OTHER):	Bladder Pump	DEPTH TO PRODUCT (btoc) N/A	THICKNESS OF PRODUCT (feet) N/A
SAMPLING APPARATUS:	QED 1.75" SIN		
TUBING SIZE / TYPE:	Teflon-lined	EQUIPMENT DECON PROCEDURE:	Alconox and DI Rinse

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 170mL/min	Depth at Purge: 26.0 ft
Max sample rate: ↓	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	8.61	456	-400.2	0.61	N/A	N/A
Average	6.645	8.275	228.3	-222.7	0.455	N/A
Highest Observed	6.99	8.61	456.00	-45.2	0.61	N/A
Lowest Observed	6.3	7.94	0.685	-400.2	0.3	N/A

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1422	400 mL	16.70	1.03	13.06	6.45	184	169.3	1.90	37.2	clear	none
1425	0.25	17.25	1.52	11.87	6.49	178	161.3	1.17	31.3	"	"
1428	0.35	17.45	1.72	11.50	6.07	176	182.5	0.75	31.9	"	"
1431	0.45	17.62	1.89	11.40	6.07	178	173.4	0.67	17.5	"	"
1434	0.55	17.81	2.08	11.37	6.33	188	135.2	0.64	12.5	"	"
1437	0.65	17.90	2.11	11.36	6.33	216	119.5	0.85	8.53	"	"
1440	0.75	18.00	2.27	11.43	6.39	269	103.0	0.74	6.60	"	"
1443	0.95	18.10	2.37	11.50	6.45	285	93.8	0.73	6.70 ✓	"	"
1446	1.15	18.19	2.46	11.60	6.49 ✓	294	83.5	0.50	5.10	"	"
1449	1.30	18.20	~~2.47~~	11.72	6.50 ✓	309	75.3	0.44	4.10 ✓	"	"
1452	1.40	18.25	2.52	11.89	6.52	362	69.4	0.40	4.63	"	"
1456	1.80	18.31	2.58	11.64	6.53 ✓	406	60.8	0.39 ✓	4.19 ✓	"	"
					STABILIZED						

FINAL PURGE DATA: START TIME: 1420 END TIME: 1505 CUMULATIVE VOLUME: 2.0 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 170mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, none, none

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	PAH SW8270D SIM							Remarks
SRF2IS-FS2IS8-0719	7/10/19	1500	GW	5	—	3	2							

SAMPLING NOTES: Scoped 7/3. Top of screen ~ 25.5 ft btoc. DTW 7/3 = 15.56 ft btoc. Expect drowned screen. Target 25.5-26.5 ft btoc for pump intake. water may be turbid above screen. Flare Pit. Well cap added

PURGE & DECON WATER GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 04D8023 Turbidimeter 15652 Other

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WELL GAUGING FORM

SITE ID: SRF Tank Setting 3-4 SHEET 1 OF 1

PROJECT NAME 2019 Kenai Contaminated Sites GWM DATE 6/27/19 START TIME 1650

CLIENT Hilcorp Alaska, LLC END TIME 1850

SAMPLER(S) AS, NM WEATHER / TEMPERATURE Sunny, 72°F

GAUGING DATA

WELL ID	TIME	PRODUCT PRESENT: DTP (feet)	PRODUCT PRESENT: THICKNESS (feet)	PRODUCT PRESENT: REMOVED (gallons)	DTW (feet)	TD (feet)	WELL CONDITION (lock, cap/plug, heave, etc.)	ODOR / PID (ppm)
TS3-4D	1840	—	—	—	15.34	26.18	Good, well cap, Stickup height: 2.0 ft	none
~~TS3-4F~~ NM								
NM ~~TS3-4Z~~ TS3-4Z	1820	—	—	—	10.47	22.53	Good, well cap, Stickup ht: 1.3ft	none
TS3-4CC	1808	—	—	—	13.13	20.94	Fair, slightly tilted, missing well cap, replaced, stickup ht 2.0ft	none
TS3-4MM	1730	—	—	—	8.26	21.19	Heaved, well cap, stickup ht 2.8	none
TS3-4NN	1310	—	—	—	8.87	27.78	Heaved, missing cap, stickup ht 3.4ft, installed cap, removed	none
TS3-4OO	1300	—	—	—	7.31	22.94	Severely heaved, casing moves, stickup height 2.4 ft	none
TS3-4PP	1650	—	—	—	7.97	17.60	~~Good~~ Fair, marked, casing moves, stickup 2.5ft	none
FS3-4A	1755	—	—	—	14.20	37.48	Heaved, Concrete completely displaced, stickup 2.5ft [B]	
FS3-4B	1745	—	—	—	9.04	30.84	Heaved Monument, stickup ht 1.5ft, disturbed soil around [A]	none
FS3-4D	1827	10.96	unknown	—	~~16.~~ NM	—	Very heaved	yes
FS3-4F	1802	—	—	—	14.03	25.89	Fair, slight tilt, stickup 1.5ft, well cap	none
TS3-4Z	1320	—	—	—	12.41	23.98	Good, cap, well stickup 1.6ft	none

[A] Missing well cap, installed well cap

[B] well cap present, dark gray sediment on probe

OTHER NOTES:

TS3-4P: Faint POL odor on probe. Scoped 7/2/2019 - frayed tubing from ~4ft btoc

FS3-4D: Lowered probe 4 feet past DTP and could not reach water. No sock inserted. 1.25 inch pipe inside 2-inch Sch 40. Length unknown - plan to return and remove NM

TS3-4D: Product found on tape when removed from well starting at water level. LNAPL - Absorbent sock inserted.

↳ Unlike note in Work Plan, no obstruction was detected and no sock present. Condition was judged to be good 7/2/2019 - did not scope due to LNAPL.

FS3-4B: Tubing removed. Scoped 7/2/2019

FS3-4A: Monument loose and tilted. Scoped 7/2/2019

NM: NOT MEASURED

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-4 WELL ID: TS3-4CC SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: 80°F Smoky
DATE: 7/9/19
START TIME: 1330
END TIME: 1440

WELL CONDITION: Good
DAMAGE PRESENT: None
HEIGHT OF STICKUP (ags): 2.0 ft
TOTAL DEPTH (btoc): 20.94 ft
DEPTH TO WATER (btoc): 13.78'
HEIGHT OF WATER COLUMN (feet): 7.16'
1 WELL VOLUME (gal): 1.2
3 WELL VOLUMES (gal): 3.7
DROWNED SCREEN?: No

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low flow bladder pump
SAMPLING APPARATUS: QED 1.75" Stainless Steel
TUBING SIZE / TYPE: Teflon-lined Poly

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA

EQUIPMENT DECON PROCEDURE: Alconox & DI Rinse

FLOW RATE (mL/min): 250 275
Max purge rate with stable drawdown: 250 mL/min
Max sample rate: 250 mL/min
SAMPLE PORT DEPTH (btoc)
Depth at Purge: 15'
Depth at Sample: 15'
1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.77	2289	-122.6	1.05	15.2	
Average	5.66	852.2	-152.3	0.89	15.2	1
Highest Observed	6.77	2289	-11.8	1.14	15.2	1
Lowest Observed	3.76	1.7	-322.6	0.47	15.2	1

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal/L)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1350	—	13.78	—	Started pumping					17.2	clear	Stagnant
1354	1.1	14.08	0.3	Hooked up YSI							
1357	1.425	14.35	0.57	13.13	5.61	190	177.0	1.92	10.3	clear	Stagnant
1400	2.75	14.55	0.77	12.31	4.92	199	180.0	1.11	6.39	"	"
1403		14.81	1.03	12.14	5.18	199 ✓	157.0	0.88 ✓	6.18	"	"
1406		14.95	1.17	12.04	5.41	200 ✓	137.0	0.78 ✓	6.07	"	"
1409		14.87	1.09	12.08	5.68	205 ✓	118.0	0.70 ✓	6.05	"	"
1412	4.5 L	14.90	1.12	12.15	5.85	205 ✓	113.4	0.62 ✓	6.03	"	"
—			—	stabelized							

FINAL PURGE DATA: START TIME: 1350 END TIME: 1420 CUMULATIVE VOLUME: 1.5gal MAX FLOWRATE WITH STABLE DRAW DOWN: 250 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear no sheen stagnant odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC HCl	VOC Non-HCl							Remarks
SRF34-TS34CC-0719	7/9	1420	GW	3		X								
SRF34-TS34CC-0719	7/9	1420	GW	2			X							

SAMPLING NOTES: Scoped 7/2 - no obstruction found ~18ft as noted from 2017. Top of screen ~10.5ft. DTW 6/27 13.13 — likely not a drowned screen. Target 1ft below top of water for pump intake.

PURGE & DECON GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-4 **WELL ID:** TS3-4MM **SHEET** 1 **OF** 1

PROJECT NAME	2019 SRF Contaminated Sites GWM	WELL CONDITION	Fair
CLIENT	Hilcorp Alaska, LLC	DAMAGE PRESENT	Concrete base loose
SAMPLER(S)	NM	HEIGHT OF STICKUP (ags)	2.8 ft
		TOTAL DEPTH (btoc)	21.19 ft
WEATHER / TEMPERATURE	Sunny, ~80 °F	DEPTH TO WATER (btoc)	9.41 ft
		HEIGHT OF WATER COLUMN (feet)	11.78 ft
DATE	7/9/19	1 WELL VOLUME (gal)	2.00
START TIME	1045	3 WELL VOLUMES (gal)	6.00
END TIME	1720	DROWNED SCREEN?	Yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
(2" Sch40)	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER):	GW	IF PRODUCT IS PRESENT	DESCRIPTION: N/A
COLLECTION METHOD (PUMP TYPE, OTHER):	Low-Flow Bladder	DEPTH TO PRODUCT (btoc) N/A	THICKNESS OF PRODUCT (feet) N/A
SAMPLING APPARATUS:	QED 1.75" S/N 12055		
TUBING SIZE / TYPE:	Teflon-lined tubing	EQUIPMENT DECON PROCEDURE:	Alconox and DI Rinse

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 105 mL/min	Depth at Purge: 11 ft
Max sample rate: 200 mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	5.11	103	84.7	4.3	N/A	N/A
Average	5.34	51.6	124.0	2.92	N/A	0.24
Highest Observed	5.57	103	163.2	4.3	N/A	0.24
Lowest Observed	5.11	0.15	84.7	1.53	N/A	0.24

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1130	0.50	10.92	1.51	9.90	4.47	90	321.6	5.10	5.21	clear	none
1133	0.75	9.75	0.34	10.48	4.98	92	279.0	4.35	18.8	"	"
1136	0.95	9.75	0.34	10.50	5.53	99	248.0	4.06	19.4	"	"
1139	1.00	9.85	0.44	9.72	5.68	104	232.6	3.65	13.6	"	"
1142	1.25	9.91	0.50	9.04	5.17	103	257.2	2.90	25.0	"	"
1146	1.50	9.89	0.48	9.13	5.37	104 ✓	236.8	2.81	14.3	"	"
1149	1.75	9.92	0.51	9.10	5.48	105 ✓	229.1	2.64	9.81	"	"
1152	2.00	9.92	0.51	9.11 ✓	5.54	106 ✓	222.7	2.47	9.29	"	"
1155	2.25	9.94	0.53	9.08 ✓	5.55 ✓	106 ✓	219.1 ✓	2.33	10.2	"	"
—	—	—	—	—	STABILIZED	—	—	—	—	—	—

FINAL PURGE DATA: START TIME: 1115 END TIME: 1158 CUMULATIVE VOLUME: 3.0 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 125 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, no sheen, no odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	PAH SW8270D SIM							Remarks
SRF3H-TS3MM-0719	7/9/19	1205	GW	5	—	3	2							

SAMPLING NOTES: Report on installation states screened interval 8-18 ft bgs, 10 ft screen. Assume top of screen is ~11 ft btoc. DTW 6/27 was 8.26 ft; screen likely drowned. Target 11-12 ft btoc for pumping.

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-4 WELL ID: TS3-400 SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: 80° smokey
DATE: 7/9/19
START TIME: 1130
END TIME: 1245

WELL CONDITION: casing jacked
DAMAGE PRESENT: loose monument
HEIGHT OF STICKUP (ags): 2.8 ft
TOTAL DEPTH (btoc): 22.94 ft
DEPTH TO WATER (btoc): 8.51'
HEIGHT OF WATER COLUMN (feet): 14.43
1 WELL VOLUME (gal): 2.5
3 WELL VOLUMES (gal): 7.4
DROWNED SCREEN? YES

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low Flow Bladder Pump
SAMPLING APPARATUS: QED 1.75" Stainless Steel
TUBING SIZE / TYPE: Teflon lined Poly
EQUIPMENT DECON PROCEDURE: Alconox & DI Rinse

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
350	
Max purge rate with stable drawdown: 350 mL/min	Depth at Purge: 14'
Max sample rate: 350 mL/min	Depth at Sample: 14'

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	7.43	25	-110.4	12.61		
Average	6.30	12.5	28.6	8.73		0.03
Highest Observed	7.43	25	167.5	12.61		0.03
Lowest Observed	5.16	0.036	-110.4	4.85		0.03

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal or L)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1140	1.4	8.51	—	Began pumping							
1144		8.70	.19						530	cloudy	No odor
1148		8.65	.14	Heard animal in woods left					662	"	"
1155		8.75	.24	Returned to well					315	"	"
1159	6.7	8.90	.29						177	"	"
1205		8.90	.29	6.42	4.86	31	270.9 ✓	16.20	103	Slightly cloudy	"
1209		8.75	.24	6.08 ✓	5.10	22 ✓	264.4 ✓	12.97 ✓	87.3	"	"
1211		8.75	.24	6.01 ✓	5.28	20 ✓	262.8 ✓	12.69 ✓	75.4	"	"
1214	11.9L	8.75	.24	5.97 ✓	5.36	20 ✓	262.8 ✓	12.40 ✓	68.6	"	"
				Stabilized							

FINAL PURGE DATA: START TIME: 1140 END TIME: 1225 CUMULATIVE VOLUME: 11.9L MAX FLOWRATE WITH STABLE DRAW DOWN: 350 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) Slightly Cloudy, No odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC	PAH							Remarks
SRF34-TS3400-0719	7/9	1200	GW	3		X								
SRF34-TS3400-0719	7/9	1200	↓	2			X							

SAMPLING NOTES: Historic installation report states screened interval 8-18 ft bgs = 10ft screen. screened interval ~13-23 ft btoc. DTW 6/27 = 7.31, likely drowned screen. Target 13-14 ft btoc for pump intake. Severely heaved.

PURGE & DECON GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-4 WELL ID: TS3-4P SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: Smokey 75°F
DATE: 7/9/19
START TIME: 0945
END TIME: 1120

WELL CONDITION: good
DAMAGE PRESENT: None
HEIGHT OF STICKUP (ags): 1.3 ft
TOTAL DEPTH (btoc): 22.53 ft
DEPTH TO WATER (btoc): 11.60
HEIGHT OF WATER COLUMN (feet): 10.93
1 WELL VOLUME (gal): 1.9
3 WELL VOLUMES (gal): 5.6
DROWNED SCREEN?: YES

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Bladder Pump low Flow
SAMPLING APPARATUS: QED 1.75" Stainless Steel
TUBING SIZE / TYPE: Teflon-lined Poly
EQUIPMENT DECON PROCEDURE: Alconox + DI Rinse

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA
THICKNESS OF PRODUCT (feet): NA

FLOW RATE (mL/min): 200
Max purge rate with stable drawdown: 200mL/min
Max sample rate: 200 mL/min
SAMPLE PORT DEPTH (btoc)
Depth at Purge: 14'
Depth at Sample: 14'
1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.39	313	-6.8	1.8	5.89	
Average	6.49	153.9	-15.0	1.19	5.89	0.4
Highest Observed	6.85	313	0.3	1.8	5.89	0.4
Lowest Observed	6.24	2.71	-38.5	0.77	5.89	0.4

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal) L	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1001	0.0	11.60	-	Started	pumping						
1004	0.6	12.25	.65	Hooked up	YSI						
1007	1.2	12.85	1.25	8.17	6.18	534	185.3	3.28	12.4	clear	None
1011	2.0	12.90	1.30	7.52	6.31	516	174.0	2.32	6.34	"	"
1014	2.6	12.95	1.35	7.42	6.36	520	162.0	1.97	5.98		
1017	3.2	12.95	1.35	7.17	6.39 ✓	522 ✓	154.5 ✓	1.77 ✓	3.15		
1020	3.8	12.89		7.12	6.41 ✓	515 ✓	147.0 ✓	1.65 ✓	3.29		
1023	4.4	12.95	1.35	7.17	6.43 ✓	504 ✓	137.9 ✓	1.42 ✓	5.53	↓	↓
		Stabelized									

FINAL PURGE DATA: START TIME: 1001 END TIME: 1040 CUMULATIVE VOLUME: 4.5L MAX FLOWRATE WITH STABLE DRAW DOWN: 200 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, none, none

Sample ID 0714	Date	Time	Matrix	Containers	QC	AK Petro	PAH	Remarks
SRF34-TS34P-0714	7/9	1040	GW	3	—	X		
SRF34-TS34P-0714	7/9	1040	"	2	—		X	
SRF34-TS34PZ	7/9	1050	"	3	DUP	X		
SRF34-TS34PZ	7/9	1050	↓	2	DUP		X	

SAMPLING NOTES: top of screen ~12.5-13 ft → screened interval 12.5-22.5. DTW at gauging 10.47 ft btoc, possibly drowned screen. Target 12.5-13.5 ft btoc for pump intake.

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-4 **WELL ID:** FS3-4A **SHEET** 1 **OF** 1

PROJECT NAME	2019 SRF Contaminated Sites GWM	WELL CONDITION	Poor
CLIENT	Hilcorp Alaska, LLC	DAMAGE PRESENT	Loose monument
SAMPLER(S)	NM	HEIGHT OF STICKUP (ags)	2.5 ft
		TOTAL DEPTH (btoc)	37.48 ft
WEATHER / TEMPERATURE	Hazy (due to forest fire) ~70°F	DEPTH TO WATER (btoc)	15.08 ft
		HEIGHT OF WATER COLUMN (feet)	22.40'
DATE	7/9/19	1 WELL VOLUME (gal)	3.8
START TIME	0710	3 WELL VOLUMES (gal)	11.4
END TIME	0922	DROWNED SCREEN?	Yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER):	GW
COLLECTION METHOD (PUMP TYPE, OTHER):	Low-Flow Bladder Pump
SAMPLING APPARATUS:	QED 1.75" Stainless Steel S/N 12559
TUBING SIZE / TYPE:	Teflon-lined Poly
EQUIPMENT DECON PROCEDURE:	Alconox + DI Rinse

IF PRODUCT IS PRESENT	DESCRIPTION: N/A	
DEPTH TO PRODUCT (btoc)	N/A	THICKNESS OF PRODUCT (feet) N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 85mL/min	Depth at Purge: 28.0 ft
Max sample rate: 125mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	7.15	779	-108.9	0.63	36.8	N/A
Average	7.08	394.3	-102.8	0.61	36.8	0.54
Highest Observed	7.19	779	-69	1	36.8	0.54
Lowest Observed	6.9	0.808	-130.6	0.21	36.8	0.54

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0750	0.10	15.52	0.44	10.31	6.45	.395	206.6	5.00	13.7	clear	slight PDL
0756	0.25	15.60	0.60	9.04	6.75	377	172.4	2.89	12.1	"	"
0759	0.35	15.70	0.62	8.97	6.80	374	103.2	2.09	10.8	"	"
0802	0.50	15.71	0.63	8.94	6.84	375	157.6	1.87	8.53	"	"
0805	0.65	15.78	0.70	8.88	6.87	375	147.8	1.75	6.91	"	"
0808	0.85	15.80	0.72	8.76	6.89✓	380✓	134.0	1.73✓	7.03✓	"	"
				STABILIZED							

FINAL PURGE DATA: START TIME: 0740 END TIME: 0810 CUMULATIVE VOLUME: 1.25gal MAX FLOWRATE WITH STABLE DRAW DOWN: 85mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) Clear, no sheen, slight PDL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	PAH SW8270D SIM							Remarks
SRF34-FS34A-0719	7/9/19	0820	GW	15	MS/MSD	9	6							MS/MSD

SAMPLING NOTES: Scoped 7/2. Top of screen ~27.5 ft btoc. DTW 6/27 14.20 ft btoc – likely drowned screen. Target 27-28 ft btoc for pump intake.

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 16H101295 Turbidimeter 11741 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-4 WELL ID: FS3-4B SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: smokey 70°F
DATE: 7/9/19
START TIME: 0715
END TIME: 0900

WELL CONDITION: good
DAMAGE PRESENT: None
HEIGHT OF STICKUP (ags): 1.5 ft
TOTAL DEPTH (btoc): 30.84 ft
DEPTH TO WATER (btoc): 10.04'
HEIGHT OF WATER COLUMN (feet): 20.80'
1 WELL VOLUME (gal): 3.5
3 WELL VOLUMES (gal): 10.6
DROWNED SCREEN?: yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Bladder pump low flow
SAMPLING APPARATUS: QED 1.75" Stainless steel
TUBING SIZE / TYPE: Teflon-lined Poly
EQUIPMENT DECON PROCEDURE: Alconox + DI Rinse

IF PRODUCT IS PRESENT: DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA

KT 200 175 FLOW RATE (mL/min)
Max purge rate with stable drawdown: 175 mL/min
Max sample rate: ↓
SAMPLE PORT DEPTH (btoc)
Depth at Purge: 22'
Depth at Sample: 22'
1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	7.89	538	-299.8	0.91	N/A	N/A
Average	7.49	269.4	-213.5	2.66	N/A	0.11
Highest Observed	7.89	538	-127.2	4.4	N/A	0.11
Lowest Observed	7.08	0.755	-299.8	0.91	N/A	0.11

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ±0.2°C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0740	—	9.75	—	began pumping							
0745	—	10.70	.66	water at surface							
0751	1.05L	10.70	.66	YSI Filled							
0753	1.35L	11.0	.96	10.01	5.48	420	162.5	3.87	21.0	slightly cloudy	stagnant
0756	1.875L	11.15	1.11	9.09	5.69	378	130.4	2.82	10.2	clear	" "
0759	2.4L	11.25	1.20	8.91	5.92	392	107.0	2.52	7.36	" "	" "
0803	2.9	11.35	1.30	8.77	6.13	406	85.2	2.87	8.35	" "	" "
0808	3.5	11.44	1.39	8.74	6.34	387	60.0	3.80	7.23	" "	" "
0812	4.0	11.50	1.45	8.87	6.49	368	42.5	3.40	5.21	" "	" "
0816	5.1	11.58	1.50	8.86	6.56	358	39.7	3.30	5.16	" "	" "
0819	5.95L	11.60	1.50	8.84	6.55	363	38.2	3.40	5.05	" "	" "
				Stabelized							

FINAL PURGE DATA: START TIME: 0740 END TIME: 0827 CUMULATIVE VOLUME: 1.75gal MAX FLOWRATE WITH STABLE DRAW DOWN: ~~2~~ KT 175 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, nosheen, stagnant

Sample ID -0719	Date	Time	Matrix	Containers	QC	VOC HCl	PAH							Remarks
SRF34-FS34B	7/9	0825	GW	3		X								
SRF34-FS34B	7/9	0825	GW	2			X							

SAMPLING NOTES: Scoped 7/2. Top of screen ~20.8 ft btoc. DTW 6/27 = 9.04 ft btoc, likely drowned screen. Target 21-22 ft btoc for pump intake.

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-4 WELL ID: FS3-4F SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: hazy (from nirby forest fire) sunny, ~80°F
DATE: 7/9/19
START TIME: 1330
END TIME: 1500

WELL CONDITION: Fair
DAMAGE PRESENT: tilted PVC
HEIGHT OF STICKUP (ags): 1.5ft
TOTAL DEPTH (btoc): 25.89 ft
DEPTH TO WATER (btoc): 15.06 ft
HEIGHT OF WATER COLUMN (feet): 10.83
1 WELL VOLUME (gal): 1.84
3 WELL VOLUMES (gal): 5.52
DROWNED SCREEN?: YES

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low Flow Bladder
SAMPLING APPARATUS: QED 1.75" Stainless Steel S/N 12055
TUBING SIZE / TYPE: Teflon lined tubing
EQUIPMENT DECON PROCEDURE: Alconox + DI Rinse

IF PRODUCT IS PRESENT: DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A THICKNESS OF PRODUCT (feet): N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 160mL/min	Depth at Purge: 17.0ft
Max sample rate: 200mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.89	693	-78.4	0.78	3.19	N/A
Average	6.80	316.9	-26.6	0.77	3.19	0.02
Highest Observed	6.94	693	38.4	1.23	3.19	0.02
Lowest Observed	6.58	0.575	-78.4	0.3	3.19	0.02

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1410	0.25gal	15.16	0.10	15.71	6.05	108	265.7	10.57	5.18	clear	none
1413	0.50gal	15.18	0.12	13.97	6.22	101	266.0	9.41	2.97	"	"
1416	0.75gal	15.15	0.09	13.70	6.37	99	262.9	8.70	2.42	"	"
1419	1.00	15.17	0.11	13.56	6.48	99	260.1	8.43	1.53	"	"
1422	1.25	15.16	0.10	13.41	6.53	100	258.5	8.46	1.47	"	"
						Stabilized					

FINAL PURGE DATA: START TIME: 1400 END TIME: 1425 CUMULATIVE VOLUME: 2.0gal MAX FLOWRATE WITH STABLE DRAW DOWN: 160mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, no sheen, no odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	PAH SW8270D SIM							Remarks
SRF39-FS34F-0719	7/9/19	1430	GW	5	—	3	2							

SAMPLING NOTES: Scoped 7/2. Top of Screen ~ 15.5 ft btoc. DTW 6/27 = 14.03 ft btoc. Possibly drowned screen. Target 15.5-16.5 ft btoc for pump intake.
Well on ~1 ft mound.
PURGE & DECON GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 11A10295 Turbidimeter 11741 Other

WELL GAUGING FORM

SITE ID: SRF Tank Setting 3-9 | **SHEET 1 OF 1**

PROJECT NAME: 2019 Kenai Contaminated Sites GWM | DATE: 6/28/19 | START TIME: 1155 | END TIME: 1400

CLIENT: Hilcorp Alaska, LLC

SAMPLER(S): AS, NM | WEATHER / TEMPERATURE: sunny, 80°F

GAUGING DATA

WELL ID	TIME	PRODUCT PRESENT: DTP (feet)	PRODUCT PRESENT: THICKNESS (feet)	PRODUCT PRESENT: REMOVED (gallons)	DTW (feet)	TD (feet)	WELL CONDITION (lock, cap/plug, heave, etc.)	ODOR / PID (ppm)
TS3-9A	1351	15.74	~~3.32 NM~~		18.75	NM	Removed sock; completely*	POL
TS3-9CR	1321	—	—	—	19.43	27.20	Cut lock. Good. Stickup ht: 2.5ft	slight
TS3-9F	1328	—	—	—	19.56	30.82	Removed sock and flipped sock	none
TS3-9S	1246	—	—	—	15.67	29.62	Good, Stickup ht: 1.8ft	none
TS3-9T	1311	—	—	—	17.33	31.23	Good, Stickup ht: 2.0 ft	slight (on probe)
TS3-9U	1343	—	—	—	16.83	29.64	Good, Stickup ht: 2.3ft	none
TS3-9V	1257	—	—	—	9.21	24.80	Good, Stickup ht: 2.0ft	none
TS3-9AA	1338	—	—	—	16.97	33.80	Good, Stickup ht: 2.5ft	none
TS3-9BB	1304	—	—	—	18.22	37.51	Good, Stickup ht: 2.0ft	none
TS3-9CC	1233	—	—	—	9.86	21.93	Good. Stickup ht: 2.0 ft	none
TS3-9DD	1228	—	—	—	9.05	27.20	Good. Stickup ht: 2.5ft	none
FS3-9B	1216	—	—	—	14.73	22.45	Good. Stickup ht: 2.5ft*	none
FS3-9E	1155	11.91	0.29		12.20	NM	Removed and replaced sock.*	POL
FS3-9G	1221	—	—	—	11.68	24.80	Good, Stickup ht: 1.75ft*	none

OTHER NOTES: *

TS3-9A: Saturated. Replaced sock. Stickup height further: 2.5 ft. Product thickness based on tape: 1.32 ft

FS3-9E: TD not measured to prevent any equipment contamination.

FS3-9G: Casing leaning against monument. Scoped 7/1 - top of screen 19.5 ft btoc.

TS3-9CC: Mislabeled TS3-9T and corrected to TS3-9CC. Gray sediment on probe. Lid and brim broken, cannot be locked, tubing removed.

TS3-9S: Tubing removed.

TS3-9V: Two caps stuck in monument. Gray sediment on probe. Caps retrieved 7/1 TS3-9V. Scoped 7/1 - top of screen

TS3-9BB: Gray sediment on probe.

TS3-9T: Bailer located in monument. -15 ft screen - Scoped 7/1/2019. Product on camera Top of screen 16.5 ft

TS3-9CR: Well located on boundary of temporary secondary containment. Replace Lock. Tubing removed.

TS3-9F: Fair, cracked concrete base. Stickup height: 2.3 ft. Scoped 7/1, Top of screen 25 ft btoc. Trace product on probe/camera

TS3-9AA: Gray sediment on Probe.

TS3-9U: Sock flipped. No well cap. Scoped 7/1 - top of screen 19.5 ft btoc.

NM: NOT MEASURED

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 WELL ID: TS3-9AA SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: Sunny, 85°F
DATE: 6/30/2019
START TIME: 1520
END TIME: 1650

WELL CONDITION: Good
DAMAGE PRESENT: none
HEIGHT OF STICKUP (ags): 2.58 ft
TOTAL DEPTH (btoc): 33.80
DEPTH TO WATER (btoc): 17.10
HEIGHT OF WATER COLUMN (feet): 16.70
1 WELL VOLUME (gal): 2.84
3 WELL VOLUMES (gal): 8.52
DROWNED SCREEN?: yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low-Flow Bladder Pump
SAMPLING APPARATUS: QED 1.75" S/N
TUBING SIZE / TYPE: Teflon-lined
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

IF PRODUCT IS PRESENT: DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A
THICKNESS OF PRODUCT (feet): N/A

FLOW RATE (mL/min)
Max purge rate with stable drawdown: 50mL/min
Max sample rate: 150 mL/min
1 L = 0.264 gal 1 gal = 3.785 L

SAMPLE PORT DEPTH (btoc)
Depth at Purge: 24.0 ft
Depth at Sample: ↓

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.69	164	-43.2	2.17	2.51	N/A
Average	6.725	82.1205	-36.8	1.335	2.51	0.02
Highest Observed	6.76	164	-30.4	2.17	2.51	0.02
Lowest Observed	6.69	0.241	-43.2	0.5	2.51	0.02

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1608	0.25	17.28	0.18	16.80	6.43	178	-23.1	4.13	1.84	clear	POL
1616	0.26	17.30	0.20	17.00	6.43	179	-29.8	3.32	2.12	clear	POL
1619	0.27	17.30	0.20	16.77	6.43	180	-34.4	2.13	3.23	"	"
1622	0.30	17.31	0.21	15.64	6.44	180	-39.0	1.66	1.83	"	"
1625	0.35	17.31	0.21	14.69	6.45	178	-43.2	1.55	2.43	"	none
1627	0.40	17.32	0.22	14.02	6.45	175	-45.2	1.38	2.18	"	POL
1630	0.45	17.31	0.21	13.75	6.43	173	-44.6	1.21	1.49	"	POL
1634	0.50	17.32	0.22	13.42	6.44	172	-46.0	0.97	1.64	"	POL
				STABILIZED							

FINAL PURGE DATA: START TIME: 1605 END TIME: 1638 CUMULATIVE VOLUME: 0.75 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 50 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.)

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C ECI	PAH SW8270D SIM							Remarks
SRF39-TS39AA-0	6/30/19	1645	GW	5	—	3	2							

SAMPLING NOTES: screened interval 21-31 ft bgs (confirmed from 2002 Report)

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S): 67945-C2575, 63522-C2480

EQUIPMENT SERIAL NUMBERS: YSI 04D8023 Turbidimeter 15652 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 **WELL ID:** TS3-9BB **SHEET** 1 **OF** 1

PROJECT NAME	2019 SRF Contaminated Sites GWM	WELL CONDITION	good
CLIENT	Hilcorp Alaska, LLC	DAMAGE PRESENT	none
SAMPLER(S)	AS	HEIGHT OF STICKUP (ags)	2.0 ft ags
		TOTAL DEPTH (btoc)	37.51
WEATHER / TEMPERATURE	80° Sunny, Clear, Breezy (dusty)	DEPTH TO WATER (btoc)	18.40
		HEIGHT OF WATER COLUMN (feet)	19.11
DATE	6/30/2019	1 WELL VOLUME (gal)	3.25
START TIME	1500	3 WELL VOLUMES (gal)	9.75
END TIME	1745	DROWNED SCREEN?	Yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): Groundwater

COLLECTION METHOD (PUMP TYPE, OTHER): 1.75" Bladder pump SS

SAMPLING APPARATUS:

TUBING SIZE / TYPE: 0.25 x 3/8" Teflon-lined bonded

IF PRODUCT IS PRESENT DESCRIPTION: NA

DEPTH TO PRODUCT (btoc) NA THICKNESS OF PRODUCT (feet) NA

EQUIPMENT DECON PROCEDURE: Alconox + DI spray

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 75 mL/min unstable	Depth at Purge: 27.5 ft
Max sample rate: 75mL/min	Depth at Sample: 27.5 ft

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.87	435	-55	0.83	26.4	N/A
Average	6.723333	238.5176667	-10.13333333	1.03	17.9	0.15
Highest Observed	6.87	435	22.7	1.91	26.4	0.15
Lowest Observed	6.59	0.553	-55	0.35	9.4	0.15

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1550		18.30	0.10	Start pumping							
1555		18.70	0.3	first water - reduce pressure to min (~10 psi still 1 cfs)							
				clear water, hook up YSI - 1610 Drill - 18.80 ft btoc							
1632	0.3	18.85	0.45	13.28	6.77	291	-22.3	13.5	5.07	clear	none
1637	0.4	19.00	0.60	11.25	6.78	289	-26.7	14.3	3.74	clear	none
1642	0.5	18.95	0.55	11.30	6.79	290	-28.6	12.8	2.94	clear	none
1647	0.6	19.00	0.60	11.47	6.81	297	-32.8	11.4	2.49	clear	none
1652	0.7	18.99	0.59	11.49	6.81	302	-34.4	10.5	2.27	clear	none
1657	0.8	19.02	0.62	~~11.54~~	~~6.82~~	~~307~~	~~-35.4~~	~~10.4~~ AS	2.04	clear	none
				11.79	6.82	310	-35.8	10.2			
1700		stable w/ four parameters excluding temperature									

FINAL PURGE DATA: START TIME: 1550 END TIME: 1730 CUMULATIVE VOLUME: 0.9 MAX FLOWRATE WITH STABLE DRAW DOWN: 75 mL/min unstable

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) CLEAR, NO ODOR

Sample ID	Date	Time	Matrix	Containers	QC	Analysis / Preservative	VOC per YSI HCl	PAH						Remarks
~~TSRF-TS39-~~ AS	~~630~~	~~1705~~	~~GW~~	~~5~~ 4			~~x~~	~~x~~ 4						
SRF39-TS39BBZ-BTA	6/30	1605	GW	5	Dup		x	x						
SRF39-TS39BB-0719	6/30	1705	GW	5			x	x						

SAMPLING NOTES: Screened interval 25-35 ft bgs (confirmed from 2002 report) PURGE & DECON GAC'D & DISCHARGED
screened interval ~ 27 ft btoc - target 27.5 ft btoc for pump intake
Final Turb: 2.14 NTU Final DTW: 19.08 ft btoc left ~32 ft tubing in well

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 11H101295 Turbidimeter 11741 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 WELL ID: TS3-9DD SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: Sunny, 80°F
DATE: 6/30/2019
START TIME: 1030
END TIME: 1230

WELL CONDITION: Good
DAMAGE PRESENT: None.
HEIGHT OF STICKUP (ags): 2.5 feet
TOTAL DEPTH (btoc): 27.20 feet
DEPTH TO WATER (btoc): 9.50 feet
HEIGHT OF WATER COLUMN (feet): 17.70
1 WELL VOLUME (gal): 3.00
3 WELL VOLUMES (gal): 9.00
DROWNED SCREEN?: Yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
(2" Sch40)	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Bladder Pump QED
SAMPLING APPARATUS: ~~Bl~~ New 1.75" S/N 12055
TUBING SIZE / TYPE: Teflon-lined
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse.

IF PRODUCT IS PRESENT DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A THICKNESS OF PRODUCT (feet): N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 40 mL/min	Depth at Purge: 17.0 ft
Max sample rate: 100 mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	5.51	119	29.3	4.56	2.81	N/A
Average	6.105	59.575	31.15	4.025	2.81	1.88
Highest Observed	6.7	119	33	4.56	2.81	1.88
Lowest Observed	5.51	0.15	29.3	3.49	2.81	1.88

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH ± 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1140	0.40	11.41	1.91	12.25	6.88	84	215.1	54.5	7.45	clear	none
1144	0.45	11.46	1.96	12.14	6.80	85	212.4	56.8	6.39	"	"
1147	0.50	11.49	1.99	11.61	6.84	87	204.7	56.8	2.42	"	"
1151	0.51	11.50	2.00	11.87	6.92	88	196.4	5.82	1.73	"	"
1155	0.52	11.50	2.00	12.22	6.68	90	198.5	6.15	1.78	"	"
1159	0.55	11.48	1.98	12.44	6.81	91	186.2	5.59	3.49	"	"
1201	0.57	11.50	2.00	12.48	6.78	92	179.1	5.18	2.20	"	"
1205	0.60	11.47	1.97	12.69	6.75	92	172.8	5.39	1.62	"	"
1208	0.75	11.44	1.94	12.80	6.70	93	167.3	5.34	2.32	"	"
1212	0.85	11.38	1.88	13.30	6.60	95	163.7	5.12	1.55	"	"
				STABILIZED							

FINAL PURGE DATA: START TIME: 1130 END TIME: 1220 CUMULATIVE VOLUME: 1.1 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 40mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) Clear, no sheen, no odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C (HCl)	PAH SW8270D SIM							Remarks
SRF39-TS39DD-0119	6/30/19	1225	GW	5	—	3	2							

SAMPLING NOTES: Screened interval: 14-24 ft bgs (confirmed from 2002 report)
Stickup: 2.5 ft (from 2019 gauging)
Top of screen: 16.5 ft btoc (14 ft bgs + 2.5 ft stickup) PURGE & DECON GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 04D8023 Turbidimeter 156652 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 | WELL ID: TS3-9CR | SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: Sunny, 85°F
DATE: 7/1/2019
START TIME: 1545
END TIME: 1745

WELL CONDITION: Good
DAMAGE PRESENT: none
HEIGHT OF STICKUP (ags): 2.5 ft
TOTAL DEPTH (btoc): 27.20 ft
DEPTH TO WATER (btoc): 19.63 ft
HEIGHT OF WATER COLUMN (feet): 7.57
1 WELL VOLUME (gal): 1.29
3 WELL VOLUMES (gal): 3.9
DROWNED SCREEN?: NO

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low-Flow Bladder Pump
SAMPLING APPARATUS: QED 1.75" S/N: 12055
TUBING SIZE / TYPE: Teflon-lined
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

IF PRODUCT IS PRESENT | DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A | THICKNESS OF PRODUCT (feet): N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 65 mL/min	Depth at Purge: 21.0 ft
Max sample rate	Depth at Sample

1 L = 0.264 gal | 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.67	450	-47.7	11.9	6.88	N/A
Average	6.67	450	-47.7	11.9	6.88	N/A
Highest Observed	6.67	450	-47.7	11.9	6.88	N/A
Lowest Observed	6.67	450	-47.7	11.9	6.88	N/A

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1646	0.50	19.78	0.15	15.108	6.90	1185	-91.6	1.06	18.3	clear yellow	POL
1650	0.60	19.78	0.15	16.52	6.83	1206	-93.9	0.81	21.4	"	"
1654	0.70	19.78	0.15	16.93	6.82	1222	-96.5	0.79	17.6	"	"
1657	0.80	19.78	0.15	17.39	6.82	1239	-100.5	0.72	14.2	"	"
1701	0.90	19.78	0.15	18.15	6.80	1259	-97.0	0.74	17.6	"	"
1705	1.00	19.78	0.15	18.39	6.78	1276	-105.1	0.64	13.6	"	"
1709	1.10	19.78	0.15	18.01	6.76	1280	-106.9	0.62	17.3	"	"
1713	1.25	19.79	0.16	17.81	6.75	1274	-105.3	0.67	9.85	"	"
1716	1.40	19.81	0.18	15.50	6.77	1223	-102.9	0.75	10.7	clear	POL
1719	1.50	19.81	0.18	14.60	6.78	1181	-99.7	0.72	12.4	"	"
1722	1.75	19.83	0.20	14.27	6.79	1163	-97.0	0.85	16.3	"	"
				STABILIZED							

FINAL PURGE DATA: START TIME: 1625 | END TIME: 1726 | CUMULATIVE VOLUME: 1.75 | MAX FLOWRATE WITH STABLE DRAW DOWN: 65 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) Clear, no sheen, POL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260D	PAH SW8270D SIM	Remarks
SRF39-TS3-0719	7/1/19	1730	GW	5	—	3	2	

SAMPLING NOTES: screened interval: 17.03 - 27.03 from Boice 2017 report

PURGE & DECON GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S): 607945-C2575 / 63522-C2480

EQUIPMENT SERIAL NUMBERS: YSI 04080223 | Turbidimeter 15652 | Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 WELL ID: TS3-9CR SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: Overcast, ~70°F
DATE: 7/12/19
START TIME: 1340
END TIME: 1500

WELL CONDITION: Good
DAMAGE PRESENT: None
HEIGHT OF STICKUP (ags): 2.5
TOTAL DEPTH (btoc): 27.20
DEPTH TO WATER (btoc): 20.29
HEIGHT OF WATER COLUMN (feet): 6.91
1 WELL VOLUME (gal): 1.2
3 WELL VOLUMES (gal): 3.5
DROWNED SCREEN?: No

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Bladder
SAMPLING APPARATUS: QED 1.75" S/N: 12550
TUBING SIZE / TYPE: Teflon-lined
EQUIPMENT DECON PROCEDURE: Alconox + DI Rinse

IF PRODUCT IS PRESENT: DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A THICKNESS OF PRODUCT (feet): N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 200 mL/min	Depth at Purge: 22.5 ft
Max sample rate: 225 mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.67	450	-47.7	11.9	6.88	N/A
Average	6.67	450	-47.7	11.9	6.88	N/A
Highest Observed	6.67	450	-47.7	11.9	6.88	N/A
Lowest Observed	6.67	450	-47.7	11.9	6.88	N/A

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1410	0.15	20.45	0.14	12.51	6.44	1069	163.1	2.90	>10 NTU	clear	POL
1413	0.25	20.45	0.14	12.24	6.51	1055	137.0	1.56	"	"	"
1416	0.35	20.46	0.15	11.47	6.56	1036	114.6	1.40	"	"	"
1419	0.45	20.47	0.16	10.47	6.62	1009	95.3	1.23	"	"	"
1422	0.55	20.57	0.23	9.83	6.60 ✓	996	82.6	1.20 ✓	"	"	"
1425	0.65	20.55	0.25	9.57	6.60 ✓	991 ✓	71.2	1.11 ✓	13.4	"	"
1428	0.75	20.57	0.27	10.15	6.67 ✓	1013	57.8	1.06	20.3	"	"
1431	0.85	20.60	"	9.51	6.68 ✓	995 ✓	53.3	1.02 ✓	10.8	"	"
					STABILIZED						

FINAL PURGE DATA: START TIME: 1400 END TIME: 1450 CUMULATIVE VOLUME: 1.50 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 200 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, no sheen, POL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	DRO/GRO SW8015M	Remarks
SRF39-TS39CR-0719	7/12/19	1440	GW	5	—	3	2	POL odor

SAMPLING NOTES:
Re-sampled.
TOP OF SCREEN @ ~17' BTOC
PURGE & DECON GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 WELL ID: TS3-9F SHEET 1 OF 2

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): AS
WEATHER / TEMPERATURE: 80s sunny and hot and buggy
DATE: 7/4/2019
START TIME: 0950
END TIME: 1250

WELL CONDITION: Good
DAMAGE PRESENT: cracked concrete
HEIGHT OF STICKUP (ags): 2.3 ft
TOTAL DEPTH (btoc): 30.92 ft
DEPTH TO WATER (btoc): 20.06 ft
HEIGHT OF WATER COLUMN (feet): 10.76 ft
1 WELL VOLUME (gal): 1.8 gal
3 WELL VOLUMES (gal): 5.4 gal
DROWNED SCREEN? yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): Groundwater
COLLECTION METHOD (PUMP TYPE, OTHER): SS QED 1.75" bladder pump
SAMPLING APPARATUS: teflon-lined bladders
TUBING SIZE / TYPE: 0.25x 3/8" teflon-lined poly bonded

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc) NA THICKNESS OF PRODUCT (feet) NA

EQUIPMENT DECON PROCEDURE: Alconox + DI spray

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 50 mL/min	Depth at Purge: 25.5 ft
Max sample rate: 50 mL/min	Depth at Sample: 25.5 ft

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.56	649	-67.9	1.47	N/A	N/A
Average	6.58	324.856	-75.15	1.09	N/A	0.4
Highest Observed	6.6	649	-67.9	1.47	N/A	0.4
Lowest Observed	6.56	0.712	-82.4	0.71	N/A	0.4

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1012		20.06		Start pumping							
1033	0.3	20.76	0.70	adjust flow rate down - chunks in water, continue purge							
				WQ YSI							
1040	0.5	20.70	0.64	fewer chunks							
1043	0.5+	20.73	0.61	Hook up YSI - few enough chunks							
1052	0.5+	20.89	0.53	YSI full (flow through cell)							
1055	0.6	20.56	0.50	13.65	6.86	540	5.6	1.44	35.8	brown tint	PH
1100	0.67	20.53	0.47	13.78	6.82	519	-0.3	0.89	24.9	slight tint	"
1105	0.74	20.59	0.53	-	-	skip reading - flow diverted 20.8				"	"
1110	0.81	20.58	0.52	13.17	6.76	527	-23.6	0.57	19.2	"	"
1115	0.88	20.48	0.42	14.18	6.73	549	-15.9	0.54	12.8	"	"
1120	0.95	20.43	0.37	14.89	6.72	550	-19.5	0.50	11.4	"	"
1125	1.02	20.40	0.34	15.67	6.70	549	-23.7	0.56	12.7	"	"

FINAL PURGE DATA: START TIME: 1012 END TIME: 1205 CUMULATIVE VOLUME: 2.0 MAX FLOWRATE WITH STABLE DRAW DOWN: 50 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear with occasional floating chunks (tan), POL odor

Sample ID	Date	Time	Matrix	Containers	QC	Analysis / Preservation	VOC HCl 1.5x 8260C list	APH 8270 SIM						Remarks
SRF39-TS3-9F-0704	7/4	1205	GW	5	-		x	x						one APH for lots of these
This sample may contain LNAPL														

SAMPLING NOTES: Top of Screen 26 ft btoc. Sock in this well - removed during sampling. Target 25 ft btoc for pump intake depth. Black product on casing. Lots of bubbles on inside of flow-through cell, occasional bubble up tubing. PURGE & DECON GAC'D & DISCHARGED. Product on interface probe and tubing. Discarded tubing.

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 04 D8023 AF Turbidimeter 11741 Other

FIELD WATER QUALITY PARAMETERS

SHEET 2 OF 2

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or ±1 NTU	Color	Odor
Copy 1120	0.95	20.13	0.37	14.89	6.72v	550	-19.5	0.50	11.4	slightly tint	POL
Copy 1125	1.02	20.40	0.34	15.67	6.70	549	-23.7	0.56	12.7	"	"
1130	1.09	20.35	0.29	16.67	6.69v	583	-32.8	0.51	14.3	"	"
1135	1.16	20.31	0.25	17.11	6.69v	607	-31.4 v	0.45	12.0	"	"
1140	1.23	20.28	0.22	17.84	6.68v	599	-42.5v	0.34	13.8	"	"
1145	1.30	20.27	0.21	18.56	6.69v	656	-49.3	0.36	12.1	"	"
1150	1.37	20.31	0.25	18.12	6.72v	656	-64.4	0.35v	12.3	"	"
1155	1.44	20.27	0.21	18.34	6.73v	663v	-61.7	0.33v	12.6v	"	"
1200	1.53	20.26	0.20	18.84	6.73v	657v	-40.4	0.33v	14.8	"	"
		Two consecutive readings with					more parameters		stable		
1205	Sample										

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 WELL ID: TS3-9F SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT & NM
WEATHER / TEMPERATURE: sunny 70°F
DATE: 7/12/19
START TIME: 1530
END TIME: 1700

WELL CONDITION: good
DAMAGE PRESENT: none concrete
HEIGHT OF STICKUP (ags): 2.3 ft
TOTAL DEPTH (btoc): 30.82 ft
DEPTH TO WATER (btoc): 20.34'
HEIGHT OF WATER COLUMN (feet): 10.48'
1 WELL VOLUME (gal): 1.8
3 WELL VOLUMES (gal): 5.3
DROWNED SCREEN?: YES

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): ~~Perf~~ NM GW
(PUMP TYPE, OTHER): peri Pump
SAMPLING APPARATUS: peri pump and ~~silico~~ KT Teflon lined tubing
TUBING SIZE / TYPE: Teflon lined tubing
EQUIPMENT DECON PROCEDURE: Alconox and D.I. water rinse

IF PRODUCT IS PRESENT: DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
160	
Max purge rate with stable drawdown: 160 mL/min	Depth at Purge: 26.0 ft
Max sample rate: 160 mL/min	Depth at Sample: 26.0 ft

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.56	649	-67.9	1.47	N/A	N/A
Average	6.58	324.856	-75.15	1.09	N/A	0.4
Highest Observed	6.6	649	-67.9	1.47	N/A	0.4
Lowest Observed	6.56	0.712	-82.4	0.71	N/A	0.4

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume ~~(gal)~~ L	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1600		20.60	.26	started pumping							
1605		20.85	.51		YSI	Attached			48.3	clear	POL
1610	0.5	21.31	0.97	12.00	6.24	515	224.7	3.37	53.5	"	"
1613	1.0	21.44	1.15	11.71	6.45	506 ✓	191.2	2.25	44.6	"	"
1616	1.6	21.56	1.22	11.40	6.52 ✓	503 ✓	164.0	2.07	36.2	"	"
1619	2.1	21.63	1.29	11.08	6.56 ✓	501 ✓	152.4 ✓	2.01	28.0	"	"
1622	2.6	21.65	1.31	10.72	6.58 ✓	499 ✓	142.1 ✓	1.81	23.1	"	"
1625	3.1	21.68	1.34	10.55	6.59 ✓	498 ✓	133.2 ✓	1.70	16.3	"	"
1628	3.7	21.71	1.37	10.53	6.60 ✓	500 ✓	126.8 ✓	1.48	14.9	"	"
1631	4.2 L	21.71	"	10.38	6.59 ✓	501 ✓	124.1 ✓	1.42	16.7	"	"
				Stabilized							

FINAL PURGE DATA: START TIME: 1600 END TIME: 1640 CUMULATIVE VOLUME: 1.2 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 160 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, none, POL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC HCl	PAH							Remarks
SRF39-TS3 ~~9~~ F-0719	7/12	1640	GW	5		3	2							POLodor

SAMPLING NOTES:
Re-sampled
TOP OF SCREEN @ 26' BTOC
NO PUMP DECON FOR PERI-PUMP
PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 WELL ID: TS3-9T SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: Sunny, ~80°F
DATE: 7/4/19
START TIME: 1015
END TIME: 1200

WELL CONDITION: Good
DAMAGE PRESENT: None
HEIGHT OF STICKUP (ags): 2.0 ft
TOTAL DEPTH (btoc): 31.23
DEPTH TO WATER (btoc): 17.87
HEIGHT OF WATER COLUMN (feet): 13.36
1 WELL VOLUME (gal): 2.27
3 WELL VOLUMES (gal): 6.81
DROWNED SCREEN? NO*

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low-Flow Bladder Pump
SAMPLING APPARATUS: QED 1.75" Pneumatic Bladder Pump S/N
TUBING SIZE / TYPE: Teflon-lined
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

IF PRODUCT IS PRESENT DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A
THICKNESS OF PRODUCT (feet): N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 105mL/min	Depth at Purge: 19.5ft
Max sample rate	Depth at Sample

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	7.18	412	-65.4	0.85	3.71	N/A
Average	6.64	266.865	-30.43333333	0.79	3.185	0.07
Highest Observed	7.18	412	32.4	1.11	3.71	0.07
Lowest Observed	6.21	0.595	-65.4	0.41	2.66	0.07

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1045 SH NM	0.25	17.91	0.04	9.76	6.65	277	13.4	3.01	4.30	Clear	Pet
1057	0.30	17.91	0.04	9.20	6.68	270	11.2	1.86	2.30	"	"
1100	0.35	17.91	0.04	8.48	6.71	266	2.1	1.51	2.40	"	"
1103	0.45	17.91	0.04	7.87	6.72	262	-9.4	1.42	1.31	"	"
1106	0.50	17.91	0.04	7.35	6.72	260	-16.1	1.38	1.28	"	"
1109	0.60	17.92	0.05	7.18	6.75	259	-21.7	1.22	1.44	"	"
1112	0.75	17.91	0.04	7.00	6.76	263	-29.9	1.14	1.55	"	"
1116	0.85	17.92	0.05	7.09	6.78	281	-38.5	1.08	1.27	"	"
1120	1.00	17.91	0.04	7.31	6.78	289	-40.7	1.02	1.23	"	"
1123	1.15	17.91	0.04	7.41	6.79	297	~~-49~~ -43.4	0.93	2.28	"	"
1126	1.25	17.91	0.04	7.59	6.79	304	-47.1	0.91	0.89	"	"
1129	1.45	17.91	0.04	7.78	6.79	312	-44.5	0.93	1.69	"	"
					STABILIZED						

FINAL PURGE DATA: START TIME: 1040 END TIME: 1145 CUMULATIVE VOLUME: 2.5 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 105mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) Clear, no sheen, DOL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260D	PAH SW8270D SIM	Remarks
SRF29:TS3-9T-0719	7/4/19	1145	GW	5	—	3	2	

SAMPLING NOTES: *Top of screen 17ft btoc.

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 11H101295 Turbidimeter 151652 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 WELL ID: TS3-9T SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: overcast, ~60-65°F
DATE: 7/12/19
START TIME: 1035
END TIME: 1220

WELL CONDITION: Good
DAMAGE PRESENT: None
HEIGHT OF STICKUP (ags): 2.0
TOTAL DEPTH (btoc): ~~30.98~~ WM 30.98
DEPTH TO WATER (btoc): 18.43
HEIGHT OF WATER COLUMN (feet): 12.55
1 WELL VOLUME (gal): 2.1
3 WELL VOLUMES (gal): 6.4
DROWNED SCREEN? NO

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Bladder
SAMPLING APPARATUS: QED 1.75" SN 12055
TUBING SIZE / TYPE: Teflon-lined

IF PRODUCT IS PRESENT DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A THICKNESS OF PRODUCT (feet): N/A
EQUIPMENT DECON PROCEDURE: Alconox + DI Rinse

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 230 mL/min	Depth at Purge: 19.5
Max sample rate: 275 mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	7.18	412	-65.4	0.85	3.71	N/A
Average	6.64	266.865	-30.43333333	0.79	3.185	0.07
Highest Observed	7.18	412	32.4	1.11	3.71	0.07
Lowest Observed	6.21	0.595	-65.4	0.41	2.66	0.07

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ±0.2°C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1110	0.25	18.46	0.03	8.70	6.29	268	194.6	5.45	8.68	clear	POL
1113	0.50	18.47	0.04	8.20	6.40	259	170.2	2.57	7.03	"	"
1116	0.75	18.46	0.03	7.56	6.46	254	158.2	1.99	4.90	"	"
1119	1.00	18.50	0.07	6.08	6.50✓	248	143.8	1.83	2.77	"	"
1123	1.25	18.51	0.08	5.71	6.54✓	247✓	132.2	1.51	2.31✓	"	"
1126	1.50	18.48	0.05	5.76	6.55✓	255✓	122.4	1.36	3.16✓	"	"
1129	1.75	18.50	0.07	5.46	6.56✓	268	111.8	1.30	2.44✓	"	"
1132	2.00	18.51	0.08	5.43	6.58✓	274	100.0	1.33	1.88✓	"	"
1136	2.25	18.51	0.08	5.37	6.59✓	281	89.4	1.28✓	2.32✓	"	"
1139	2.50	18.51	0.08	5.37✓	6.60✓	285	79.4	1.18	1.74✓	"	"
1142	2.75	18.51	0.08	5.34✓	6.61✓	290	72.7	1.11	1.91	"	"
1145	3.00	18.51	0.08	5.37✓	6.62✓	292✓	64.9✓	1.07✓	2.46✓	"	"
				STABILIZED							

FINAL PURGE DATA: START TIME: 1044 END TIME: 1200 CUMULATIVE VOLUME: 3.25 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 230 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, POL odor, no sheen

Sample ID	Date	Time	Matrix	Containers	QC	1 VOC 8260/8021	2 GRO 8015							Remarks
SRF39-TS3T-0719	7/12/19	1150	GW	5	—	3	2							POL odor

SAMPLING NOTES:
Re-sample, PVC casing coated/stained w/ product
TOP OF SCREEN @ 17' BTOC
PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 WELL ID: TS3-9U SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM
WEATHER / TEMPERATURE: sunny, ~65°F
DATE: 7/4/19
START TIME: 0637
END TIME: 0842

WELL CONDITION: Good
DAMAGE PRESENT: none
HEIGHT OF STICKUP (ags): 2.3 ft
TOTAL DEPTH (btoc): 29.64
DEPTH TO WATER (btoc): 17.26
HEIGHT OF WATER COLUMN (feet): 12.38
1 WELL VOLUME (gal): 2.10
3 WELL VOLUMES (gal): 10.31
DROWNED SCREEN?: yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low-Flow Bladder Pump
SAMPLING APPARATUS: QED 1.75" Pneumatic Bladder Pump S/N 12055
TUBING SIZE / TYPE: Teflon-Lined
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

IF PRODUCT IS PRESENT DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A
THICKNESS OF PRODUCT (feet): N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 55mL/min	Depth at Purge: 21.0 ft
Max sample rate: 65mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.33	173	-5.3	0.92	N/A	N/A
Average	6.375	86.673	-29.55	0.745	N/A	0.55
Highest Observed	6.42	173	-5.3	0.92	N/A	0.55
Lowest Observed	6.33	0.346	-53.8	0.57	N/A	0.55

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0726	0.50	17.79	0.53	8.19	6.06	134	-37.4	1.40	7.97	Clear	Strong POL
0729	0.65	17.78	0.52	8.50	6.11	130	-47.6	1.13	7.05	"	"
0732	0.75	17.80	0.54	8.58	6.15	129	-54.9	0.82	6.12	"	"
0735	0.95	17.80	0.54	8.54	6.17	131	-35.6	0.78	6.38	"	"
0738	1.00	17.77	0.51	8.59	6.22	132	-37.3	0.107	6.96	"	"
0742	1.25	17.81	0.55	8.80	6.23	133	-19.7	0.62	6.71	"	"
0745	1.45	17.90	0.64	8.43	6.26	136	-36.6	0.63	6.58	"	"
0748	1.50	17.86	0.59	8.56	6.29	137	-49.9	0.55	7.79	"	"
0751	1.65	17.81	0.55	8.83	6.31	138	-56.1	0.51	7.36	"	"
0754	1.85	17.81	0.55	9.00	6.32	140	-57.3	0.48	7.06	"	"
0758	1.95	17.75	0.49	9.27	6.33	141	-34.3	0.54	8.25	"	"
0802	2.00	17.81	0.55	9.38	6.33	143	-49.7	0.51	5.54		
					STABILIZED						

FINAL PURGE DATA: START TIME: 0716 END TIME: 0807 CUMULATIVE VOLUME: 2.0 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 55mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, no sheen, POL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC SW8260C	PAH SW8270D SIM							Remarks
SRF39-TS3U-0719	7/4/19	0810	GW	5	—	3	2							
SRF39-TS3U7-0719	7/4/19	0710	GW	5	DUP	3	2							

SAMPLING NOTES: Top of screen ~28ft btoc. Sock in well.

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 042D8023 Turbidimeter 1174 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 WELL ID: TS3-9U SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: partly cloudy 70°F
DATE: 7/12/19
START TIME: 1400
END TIME: ~~HKT~~ KT 1510

WELL CONDITION: Good
DAMAGE PRESENT: none
HEIGHT OF STICKUP (ags): 2.3'
TOTAL DEPTH (btoc): 29.64'
DEPTH TO WATER (btoc): 17.89
HEIGHT OF WATER COLUMN (feet): 11.75
1 WELL VOLUME (gal): 2.0
3 WELL VOLUMES (gal): 6.0
DROWNED SCREEN? yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): low flow bladder Pump
SAMPLING APPARATUS: QED 1.75"
TUBING SIZE / TYPE: Teflon lined tubing

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA
EQUIPMENT DECON PROCEDURE: Alconox and DI rinse

150 FLOW RATE (mL/min)
Max purge rate with stable drawdown: 150 mL/min
Max sample rate: 150 mL/min
SAMPLE PORT DEPTH (btoc)
Depth at Purge: 22.0'
Depth at Sample: ↓
1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.33	173	-5.3	0.92	N/A	N/A
Average	6.375	86.673	-29.55	0.745	N/A	0.55
Highest Observed	6.42	173	-5.3	0.92	N/A	0.55
Lowest Observed	6.33	0.346	-53.8	0.57	N/A	0.55

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume ~~(gal)~~ L	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1418		17.54		Started pumping							
1420		17.64		Filling WST							
1424	0.7	18.15	0.26	11.64	6.64	150	81.3	3.29	49.3	cloudy	POL.
1427	1.5	18.15	0.26	11.04	6.64	146	79.6	3.57	43.5	"	"
1430	2.2	"	"	10.18	6.68	146	74.9	3.82		"	"
1433	2.9	"	"	9.71	6.74	149	62.5	3.90	36.1	clear	"
1436	3.7	"	"	9.61	6.75	150	58.1	3.83	25.4	"	"
1439	4.46	18.25	0.36	9.40	6.66	153	75.2	3.85	28.1	"	"
				Stabilized							

FINAL PURGE DATA: START TIME: 1418 END TIME: 1450 CUMULATIVE VOLUME: .75gal MAX FLOWRATE WITH STABLE DRAW DOWN: 150mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, none, POL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC VIAL	PAH							Remarks
SRF39-TS3U-0719	7/12	1440	GW	5	—	3	2							POL odor

SAMPLING NOTES:
Re-sampled

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 WELL ID: TS3-9V SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): NM/AS
WEATHER / TEMPERATURE: Sunny. 75°F
DATE: 7/1/19
START TIME: 1130
END TIME: 1230

WELL CONDITION: Good
DAMAGE PRESENT: None
HEIGHT OF STICKUP (ags): 2.0 ft
TOTAL DEPTH (btoc): 24.80 feet
DEPTH TO WATER (btoc): ~~9.20~~ NM 9.40ft
HEIGHT OF WATER COLUMN (feet): 15.40 ft
1 WELL VOLUME (gal): 2.618
3 WELL VOLUMES (gal): 7.854
DROWNED SCREEN?: yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): Low-Flow Bladder Pump
SAMPLING APPARATUS: QED 1.75" S/N 10255
TUBING SIZE / TYPE: Teflon-lined
EQUIPMENT DECON PROCEDURE: Alconox and DI Rinse

IF PRODUCT IS PRESENT DESCRIPTION: N/A
DEPTH TO PRODUCT (btoc): N/A THICKNESS OF PRODUCT (feet): N/A

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 55mL/min	Depth at Purge: 15.0ft
Max sample rate: 75mL/min	Depth at Sample: ↓

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.46	975	-70.1	1.18	2.36	N/A
Average	6.476667	473.2293333	-55.96666667	0.736666667	2.53	0.02
Highest Observed	6.54	975	-34.9	1.18	2.7	0.02
Lowest Observed	6.43	0.688	-70.1	0.45	2.36	0.02

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2°C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1150	0.10	9.47	0.07	12.55	6.37	556	-11.0	7.16	3.10	Clear	POL
1153	0.15	9.47	0.07	10.94	6.39	526	-29.3	5.42	3.30	"	"
1156	0.20	9.47	0.07	10.40	6.41	515	-36.2	3.09	2.32	"	"
1159	0.22	9.47	0.07	10.21	6.40	511	-39.5	2.08	2.87	"	"
1202	0.25	9.47	0.07	10.29	6.40	513	-41.6	1.54	2.19	"	"
1205	0.30	9.47	0.07	10.11	6.41	513	-44.6	1.47	2.90	"	"
1208	0.35	9.47	0.07	9.92	6.41	514	-47.8	1.30	3.35	"	"
				STABILIZED							

FINAL PURGE DATA: START TIME: 1150 END TIME: 1213 CUMULATIVE VOLUME: 0.50 MAX FLOWRATE WITH STABLE DRAW DOWN: 55mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) Clear, no Sheen, POL odor

Sample ID	Date	Time	Matrix	Containers	QC	Preservative Lot # HCl	pH Strip Lot #	Remarks
SRF39-TS39V-0719	7/1/19	1215	GW	5	—		x	y	
SRF39-TS39V2-0719	7/1/19	1115	GW	5	DUP		x	y	

SAMPLING NOTES:
Downhole camera: Screened at ~14.5 feet btoc. 10 foot screen. Turbid at ~ ~~top~~ 13 feet btoc to DTW observed. DTW using downhole screen = 9.20 ft btoc. Fished tubing out of well. Retrieved 2 well caps and one lock from inside monument.
PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 11H101295 Turbidimeter 15652 Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 WELL ID: TS3-9V SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: cloudy 65°F
DATE: 7/12/19
START TIME: 1200
END TIME: 1310

WELL CONDITION: good
DAMAGE PRESENT: none
HEIGHT OF STICKUP (ags): 2.0
TOTAL DEPTH (btoc): 29.64'
DEPTH TO WATER (btoc): 10.30'
HEIGHT OF WATER COLUMN (feet): 19.34'
1 WELL VOLUME (gal): 3.3
3 WELL VOLUMES (gal): 9.9
DROWNED SCREEN? YES

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): low flow bladder Pump
SAMPLING APPARATUS: QED 1.75"
TUBING SIZE / TYPE: Teflon lined tubing
EQUIPMENT DECON PROCEDURE: Alconox + DI rinse

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 275mL/min	Depth at Purge: 16.0'
Max sample rate: 200 mL/min	Depth at Sample: 16.0'

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.46	975	-70.1	1.18	2.36	N/A
Average	6.476667	473.2293333	-55.96666667	0.736666667	2.53	0.02
Highest Observed	6.54	975	-34.9	1.18	2.7	0.02
Lowest Observed	6.43	0.688	-70.1	0.45	2.36	0.02

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1218	0.4	10.60	.30	6.03	7.08	318	76.8	4.00	12.5	clear	Slight POL
1221	0.9	10.60	.30	5.71	6.24	322 ✓	95.3 ✓	3.00	8.41	"	"
1224	1.3	10.60	.30	5.57	6.13	315 ✓	89.8 ✓	2.76	10.3	"	"
1227	1.8	10.60	.30	5.46	6.20	321 ✓	77.6 ✓	2.57 ✓	8.85	"	"
1230	2.2gal	10.60	.30	5.47	6.25 ✓	317 ✓	72.2 ✓	2.51 ✓	—	"	"
				5.51	6.30 ✓	315 ✓	71.0 ✓	2.60 ✓	7.36	"	"
←			—	Stabilized		—					—

FINAL PURGE DATA: START TIME: 1218 END TIME: 1250 CUMULATIVE VOLUME: 2.5gal MAX FLOWRATE WITH STABLE DRAW DOWN: 275 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, none, slight POL odor

Sample ID	Date	Time	Matrix	Containers	QC	VOC HCL	PAH							Remarks
SRF39-TS39V-0719	7/12	1250	GW	5		3	2							Slight POL
SRF39-TS39VE0719	7/12	1150	↓	5	DUP	3	2							Duplicate

SAMPLING NOTES:
RESAMPLE
TOP OF SCREEN @ ~14.5' BTOC

PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 | WELL ID: ~~FS3-9G~~ AS FS3-9B | SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): AJ
WEATHER / TEMPERATURE: Clear, Sunny, 70°
DATE: 6/30/2019
START TIME: 1020
END TIME: 1245

WELL CONDITION: Good
DAMAGE PRESENT: none
HEIGHT OF STICKUP (ags): 2.5 ft ags
TOTAL DEPTH (btoc): 22.45 ft btoc
DEPTH TO WATER (btoc): 14.86 ft btoc
HEIGHT OF WATER COLUMN (feet): 22.45-15 7.59 ft
1 WELL VOLUME (gal): 1.3
3 WELL VOLUMES (gal): 3.9
DROWNED SCREEN?: No, assuming 10ft

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
(2" Sch40)	2.375	2.067	(0.17)
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): Groundwater
COLLECTION METHOD (PUMP TYPE, OTHER): Bladder pump 1.75" SS
SAMPLING APPARATUS:
TUBING SIZE / TYPE: 0.25 x 3/8" ref-lined bonded
EQUIPMENT DECON PROCEDURE: Alconox + DI spray

IF PRODUCT IS PRESENT | DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA | THICKNESS OF PRODUCT (feet): NA

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 150mL/min stable	Depth at Purge: 15.7 ft
Max sample rate: 150mL/min	Depth at Sample: 15.7 ft

1 L = 0.264 gal | 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.83	426	-2.4	~~0.81~~	15.9	N/A
Average	6.74	213.406	~~-5.6~~	0.88	15.9	0.02
Highest Observed	6.83	~~426~~	-2.4	0.95	15.9	0.02
Lowest Observed	~~6.65~~	0.812	-8.8	0.81	15.9	0.02

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1055	first water	-14.90 ft btoc		water clear hookup YSI				1059 - full	1102		
1107	0.25	14.90	0.04	10.22	6.41	180	141.8	9.0	0.92	clear	none
1112	0.45	14.91	0.05	10.17	6.44	181	120.6	12.8	1.76	clear	none
1117	0.65	14.92	0.06	10.25	6.43	181	108.9	11.4	0.47	clear	none
1122	0.85	14.91	0.05	10.06	6.43 ✓	182 ✓	92.6	10.2	1.03 ✓	clear	none
1127	1.05	14.91	0.05	10.21 ✓	6.45 ✓	183 ✓	71.7	9.0	0.89 ✓	clear	none
1132	1.25	14.92	0.06	10.32 ✓	6.47 ✓	184 ✓	59.6	8.6	1.21 ✓	clear	none
1135	- Stable w/ four parameters including temp - sample										

FINAL PURGE DATA: START TIME: 1055 | END TIME: 1204 | CUMULATIVE VOLUME: 2gal | MAX FLOWRATE WITH STABLE DRAW DOWN: 150 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, no odor

Sample ID	Date	Time	Matrix	Containers	QC	Preservative	AK PBT 1ST VOC KEY	PAH						Remarks
SRF39-FS39B-0719	6/30	1135	GW	15	MS/MSD		X	X						

SAMPLING NOTES: Screened interval unknown, assumed to be 10 ft use ~23 ft tubing.
pump intake target depth ~15.5 ft btoc to start
Final turb 0.62 Final drawdown 0.06 (14.92 ft btoc)
left tubing in well
PURGE & DECON GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 11H101295 | Turbidimeter 11741 | Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 WELL ID: FS3-9G SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): AS
WEATHER / TEMPERATURE: 70° sunny
DATE: 7/4/2019
START TIME: 0600
END TIME: 0815

WELL CONDITION: Good
DAMAGE PRESENT: Monument wobbles
HEIGHT OF STICKUP (ags): 1.75 ft
TOTAL DEPTH (btoc): 24.88 ft.
DEPTH TO WATER (btoc): 12.13 ft
HEIGHT OF WATER COLUMN (feet): 12.75 ft
1 WELL VOLUME (gal): 2.2 gal
3 WELL VOLUMES (gal): 6.6 gal
DROWNED SCREEN? yes

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): Groundwater
COLLECTION METHOD [PUMP TYPE, OTHER]: SS 1.75" QED bladder pump
SAMPLING APPARATUS: Teflon-lined bladder
TUBING SIZE / TYPE: 0.25 x 3/8" Teflon-lined bonded
EQUIPMENT DECON PROCEDURE: Alconox + DI spray

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA

FLOW RATE (mL/min)	SAMPLE PORT DEPTH (btoc)
Max purge rate with stable drawdown: 75 mL/min	Depth at Purge: 20.5 ft
Max sample rate: 75 mL/min	Depth at Sample: 20.5 ft

1 L = 0.264 gal 1 gal = 3.785 L

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.83	426	-2.4	0.81	15.9	N/A
Average	6.74	213.406	-5.6	0.88	15.9	0.02
Highest Observed	6.83	426	-2.4	0.95	15.9	0.02
Lowest Observed	6.65	0.812	-8.8	0.81	15.9	0.02

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3% (min ± 0.2 °C)	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
0648	0	12.13	Start pumping								
0651		12.50	first water @	12.5 ft btoc and			falling - decrease pressure				
0654		12.25	water is clear								
0700		12.20	hook up YSI								
0705		12.40	YSI full								
0710	0.25	12.35	0.23	7.63	6.58	427	91.2	2.21	2.93	clear	none
0715	0.35	12.30	0.17	7.49	6.65	439	84.7	1.68	1.26	clear	none
0720	0.50	12.35	0.23	7.61 ✓	6.68 ✓	443	83.9 ✓	1.59	1.05 ✓	clear	none
0725	0.70	12.30	0.17	7.96	6.71 ✓	450 ✓	80.0 ✓	1.47	0.77 ✓	clear	none
0730	0.80	12.30	0.17	8.08	6.73 ✓	453 ✓	76.6 ✓	1.41	1.26 ✓	clear	none
		Stable - Sample				0740					

FINAL PURGE DATA: START TIME: 0648 END TIME: 0740 CUMULATIVE VOLUME: 1.2 MAX FLOWRATE WITH STABLE DRAW DOWN: 75 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, no odor

Sample ID	Date	Time	Matrix	Containers	QC	Analysis Requested (Preservation)	VOC 8260C Ltd List	PAH 8270D SIM						Remarks
SRF3i-FS3G-0719	7/4	0740	GW	5	-	~~Hcl~~	X	X						

SAMPLING NOTES: Top of screen 20ft btoc - target 20.5ft btoc
Left bonded tubing tied off in well.
PURGE & DECON GAC'd & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI 17H101295 Turbidimeter 1565Z Other

WELL PURGE AND SAMPLING FORM

SITE ID: SRF TS 3-9 WELL ID: ~~FS3-9E~~ FS3-9G SHEET 1 OF 1

PROJECT NAME: 2019 SRF Contaminated Sites GWM
CLIENT: Hilcorp Alaska, LLC
SAMPLER(S): KT
WEATHER / TEMPERATURE: cloudy 60°F
DATE: 7/12/19
START TIME: 1015
END TIME: ~~10~~ KT 1130

WELL CONDITION: good
DAMAGE PRESENT: monument wobbles
HEIGHT OF STICKUP (ags): 1.75'
TOTAL DEPTH (btoc): 24.88'
DEPTH TO WATER (btoc): 10.45'
HEIGHT OF WATER COLUMN (feet): 14.43'
1 WELL VOLUME (gal): 2.5
3 WELL VOLUMES (gal): 7.4
DROWNED SCREEN?: YES

DIAMETER	O.D. (inch)	I.D. (inch)	VOLUME (gal/LF)
1" Sch40	1.315	1.049	0.05
2" Sch40	2.375	2.067	0.17
3" Sch40	3.5	3.068	0.38
4" Sch40	4.5	4.026	0.66
6" Sch40	6.625	6.065	1.50
8" Sch40	8.625	7.981	2.60
2" Sch80	2.375	1.939	0.15
4" Sch80	4.5	3.826	0.60

SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW
COLLECTION METHOD (PUMP TYPE, OTHER): low flow bladder pump
SAMPLING APPARATUS: teflon lined bladder/tubing
TUBING SIZE / TYPE: teflon lined tubing

IF PRODUCT IS PRESENT DESCRIPTION: NA
DEPTH TO PRODUCT (btoc): NA THICKNESS OF PRODUCT (feet): NA

EQUIPMENT DECON PROCEDURE: Alconox & DI rinse

180 mL FLOW RATE (mL/min)
Max purge rate with stable drawdown: 180 mL/min
Max sample rate: 180 mL/min
1 L = 0.264 gal 1 gal = 3.785 L

SAMPLE PORT DEPTH (btoc)
Depth at Purge: 21.0'
Depth at Sample: 21.0

Historical Parameter Observations

	pH	Cond. (µS/cm)	ORP (mV)	D.O. (mg/L)	Turbidity (NTU)	Drawdown (btoc)
Last Event	6.63	437	-66.1	0.46	7.2	N/A
Average	6.535	218.811	-75.25	0.485	7.2	0.85
Highest Observed	6.63	437	-66.1	0.51	7.2	0.85
Lowest Observed	6.44	0.622	-84.4	0.46	7.2	0.85

FIELD WATER QUALITY PARAMETERS

Time	Cumulative Purged Volume (gal)	Water Level (btoc)	Drawdown (btoc)	Temperature (°F or °C) ± 3%	pH 0.1	Conductivity (µS/cm) ± 3%	ORP (mV) ± 10mV	D.O. (mg/L) ± 10%	Turbidity (NTU) ± 10% or < 10 NTU	Color	Odor
1028				Started pumping					~~35.2~~ KT	clear	none
1033		12.74	2.29	YSI filled				KT	35.2	"	"
1036	0.5	12.75	2.30	8.81	6.86	350	289.9	~~4.20~~	20.4	"	"
1039	1.1	12.77	2.32	8.11	5.58	331	325.2	3.44	20.2	"	"
1042	1.6	12.88	2.43	7.74	5.60	316 ✓	304.9	2.42 ✓	16.7 ✓	"	"
1045	2.2	12.82	2.37	7.55	5.73	318 ✓	287.6	2.39 ✓	13.1 ✓	"	"
1048	2.7	12.85	2.40	7.43	5.91 ✓	328 ✓	268.4	2.46 ✓	12.5 ✓	"	"
1051	3.2	12.87	2.42	7.33 ✓	6.01 ✓	327 ✓	244.4	2.56 ✓	15.0 ✓	"	"
1054	3.8	12.84	2.39	7.27 ✓	6.00 ✓	346 ✓	234.8	2.58 ✓	8.65 ✓	"	"
1057	4.3	12.86	2.41	7.25 ✓	6.10 ✓	340 ✓	226.6	2.49 ✓	7.03 ✓	"	"
1100	4.9L	12.85	2.40	7.27 ✓	6.05 ✓	355 ✓	217.1	2.48 ✓	7.79 ✓	"	"
				Stability							

FINAL PURGE DATA: START TIME: 1033 END TIME: 1112 CUMULATIVE VOLUME: 1.3 gal MAX FLOWRATE WITH STABLE DRAW DOWN: 180 mL/min

ANALYTICAL SAMPLE INFORMATION

SAMPLE DESCRIPTION: (color, product, odor, etc.) clear, none, none

Sample ID	Date	Time	Matrix	Containers	QC	VOC HCL	PAH							Remarks
SRF39-FS39G-0719	7/12	1110	GW	5		3	2							

SAMPLING NOTES: Resample, ~~PVC tubing stained w/product, sock in well~~ KT
TOP OF SCREEN @ 20' BTOC
PURGE & DECON GAC'D & DISCHARGED

BOTTLE LOT NUMBER(S):

EQUIPMENT SERIAL NUMBERS: YSI Turbidimeter Other

YSI Calibration Log

Project Name/Location: ~~FUDS GW/GVS2~~ HAK SRF & ES
Project Number: ~~E50201~~ 110701/110702
Equipment Make and Model: YSI 556
Serial Number: 11H101295/04D8023

	Date	Temperature	pH (3 point)		Conductivity (µs/cm)		ORP(mV)		DO (100% Saturation)		Initials	
			Standard	Reading	Standard	Reading	Standard	Reading	Atm. Pressure (mmHg)	Reading		
11H101295	6/30 2019	19.28	4.00 7.01 10.06	4.00 7.01 10.05	1251	1251	240.0	240.0	763.1	100.4	NM	
04D8023	6/30 2019	19.60	4.00 7.01 10.06	3.98 7.00 10.07	1251	1252	240.0	240.1	763.3	100.2	AS	pH drifts - cleaned cup, drifts much less
11H101295	7/1 2019	18.32	4.00 7.01 10.06	4.00 7.01 10.06	1225	1225	240.0	240.0	763.7	100.5	NM	
04D8023	7/1 2019	18.45	4.00 7.01 10.06	4.00 7.01 10.06	1225	1225	240.0	240.0	764.1	100.4	NM	
11H101295	7/4 2019	19.30	4.00 7.01 10.06	4.00 7.01 10.06	1251	1251	240.0	240.0	761.8	100.2	NM	
04D8023	7/4 2019	19.59	4.00 7.01 10.06	4.00 ~~7.01~~ 10.06	1251	1251	240.0	240.0	762.0	100.3	NM	
11H101295	7/5 2019	19.62	4.00 7.01 10.06	4.00 7.01 10.06	1251	1251	240.0	240.0	764.9	100.7	NM	
04D8023	7/5 2019	20.32	4.00 7.01 10.06	4.00 7.01 10.06	1278	1278	240.0	240.9	765.1	100.2	AS	
11H101295	7/6 2019	19.11	4.00 7.01 10.06	4.00 7.01 10.06	1251	1251	240.0	240.0	764.1	100.6	NM	
04D8023	7/6 2019	19.59	4.00 7.01 10.06	4.00 7.01 10.06	1251	1251	240.0	240.0	764.2	100.6	NM	
11H101295	7/7 2019	18.98	4.00 7.01 10.06	4.00 7.01 10.06	1251	1251	240.0	240.0	759.3	99.9	NM	
04D8023	7/7 2019	19.11	4.00 7.01 10.06	4.00 7.01 10.06	1251	1251	240.0	240.0	~~55~~ NM 759.5	99.9	NM	
11H101295	7/8 2019	19.50	4.00 7.01 10.06	4.00 7.01 10.06	1251	1251	240.0	240.0	755.8	99.5	NM	
04D8023	7/8 2019	19.64	4.00 ~~10.06~~ 7.01 10.06	4.00 7.01 10.00	1251	1251	240.0	240.0	755.9	99.5	NM	
11H101295	7/9 2019	20.20	4.00 7.01 10.06	3.98 7.03 9.96	1278	1235	240.0	233.3 ~~230.5~~	755.9	99.2 ~~102.4~~ KT	KT	
04D8023	7/9 2019	19.92	4.00 7.01 10.06	4.00 7.01 10.05	1251	1251	240.0	240.0	755.9	99.5	NM	

S/N	DATE	TEMPERATURE	PH (3 POINT) STANDARD	PH (3 POINT) READING	DO (100% SATURATION) Atm. Pressure (mmHg)	DO (100% SATURATION) READING	ORP (MV) STANDARD	ORP (MV) READING	CONDUCTIVITY (uS/cm) STANDARD	CONDUCTIVITY (uS/cm) READING	INITIALS
1H101295	7/10 2019	18.74	4.00 7.01 10.06	4.00 7.01 10.05	757.2	99.7%	240.0	240.0	1225	1225	NM
04D8023	7/10 2019	18.35	4.00 7.01 10.06	4.00 7.01 10.05	757.7	99.7%	240.0	240.0	1225	1225	NM
1H101295	7/11 2019	18.41	4.00 7.01 10.06	4.00 7.01 10.05	756.1	99.4%	240.0	240.0	1225	1225	NM
04D8023	7/11 2019	18.45	4.00 7.01 10.06	4.00 7.01 10.05	756.5	99.6%	240.0	240.0	1225	1225	NM
1H101295	7/12 2019	17.93	4.00 7.01 10.06	4.00 7.01 10.06	757.5	99.7%	240.0	240.0	1199	1199	NM
04D8023	7/12 2019	18.15	4.00 7.01 10.06	4.00 7.01 10.06	757.9	99.7%	240.0	240.0	1225	1225	NM

Turbidity Meter Calibration Verification Check

Project Name/Location: ~~FUDS GW/GV52~~ HAK SRF & ES
Project Number: ~~550201~~ 110701/110702
Equipment Make and Model: Hach 2100P Turbidimeter
Serial Number: 11741 / ~~6.1~~ NM 15652

11741

Date/Time	4.95 NTU	53.8 NTU	534 NTU	Initials	Date/Time	6.13 NTU	54.9 NTU	534 NTU	Initials
6/30/19 0604	5.23	54.6	540	NM	6/30/19 0603	5.87	54.7	535	NM
7/1/19 0643	4.98	54.3	539	NM	7/1/19 0640	5.87	54.9	534	NM
7/4/19 0420	5.25	56.3	535	AS	7/4/19 0426	5.77	54.9	534	AS
7/5/19 0425	5.39	56.1	540	AS	7/4/19 0425	6.16	54.7	535	AS
7/6/19 0516	5.26	56.6	547	NM	7/6/19 0518	5.79	55.0	535	NM
7/7/19 0510	5.59	57.3	544	NM	7/7/19 0513	5.88	55.0	535	NM
7/8/19 0707	5.38	55.5	541	NM	7/8/19 0705	5.86	55.1	537	NM
7/9/19 0555	5.14	57.3	535	KT	7/9/19 0555	5.89	55.5	537	KT
7/10/19 0700	4.94	57.3	543	NM	7/10/19 0700	5.77	54.9	532	NM
7/11/19 0743	5.62	56.2	538	NM	7/11/19 0733	5.71	Calibration issue w/turb 554.9, w/in field		NM
7/12/19 0805	5.60	56.5	537	NM	7/12/19 0855	5.75	Cannot read turb 554.9		NM

15652

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APPENDIX E:
LOGBOOK NOTES

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26 JUNE 2019 - 11 JULY 2019



Rite in the Rain
ALL-WEATHER
FIELD
№ 351FX

110701/
110702

2019 SWANSON
RIVER FIELD &
ELECTRIC SHOP
GWM

#1

MADE IN TACOMA
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Rite in the Rain®
= DEFYING MOTHER NATURE =

Name BRICE ENVIRONMENTAL SERVICES

Address 3800 CENTERPOINT DRIVE, STE 400
ANCHORAGE, AK 99503

Phone 907·275·2896

Project 2019 CS GWM: SWANSON RIVER
FIELD ELECTRIC SHOP (1107702) &
TANK SETTINGS (1107703)

RiteintheRain.com

CONTENTS

PAGE	REFERENCE	DATE

6/26/2019 70° Sunny, Smoky
1000 depart ANC for Kenai
1200 Stop at Cooper Landing
1230 continue on to Soldotna - expect delays due to smoke on the road
1530 arrive Soldotna warehouse, unpack
1700 complete repack, head to dinner
1930 arrive at lodging, get ice in freezer
EOD

6/27/2019 55° sunny
0615 depart Lodging in Nikiski
crew Kimi Lloyd (KL), Mikayla Daigle (MD), Nicole Mattice (NM)
0800 arrive SRF - safety briefing
0900 Go to SRF Lodging, unpack, organize
1030 Head to office to pick up radio, to Plant for additional safety briefing and JSA/PTW
1130 arrive TS3-4 to gauge
1150 find that wells are filled with keyed locks, not all of which are locked - bolt cutters are not effective
AS walk site to check status of locks - most wells have keyed locks, some unlocked -
1215 AS offsite w/ NM to as about keys
1245 keys obtained from lead operator at main office
1300 meet KL/MD @ TS1-9 - walkaround and open all wells
1315 prepare to gauge TS1-9
1445 complete gauging/sock change at TS1-9 - go to GOI to get GAC
1505 Complete transfer of GAC. KL/MD depart SRF to return to Kenai AS/NM to quarters for lunch
1600 go to main office for new radio

Rite in the Rain

6/27/19

1615 arrive TS 3-4 to gauge

1855 complete gauge and decon at TS 3-4 see form for data

1900 at Plant office to turn in JSA

1915 return to lodging, drop off radio at main office - AS log book / daily

1930 EOD

6/28/2019 Sunny, Clear, 60°

0900 organization, complete JSA form, procurement list (for lodging and pool)

0910 at main office, sign in, pick up radio, file timecards, access internet

0950 head to Plant to get PTW signed

1030 arrive TS 3-9 to do walk around

1145 call South Area Operator to confirm access to flare pit well is allowed - he is coming to TS 3-9

1415 complete gauging and decon at TS 3-9 break for lunch

1515 organize truck and equipment

1615 begin building sample kits in the cool basement - ~70° outside and sunny

1800 break for dinner

1845 head to TS 1-9 to attempt pumping product from Flare Pit well - Carl 3 Amerhs

1910 remove ~1/10th gallon of water with blebs of product w/ peri pump

1915 head to plant to close permit

1930 go to main office to return radio, file time cards, check email

2000 return to lodging

Rite in the Rain

6/29/2019 Sunny, clear. 60° 180°
0700 pack truck, head to main office to sign in, get radio
0730 enter Plant office for PTW
0750 meet w/ ~~North~~ AS South Area operator to discuss flare pit activity planned for today and future - operator must be present - Garrett will make sure he is - we will notify Area operator in morning of planned flare pit activities
0800 Arrive ES - review site w/ NM - begin walk-through / un lock
0935 Notify South area operator we are ready for access to flare pit wells to gauge
1000 Review well in relief pit (TS1-2E) with Area operator - no issues working around this well
1130 complete gauging 1-4 and go to lunch at main office
1150 return to gauge electric shop
1440 complete gauging electric shop and ES mw wells. Return to lodging to decon and contact KL
1515 complete decon / refill decon bottles - break
1535 leave lodging for TS3-4 to attempt product recovery from Flare Pit well FS 3-4

1600 meet South area operator at TS3-4 - shift change in 45 minutes, cannot babysit us in the flare pit - no product removal until after shift change - drive by TS1-33, 1-27, and 2-15.
1645 return to lodging - build GAC, clean truck windows
1700 GAC built, windows clean - going to close out permit and return radio
1715 back at lodging - dinner
1800 leave SRF to meet Kim to pick up needed supplies
1930 return to SRF, sign in

Rite in the Rain

6/30/2019

0600 begin calibrating YSI, bump check turb

0700 load vehicle, ice cooler

0730 depart lodging to pick up radio, get PTW

0800 Await South Operator at plant - get PTW signed, discuss daily plan, review flare activity (TS 1-4 flare 6/29 unplanned) importance of upwind evacuation

0830 arrive TS 3-9, prepare to sample

1315 complete sampling two wells - TS3-9DD and TS 3-9B (MS/MSD) - break for lunch

1340 begin decon pumps

1400 product recovery from TS3-9A - about 0.2 gallons of product with some water - bailed

1420 begin setting up to sample

1800 depart TS 3-9

1815 close out PTW at plant - dinner

1900 sample management - packing cooler

2030 complete sample management, go to main office to file time cards and return radio

2100 EOD

6/30/2019

Sample Summary - all VOC/PAH analyses

SRF39-TS39B-0719	1135	MS/MSD
SRF39-TS39DD-0719		
SRF39-TS39AA-0719		
SRF39-TS39BB-0719	~~0945~~	Duplicate
SRF39-TS39BBZ-0719		

* All pumps decontaminated and new bladders installed for each sample. New tubing.

Waste Summary

GACed 6 gallons of purge and decon water - TS 3-9 - released to upland vegetated area at least 100ft away from surface water. No sheen or odor observed in GACed water.

Rite in the Rain

7/1/2019

List of wells requiring downhole camera

Well name	Purpose
TS1-4CC	determine if PVC is fully obstructed at ~4 ft or broken
TS1-4~~EE~~	possible break in casing? confirm top of screen (should be 6 btoc)
FS1-4E	confirm top of screen (~7.5 ft btoc)
FS1-4H	confirm top of screen (~10 ft btoc)
—	
TS1-9U, TS1-9M	confirm top of screen - consider these representative of old wells
—	
FS1-27C	confirm top of screen (unknown)
TS1-27G	confirm top of screen (~15 ft btoc)
—	
FS1-33S	obstruction at 29 ft btoc, screen
TS1-33Q	obstruction at 17.3 ft btoc, screen
FS1-33F	top of screen
FS1-33H	top of screen
FS1-33O	top of screen
—	
TS2-15O	top of screen
FS2-15B	top of screen
—	
TS3-4D	potential obstruction
TS3-4P	top of screen
TS3-4CC	obstruction at 18 ft btoc

List of wells requiring downhole camera

Well name	Purpose
FS3-4F	top of screen
FS3-4A	top of screen
FS3-4B	top of screen
—	
~~FS3-9F~~ 25.5	top of screen ~~light production~~
~~FS3-9T~~ 16.5	top of screen 16.5 ft ~~lot of high water~~ ~4 ft - rings of dark just above WL
~~FS3-9U~~ 19.5	top of screen
~~FS3-9V~~ 14.5	top of screen ~14.5 ft btoc
~~FS3-9G~~ 19.5	top of screen ~19.5 ft btoc

Scope if time allows - wells are not all in sampling program, but screened intervals are unconfirmed

TS1-4DD	Also scope
~~FS1-9II~~ AS	KSW-7
~~TS1-9HH~~ AS	
FS1-27~~J~~	
TS1-27N	
TS1-33P	
FS1-33T	
TS2-15Q	
TS3-4Z	
TS3-9S	

Rita in the Rain

7/1/2019

0600 NM calibrate sampling equipment. AS list of wells to scope

0715 NM/AS depart SRF to meet KL/MD to handoff samples

0800 meet KL/MD at Sterling intersection - hand off sample cooler

0820 head to Tesoro for fuel

0840 perform vehicle inspection, depart for SRF

0920 arrive SRF, sign in at Main Office, pick up radio - go to lodging, pack vehicle

0955 depart for TS3-9V - arrange to meet South area operator there to get permit signed.

1000 arrive TS3-9, await South Area operator

1010 South Operator arrives, PTW signed

1030 deploy down hole camera at TS3-9V to determine top of screened interval.

Observe very turbid water in the water column several feet above the screen - water just above and in the screened interval is clear, Identify top of slotted casing/screen at ~14.5 ft btoc - photograph image, but difficult to capture in current lighting conditions.

1130 Go set up to scope TS3 9G.

1200 Apparent battery failure. TTT suggests charging and trying again - AS to help NM complete sampling at TS3-9V.

1250 complete sampling and pack up. GAL gallon purge water and decon water release to vegetated upland area

1255 pick up Solex from down hole camera, return to lodging to charge batteries and eat lunch

1300 arrive lodging

1345 decon pump/sample management while battery charges - AS review remaining sites/schedule

1430 one battery fully charged - prepare to go back to TS3-9

1440 arrive TS3-9 - NM sets up on CR, AS to scope.

TS3-9G - find top of screen at 19.5 ft btoc.

TS3-9T - top of casing at ~16.5 ft btoc, making this a 15 foot screen (TD ~31.2 ft btoc) Screen not drowned. "Bathtub rings" on inside of casing around 10 ft, 14 ft, and current water level. Slight amount of product on probe after removed from well. Will gauge later and inspect probe to confirm.

Rite in the Rain

7/1/2019
TS3-9U - top of screen at 19.5ft btoc. Lots of staining on casing, but no clear evidence of product on probe. Will gauge later to confirm
TS3-9F - threads/wrinkles noted ~2ft btoc. This riser may have been loose last year. Does not create obstruction. Top of screen at 25.5 ft btoc. Product on camera probe after withdrawing from well. Will gauge later to confirm
1640 Scoping complete NM still purging CR. AS will gauge three wells that had suspected product based on casing staining or product observed on probe.
1700 TS3-9U DTW 17.09 ft btoc
no evidence of product on probe
1707 TS3-9T DTW 17.60 ft btoc
no evidence of product on probe - will install sock anyway
1715 TS3-9F DTW 19.98ft btoc
trace of black product globules and brown residue on probe, smell of product
1745 complete sampling TS3-9CR - clean up and decon
GAC ~25 gallons purge and decon water and release to upland area w/ vegetation.
1810 depart TS3-9 to meet South Operator at MOA to close work permit
1830 return to lodging - NM decon, sample management
1930 EOD

Sample Summary - all PAH/VOC analyses
SRF39-TS39V-0719 1215
SRF39-TS39VB-0719 1115 Duplicate
SRF39-TS39CR-0719 1730
All equipment (including pumps) decontaminated with Alconox and DI rinse between wells. New bladders installed in pumps, dedicated tubing.

Waste Summary
1.25 gallons purge and decon water GACed and released to vegetated upland area on TS3-9 at least 100 feet away from surface water. No sheen or odor observed in treated water

Rite in the Rain

7/2/2019 60's, overcast

0500 bag in loading vehicle, NM filling out work permit - review w/ AS

0545 pick up radio and sign in at main office

0600 Await South operator at Plant - get PTW signed

0620 Arrive I-9 - discuss strategy for today's tasks — After finding screens of varying lengths among the older wells yesterday, add several other wells to scope list at this site. Should have no drowned screens if 10 Ft screens, so will check LNAPL wells last — no immersion of probe should be required

0703 Scoping well TSI-9A. Found tubing using scoping camera in well at ~ 1.5 ft (old tubing - 2015)
Top of screen: 19.5 ft btoc
DTW: 23.5 ft
Inside of casing contains much redish-brown residue and PVC shavings in water.

0727 Scope well TSI-9C. Black staining inside casing.
Top of Screen: 16.5 ft btoc
DTW: 22.0 ft
*Re-evaluate TD to confirm screening interval.

7/2/2019 60's, overcast

0801: Scope well FSI-9I.
Top of screen: 9 feet btoc
DTW: 13 feet btoc

0820: Scope well FSI-9D. Drowned screen.
Top of Screen: 14.5 ft btoc
DTW: 13.5 ft btoc

0842: Scope FSI-9M
Top of Screen: 15.5 feet btoc
DTW: 20.0 feet btoc

0850: Scope FSI-9N
Top of screen: 15.5 ft btoc
DTW: 16.5 ft btoc

0919: Gauge TSI-9A to determine product presence. Sock in well.
DTW: 22.81 ft btoc
No product measured. 2 pieces PVC in monument.
Gauged around sock.

0932: Gauge TSI-9D No product traces.
DTW: 22.01 No measurable product

0939: Gauge TSI-9B Gauge around sock.
DTW: 22.41 ft btoc
Traces of product detected on probe.
Strong POL odor.

0947: Scope TSI-9D *Removed sock prior to scoping.
Top of screen: 17.25 ft btoc
DTW: 21.5 ft btoc

Rite in the Rain

7/2/2019 70's, Sun and clouds

1000 Complete sloping/gauging at TS1-9
Return to lodging to compile notes, let down hole camera dry out (fog inside camera lens), eat lunch

1100 re-ice sample cooler, pick up truck, drive to TS3-4

1115 arrive TS3-4

1131 Scope FS3-4B, large amounts of reddish-brown residue inside well casing.
Top of screen: 20.5 ft
DTW: 9.5 ft
Floating black and white chunks w/in water column and throughout.

1152 Scope FS3-4A
Top of screen: 27 ft btoc DTW: 14 ft btoc
First joint appears to be loose.
Orange-brown gunk above water / clear below
Black staining @ 21 ft btoc
Slots appear to be ~~blocked~~ partially obstructed @ 34 ft bgs sediment
Sediment in bottom of well

1215 Scope ~~FS3-4F~~ FS3-4F
Top of screen: 15.1 ft btoc DTW: 14 ft btoc
Brownish-orange staining inside PVC

1239 Scope TS3-4CC
Top of screen: 10.5 ft DTW: 12.8 ft
Obstruction predicted @ 18 ft → no obstruction detected
Brownish-orange staining inside PVC
*Lower BP down to obstruction depth

7/2/2019 70's, Sunny

1303 : ~~Scope~~ Guage TS3-4D* for product presence
DTW: 15.80 ft
No measurable Product; however, Product detected on probe & odor

1319 : Scope TS3-4P
Top of screen: 12.5 ft DTW: 10.5 ft
Tubing at ~4 ft btoc – removed
Strong POL odor

1345 depart 3-4, head to Electric Shop to scope KSW-7, KSW-8 for damage/top of screen
* Decided not to scope this well to prevent excessive contamination of scope. This well is considered an LNAPL well and will not be sampled in 2019.

1355 Scope KSW-8
Top of screen: ~~7.0 ft btoc~~ ~~6.5 btoc~~ DTW: 6.5 ft
Scoping for damage from strike earlier in year. PVC cut ~1 foot.

1406 Scope KSW-7
Top of screen: 7.25 ft DTW: 6.15 ft btoc

1421 Scope TS1-4CC
Top of screen: NM DTW: NM
Tubing removed.

Rite in the Rain

TS1-4CC (cont'd) 7/2/2019 80's, Sunny
obstruction at ~3.5 ft btoc
steel monument bent and damaged
from snow plow denting/obstructing casing.
1445 call South Operator to ask about
getting into flare pit at TS1-4-10 min.
Out he says
1450 hear over the radio 12 and 13 say that
being in flare pits is not a good idea
while Plant is dealing with compressors
going down – we will save all flare
pit activity until compressors are back
online and pressure normalizes
1500 South operator (13) stops by to check
in. North sites next, North operator
(12) to stop by in a while to check in
about moving to north sites. NMAS
to scope last non-flare pit well at TS1-4.
1509 Scope TS1-4EE
Top of screen: 5.5 ft OTW: 5.9 ft
1530 Talk w/ North Operator – postponing
North activity until tomorrow morning.
Will do flare pits as early as possible in
the morning - less risk of flaring in
cooler temperatures
1535 arrive Plant – dispose of one bag IDW
in Alaska waste dumpster - will be

7/2/2019 80's, Sunny,
transferred to local landfill – nitrile
gloves, poly tubing, paper towels, bailing
twine and nylon rope, bladders and
O-rings, packagings for items above
1645 – close PTW, head to lodging via
main office
1700 unpack truck, charge equipment/dry
scope, ice samples, paperwork
1800 EOD

Waste Summary

Disposed of one bag of IDW in Alaska
Waste Dumpster at the Plant (HOA).

Rite in the Rain

7/3/2019 60°s clear
0515 load truck, re-ice samples,
0530 meet North Operator (Seth) to get PTW signed and discuss plan for day - Flare pit activity allows entry - head to 2-15.
0545 arrive 2-15, prepare to scope and gauge flare pit well
0605 move on to gauge remainder of site
0715 complete gauging 2-15 and scoping second well. Review notes to ensure that no other wells need be scoped at 2-15.
→ Other screen depths confirmed from 2002 installation reports. Done scoping
0730 radio call/check from North Operator that we are heading to TS1-27 flare pit — Operator was called to another task just prior to our request, we will go to 1-27 and begin with wells outside the flare pit
NOTE: Scoping notes are captured on gauging forms for all sites scoped/gauged today.
0900 complete gauging 1-27, scope wells, some added due to suspected tubing down well (not visible).
1000 complete scoping at TS1-27 - found tubing fallen down several wells not on list for scoping - identified and removed tubing

7/3/2019 80°s clear, sunny, hot
1005 head to TS1-4 to meet South Operator to scope remaining TS1-4 wells. Await Operator at 1-4
1030 South Operator arrives - get into flare pit to scope two wells there
1100 complete scoping, pack up, to lodging for lunch
1200 pack truck, go to 1-33 to scope and gauge
1215 arrive TS1-33 - discuss approach for scoping/gauging - well sequence
1445 complete gauging TS1-33 - cool down
1500 start scoping
1615 complete scoping - notes on gauging form - return to plant to drop off work permit
1630 leave plant for lodging - dinner
1645 1700 planning/paperwork - preparation for tomorrow, organizing.
1845 EOD

Rite in the Rain

7/4/2019

0400 email / questions for KL regarding schedule and wells
0415 Calibrate YSIs / turb bump check, recice samples
0445 load truck / clean windows / vehicle inspection
0530 main office - sign in, get radio
0540 rn to I-33 to pick up shirt left overnight
0545 radio South Operator - meet him at 3-9 to get PTW signed
0600 arrive TS 3-9 - set up on FS 3-9G and TS 3-9U.
0930 Complete sampling FS3-9G and TS3-9U. AS call KT about staffing.
1000 Set up to sample next well - decon pumps and install new bladders. Set up to sample TS 3-9T and TS 3-9F.
1250 Complete sampling wells, pack truck GAC 7.7 gallons purge and decon water
1345 Complete GAC - no odor or sheen observed. Release to vegetated upland area more than 200 ft from surface water. Head to HoA to close work permit
1400 close work permit. Dispose of one bag of IDW at Alaska Waste Dumpster

7/4/2019

1415 return to lodging - unpack sampling equipment.
1445 depart lodging - sign out and return radio at main office
1530 arrive Fred Meyer Soldotna to hand samples over to Kenai team
1600 dinner
1800 drive back to SRF
1850 sign in at main office
1855 drop gel ice at cook's freezer
1900 return to lodging - decon pumps and refill decon bottles
1945 EoD

Summary of Samples 7/4 (all VOC/PAH)

SRF39-FS39G-0719	0740	
SRF39-TS39U-0719	0810	
SRF39-TS39U2-0719	0710	Duplicate
SRF39-TS39T-0719	1145	
SRF39-TS39F-0719	1205	likely hot-LNAPL

* Pumps decontaminated with Alconox / DI spray and scrub, bladders changed before each well.

Waste Summary
7.7 gallons of purge and decon water (TS3-9)
One bag IDW at Alaska Waste Dumpster at Plant

7/6/2019

0400 begin calibration/pump decon/ planning for 1-4 wells (screens, rates from notes/historic)
0600 load vehicle - relce samples, pickup radio sign in
0630 Arrive NOA to await South Operator
0645 South operator arrives, does not sign permit, calls Plant to sign - head to TS 1-4 Flare pit, unload gear
0650 radio call from Plant, cannot send Operator to 1-4 until 10am. Reload, go to 1-9 to finish two wells.
0700 arrive 1-9.
0915 complete sampling two wells and pack truck. Decon in shady location onsite
1000 drive to 1-4 - setup to sample Flare pit wells
1145 Plant pressure climbing, Ops asks us to leave flare pit - remand personnel to vehicle and leave equipment at wells
1200 Return to flare pit allowed. Determine to collect samples without further stabilization. The heat of the day is likely to make matters worse, not better, at the plant. We feel it is safer to be out of the flare pit as soon as possible. No duplicate collected. Neither well can sustain over 50 mL/min without drawing down

7/6/2019

1245 depart TS 1-4 flare pit - return to lodging to perform sample management and decon
1300 return to lodging - unpack, organize
1340 break
1500 begin GAC changeout, sample management
1715 Drive to TS 1-9 to GAC remaining purge/decon water
1745 complete GAC - 7.0 gallons purge/decon
1750 stop at TS 1-33 to see if bladder pump could fit down 1-3302 - possibly if PVC is forced to side of monument, but not for sure.
1820 Close PTW
1825 return radio to Main office - back to lodging
1830 EOD

Summary of Samples (all PAH/VOC)

SRF19-TS19C-0719	0835	
SRF19-TS19D-0719	0835	likely Dup
SRF19-TS19DZ-0719	0735	likely Dup
SRF14-FS14E-0719	1215	samples collected without complete stabilization, see note at 1200
SRF14-FS14H-0719	1220	

Pumps were decontaminated with Alconox/DI spray and scrub and bladders changed for each well.

7/6/2019

Waste Summary

7.0 gallons purge and decon water from TS1-9 released to an upland vegetated area at TS1-9 - no sheen or odor observed.

7/7/2019

0415 calibrate YSI, bump check for B, kit build for Electric Shop, jar inventory, park truck, re-ice sample coolers

0600 sign in and pick up radio at main office

0605 go to plant office, meet Taylor (Lead Op)

0615 meet South and North Area Opr. at TS133, get PTW signed. Go to I-4 to sample Two remaining wells (EE and GR)

0620 set up to sample I-4 wells

1235 Complete Sampling TS1-4GR - a pan fully slow well with a orange-tinted water that stains everything it touches. Could not avoid taking a duplicate because flare pit wells were not an option, other wells on site have LNAPL

1240 release purge/decon water (GACed) from FS1-4E and FS1-4M ~2 gallons No sheen or odor observed. Released to vegetated upland area >200 ft from surface water

1250 arrive at Plant - lunch

1315 go to main office for cell reception, lodging to pick up supplies

Rite in the Rain

7/7/2019

1330 arrive at TS1-33 - notice water in truck, investigate — turns out to be a liter of DI that spilled.

1345 go to TS1-33 to re-scope FS1-33S to look for potential obstruction at 29ft btoc. Possible slight deviation, incasing at that depth, but scope passes to TD with no issue. No apparent obstruction.

1415 back to Electrics Hop to sample KSW-8 and ensure well labels are accurate

2015 complete sampling KSW-7 and KSW8

Go to Plant to close TIW

2020 dispose of one bag IDW and Alaska Waste Dumpster at Plant for transfer to local landfill

2025 Stop at main office to drop off radio

2030 return to lodging, unpack, re-ice samples

2045 EOD

Sample Summary (VOC/PAH for all ~~SRFs~~ for 1-4 wells)

SRF14-TS14EE-0719	0825	MS/MSD for all, incl. Ethyl
SRF14-TS14GR-0719	0930	includes EG
SRF14-TS14GRZ-0719	0830	duplicate ~~EG only~~ AS all.
SRFES-KSW7-0719	1900	VOC/PAH
SRFES-KSW79-0719	1800	duplicate VOC/PAH
SRFES-KSW8-0719	1820	GRO ~~MS~~/MSD, VOC/PAH
SRFES-KSW89-0719	1720	GRO only DUP

7/7/2019

Waste Summary

2 gallons purge and decon water from 1-4 flare pit wells GACed and released to a vegetated upland area >100 ft from any observable surface water. No sheen or odor.

~3.75 gallons of purge and decon water from TS1-4EE and TS1-4GR containerized and labeled. This water may contain ethylene glycol and will not be GACed or released. It will be labeled and taken to the G&I facility.

1 bag IDW disposed of in Alaska Waste Dumpster at the Plant. Waste will be transferred to local landfill by Alaska Waste.

*Pumps were decontaminated with Alconox and DI spray and scrub between each well. New bladders were installed for each well.

Rite in the Rain

7/8/2019

0500 Prepare forms, discuss sampling plan, review historical data
0600 decon pumps, re-ice coolers, calibrate YSI / bump check turbidimeters, pack truck, organize equipment, PTW, talk to Kyle Thornberry
0830 main office for sign in, pick up radio – Plant to get PTW signed
0840 arrive Electric Shop, Set up to sample KSW-6 and KSW-1.
1215 complete sampling, pack truck
1220 GAC and release 2.0 gallons purge and decon water from KSW-7 and KSW-8 to upland vegetated area >200ft from observable surface water. No sheen or odor observed.
1230 return to lodging, charge batteries, decon, lunch
1340 go to Plant to meet Bob
1430 arrive ES, find KSW-4 approach set up
1450 GAC and release about 3.5 gallons purge water from KSW1 and KSW-6. Released to upland area >200 ft from surface water. No sheen or odor observed
1505 AS to pick up KT at Plant
1800 Completed GW sampling at Electric Shop
1815 GAC and release ~3.5 gallons of purge/decon water.

7/8/2019

1830 Returned to lodging and unpacked eq.
1930 Packed sample kits/coolers for shipment

*Sample Summary (VOC/PAH For all 4 wells)

Sample	Time	Notes
SRFES-KSW1-0719	1105	MS/MSD
SRFES-KSW3-0719	1655	
SRFES-KSW4-0719	1610	
SRFES-KSW42-0719	1510	Duplicate of KSW4
SRFES-KSW6-0719	1145	

Waste Summary

9 gallons of purge and decon water from KSW-7, KSW-8, KSW-1, KSW-6, KSW-3, and KSW-4 GAC'ed and released to vegetated upland area >200 ft from surface water at Electric Shop site. No sheen or odor was observed.

* Pumps were decon'd/laminated between wells and a new bladder installed for each well. Alconox and DI spray and scrub were used for decon.

Rite in the Rain

7/9/2019

0500 prepare Forms, discuss sampling plan, submit timecard, calibrate YSI

0600 complete shift change with Alison Sacks,

0630 complete bump checks on 4 IST turbidity meeter

0630 reice coolers, pack truck, organize equipment

0645 arrive at main office for sign in and grab radio

0650 arrive at plant, call Car 13

0700 met car 13 at TS3-4, signed work permit

0715 dropped gear at FS3-4B and FS3-4A.

0930 completed sampling

1000 KT moved to TS3-4P to sample

1005 NM went to main office/ made call for supplies

1030 NM returned to TS3-4 and GAC'd 3 gal of purge water from FS3-4B & 4A which had no oder and no sheen

1050 NM set up on FS3-4MM

KT moves to ~~FS3-400~~ TS3-400

1220 KT Finishes TS3-400

1310 KT GAC 5gal of purge water From TS3-4P & 400*

1310 NM GAC 3 gal of purge water From FS3-4MM*

* purge water has no oder or sheen present

KT

1330 ~~1445~~ KT & NM set up on FS3-4F and TS3-4CC

1445 KT & NM GAC 3-5 gal of purge water that had no sheen and no oder from FS3-4F & TS3-4CC

1515 KT & NM pack up gear and prepare to leave TS3-4

1525 KT & NM arrive at Aspen bunkhouse

1545 KT & NM Arrived at TS1-33 NM set up gear on FS1-33W

1600 KT inspected FS1-33M. Well has sock installed and two bailers adjacent to PVC in Casing. KT & NM concluded there is too much product on sock to merrit sampling well.

Rite in the Rain

7/9/19

1610	KT moved to FS1-33F to sample
1745	KT Finished sampling
1755	KT & NM GAC 2 gal From FS1-33F and 2.5 gal From FS1-33W. Purge water had no sheen or odor
1800	KT & NM Depart to Plant to turn in work permit
1810	KT & NM return to Aspen Bunk house
13.5	
1825	KT & NM Finish unloading truck
1915	KT went back to FS1-33F to pick up GAC Bucket
1930	KT & NM start sample, inventory and COC/Summary
2.25	
2146	KT & NM complete All tasks - For day

KT 7/9/19

Summary of Samples	7/9 (all VOC/PAH)	
SRF34-FS34A-0719	MS/MSD	0820
SRF34-FS34B-0719		0825
SRF34-TS34P-0719		1040
SRF34-TS34PZ-0719	Duplicate	1050
SRF34-TS3400-0719		1200
SRF34-TS34MM-0719		1205
SRF34-TS34CC-0719		1420
SRF34-FS34F-0719		1430
SRF34-FS133F-0719		1710
SRF34-FS133FZ-0719	Duplicate	1720
SRF34-FS133W-0719		1720

Waste Summary

19 gallons of purge water & decon water From FS3-4A, FS3-4B, TS3-4P, TS3-400, TS3-4MM TS3-4CC, FS3-4F, FS1-33F and FS1-33W GACed and released to vegetated upland areas >200ft from surface water. No sheen or odor was observed

*All pumps were decontaminated and new bladders were installed For each well. Alconox & DI were used to scrub for decon

Rite in the Rain

7/10/19

0600 KT & NM discuss sampling plan and submit time card

0625 KT departs for main office to pick up radios an sign in

0634 KT Arrives at plant office to complete work permit and discuss a sampling plan For TS2-15

0645 KT returned to Aspen bunkhouse to clean bladder pumps and replace the bladders.

0630 NM calibrates both YSI's and completes bump checks on both turbidity meeters.

0700 KT & NM load truck with gear and sample coolers

0735 KT & NM call car 12 to arrange Flare pit watch at TS2-15

0740 KT & NM depart For TS2-15 to sample ~~the~~ KT well FS2-15B

0750 KT & NM met with North Operator at TS2-15. North operater not available until 1230 or 1300 to monitor Flare

7/10/19

0800 KT & NM set up on wells TS2-15P and TS2-15R.

0900 KT Finishes TS2-15R and ~~pdr~~ KT GAC's 2.5 gal of purge water that had no oder or sheen

0930 NM completes sampling TS2-15P and ~~P~~ KT GAC's 2 gal of purge water that had no oder or sheen.

0915 KT setup on TS2-15O

1013 KT completes sampling and GAC's 1.5 gal of purge water that had no sheen or odor

1015 KT & NM. decon bladder pumps and replace ~~tat~~ KT bladders

1115 KT & NM move to TS1-27 to sample wells

1315 KT & NM Finished wells TS1-27G and TS1-27K, decon bladder pumps, and replace bladders

1320 KT & NM return to TS2-15 to GAC 3.4 gal of purge water From TS1-27K & TS1-27G purge water did not have odor or sheen after GAC process.

Rite in the Rain

7/10/19

1340 KT contacted car 12 North Operator to gain access to FS2-15B.

1400 Intern Johnathan arrives KT & NM describe work to be completed in Flare pit. Intern shutdown Flare valve.

1505 KT & NM Finish sampling FS2-15B.

1510 KT GAC's 2.0 gal of purge water, no sheen or odor was noted.

1515 KT & Intern Johnathan discuss moving to TS1-27~~6~~C

1516 KT & NM Head to TS1-27C (KT)

1520 KT & NM begin purging TS1-27C

1625 KT & NM complete sampling TS1-27C and return to ~~F~~TS2-15 to ~~KT~~ GAC 2.4 gal of purge (KT) water from TS1-27C. Post GAC the ~~KT~~ purge water did not have a sheen or odor.

1700 KT & NM complete decon of bladder pumps and replaced bladders - KT & NM return to TS1-27 to sample wells => TS1-27M and TS1-27L

7/10/19 -27M KT

1825 KT completes TS1-~~27t~~. Purge water total = 1.2 gal

1830 upon sampling completion KT returns to NM at TS1-~~27M~~ (KT) -27L ~~KT~~ (KT)

1848 NM completes sampling TS1-27L purging 1.0 gal of water

1855 NM called Kimi Lloyd to coordinate cooler pickup and resupply.

1900 KT & NM depart TS1-27 to turn in work permit ~~and~~ (KT)

1915 KT & NM drop off radio at main office

1920 KT & NM arrive at Aspen Bunkhouse

1945 KT & NM unload truck and ~~begin~~ (KT begin) complete sample inventory, COC's, daily report, QC's of field reporting, waste summary

2200 End of day

7/10/19

Rite in the Rain

7/10/19

Sample Summary (7/10) (All VOC + PAH)

Sample	Time	Notes
SRF215-TS215R-0719	0850	
SRF215-TS215P-0719	0910	MS/MSD
SRF215-TS2150-0719	1020	
~~SRF2T~~ KT		
SRF215-TS2150Z-0719	0920	Duplicate
SRF215-FS215B-0719	1500	
~~SRF215-FS21~~ KT		
SRF127-TS127G-0719	1210	MS/MSD
SRF127-TS127K-0719	1210	
SRF127-TS127KZ-0719	1110	Duplicate
SRF127-FS127C-0719	1610	
SRF127-TS127M-0719	1800	
SRF127-TS127L-0719	1830	

Waste Summary

13.8 gal of purge and decon water From TS2-15R, TS2-15P, TS2-150, FS2-15B, TS1-27G, TS1-27K, FS1-27C, was GAC'ed and released to vegetated upland areas >200 Ft From surface water. No sheen or odor was observed

*All pumps were decontaminated and new bladders were installed For each well Alconox and DI water were used to decon.

7/11/19

0645 KT Fills out Permit to work (PTW)

0700 KT + NM discuss morning tasks - calibrations YSI / turbidity meter, pickup radio, turn in (PTW), sign in at main office, decon bladder pumps, replace the carbon in GAC

0835 morning tasks completed bladder pumps deconed with alconox and DI rinse. Replaced bladders.

0846 KT + NM arrive at TS1-31 and prepare to sample

0905 KT + NM set up on FS1-33S with peri pump due to the significant casing damage that will not allow For a bladder pump to Fit down PVC

1030 complete FS1-33S, GAC'ed 2.5 gal of purge water*

1045 KT set up on TS1-33Q to sample

1200 KT Finish sampling TS1-33Q, 1.5 gal of purge water* GAC'd

Rite in the Rain

7/11/19
1100 NM set up on TS1-33JJ
1240 NM Finish's sampling TS1-33JJ and GAC'ed 2.5 gal of purge water*
1300 KT & NM conduct product recovery at FS1-33H. Visable product was seen on the sock. A bailer retrieved 3L of clear water* with some sediment which was black in color. The bailed water contained a strong POL oder. The water was added to a product bucket as a GAC would not clean ~~thru~~ KT thoroughly.
1340 KT & NM inspect TS1-33UR for signs of product. Sock was redish brown in color. DTW 9.44' interface probe (oil/water) did not determin that there was any product present.
1350 KT & NM decon bladder pumps and replace with new bladders
1415 KT set up on TS1-3302
NM set up on TS1-33UR
1530 KT completes TS1-3302
1555 NM completes ~~FS1-33UR~~ KT TS1-33UR
log continued on book 2 ↵

SRF Safety Orientation Notes 6/27/19
Lead Operator Max - arrangements for lodging

In theevent of a nearby wildfire, HTK will Notify of evacuation and, if road is not passable, evacuation will be by helicopter

Get radio from main affice

BLM, FSW onsite for inspections

Tankcleaning operations going on now

Complete JSA each day / Work Permit

Emergency Trauma Technicians onsite

Wolves seen on the Facility

Freight delivery Tuesdays

Muster - Plant unless emergency is there, then office

Ask lead operator about duck ponds
AFE for fuel used in field activities

EQUIPMENT	#1	#2
BLADDER PUMP	12559	12055
COMPRESSOR (MP-50)	1092	1505
YSI	04D8023 AF	11H101295
TURBIDIMETER	11741	15652
MINI RAY	910771	N/A
W-L METER	16:25980	091516
C-W INTERFACE	09.010463-1	N/A
SCHONSTEDT	249089	N/A
PERI PUMP	56270	N/A

BOTTLES

40 mL VOA	15
40 mL VOA + HCl	288
250 mL AMBER	180
250 mL AMBER + HCl	12



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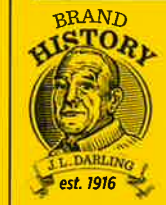


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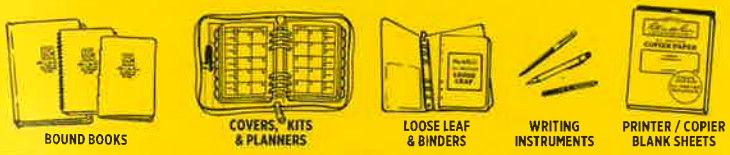
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Project 2019 CS GWM: SWANSON RIVER FIELD ELECTRIC SHOP (1107702) & TANK SETTINGS (1107701)

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CONTENTS

PAGE	REFERENCE	DATE

7/11/19

continued from log book 1.

- KT & NM GAC'ed ____ gallons of purge water* from TS1-3302 and TS1-33UR.
- KT & NM move to FS1-33H to sample well. A peripump was used to sample well due to the significant quantity of product observed on the PVC walls. This peripump was utilized to keep from comprimizing the bladder pumps with POL product.
- KT & NM utilized a hydrsleeve to sample VOC's. The diameter of the hydrosleeve was too large once filled and scraped the walls of the PVC on the way to surface. VOC samples were obtained regardless as there was no alternative method of obtaining a sample without introducing POL. The hydrosleeve was decontaminated with Alconox and DI water prior to punchuring with sample

7/11/19

straw.

- KT & NM complete sampling FS1-33H and return to The Aspen Bunkhouse.
- NM starts sample inventory and completes COC's for cooler handoff
- KT closes off work permit At the plant
- KT returned radio to main office
- KT un loads equipment At Aspen bunkhouse to make room for 4 cooler handoff.
- KT & NW complete COC's and sample inventory and depart for cooler swap at Sterling highway and Swanson River Road.

1850-1900 - Arrive at cooler swap location

2050-2130 - Arrive at Brice equipment rental to obtain samples 1ST jars for re-sampling at TS3-9

2145- Leave Brice Equipment Rental to get fuel and head back to Swanson River Lodging

Rite in the Rain

7/11/19

2245 arrived at Aspen Burnhouse

Sample Summary	time	Notes
SRF133-FS133S-0719	1015	
SRF133-TS133Q-0719	1115	MS/MSD
SRF133-TS133JJ-0719	1210	
SRF133-TS133UR-0719	1520	
SRF133-TS13302-0719	1500	
~~SRF133-TS113302Z-0719~~	~~1400~~	~~Duplicate~~ KT
SRF133-TS133022-0719	1400	Duplicate
SRF133-TS133H-0719	1655	

Waste Summary

11.7 gal of purge water* and decon water* From TS1-27M, TS1-27L FS1-33S, TS1-33Q, TS-133JJ, TS1-33UR, TS1-3302, TS1-33H was GAC'ed and released to vegetated upland areas >200 FT from surface water. ~~AT~~ KT * = No sheen or odor was observed after the GAC process.

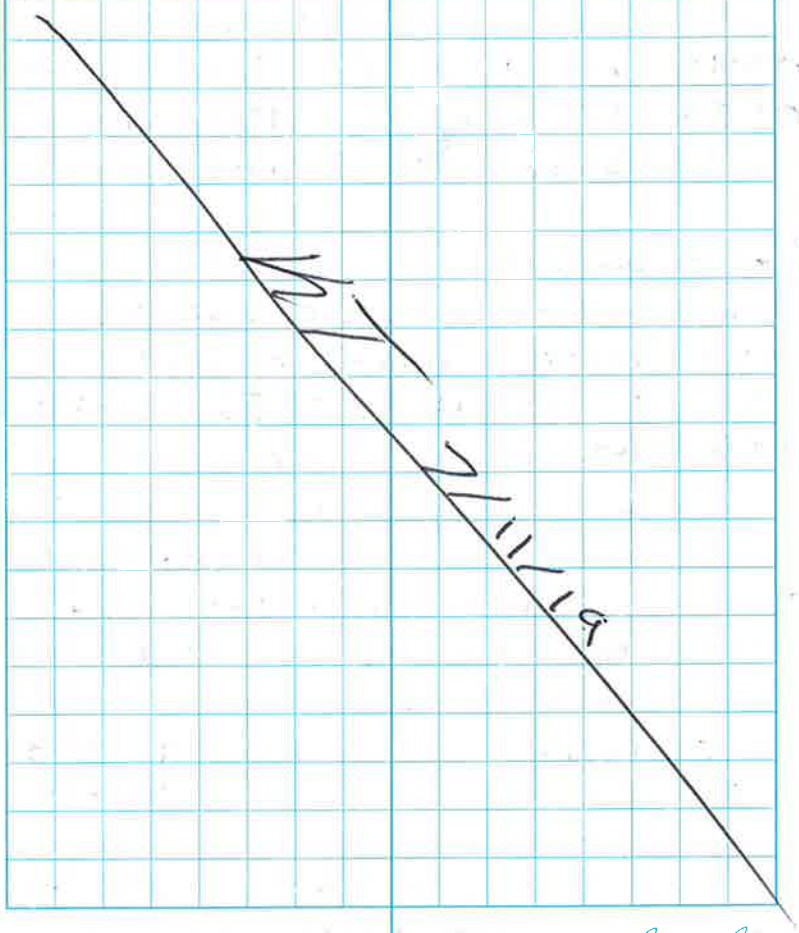
- All pumps were decontaminated and new bladders were installed for each well. Alconox and DI water were used to decon.

1.2 gal of purge water From TS1-33H was collected and stored For GoI processing

7/11/19

due to the ~~of~~ KT strong odor of POL. It would prove to be too time consuming to process this 1.2 gal of water with the GAC. As three attempts prosed POL smell remains

EOD ~~20~~ KT 2245



Rite in the Rain

7/12/19

0645 KT Fills out Permit to work

0700 KT & NM discuss morning tasks - calibration of YSI and turbidity meter, sign into main office, pick up radio, sampling strategy

0745 KT departs for main office

0750 KT completes PTW at Plant office and discusses waste stream process w/ plant Forman.

0810 KT arrives at TS1-33 to install absorbant socks at FS1-33H and TS1-33UR

0830 KT departs for Aspen bunkhouse to complete decon, create organization to waste streams / documentation, load vehicle w/ equipment. NM created sample kits and calibrated. Sample preparations.

1000 Depart for resampling at TS3-9.

1015 NM gets up on well TS3-9T

1025 KT sets up on well FS3-9G

1125 KT completes well FS3-9G purge water total is 1.3 gal

1150 KT completes deconing bladder pump * and GAC's 1.3 gal of purge water. No odor or sheen was observed.

↗ KT moves to TS3-9V

1200 - NM completes well TS3-9T purge water total is 3.25 gal

- NM completes deconing bladder pump * and GAC's 3.25 gal of purge water. No odor or sheen was observed 9V KT

- KT completes well TS3-~~9H~~ purge water total is 2.5 gallons

1345- KT completes deconing bladder pump * and GAC's 2.5 gallons of purge water. No odor or sheen KT was observed. NM starts TS3-9R GW.

1400 KT starts ~~TS3-R~~ KT TS3-9U gw monitoring.

1500 NM completes well TS3-9CR. Purge water is 1.50 gal and is GAC'd. No odor or sheen is observed. KT completes well TS3-9U. Purge water is 1.00 gal and GAC'd. No sheen

Rite in the Rain

or odor was observed.

1515 KT completes decon of bladder pump.

1530 KT and NM set up on well TS39F It was decided to use a peri Pump to sample this well due to the sock being observed to be stained w/ product and the equipment being compromised from this well when it was sampled on 7/9. Product recovery was attempted to determine any presence of product using a bailer, but none was detected. Instead of eliminating this well from the program, a peri pump will be used so as not to compromise the bladder pump and associated equipment.

1650 KT & NM complet TS3-9F purge water total is 1.2 gal Purge water was GAC'ed until there was no POL odor or sheen

1700 KT & NM head to TS1-9 to document wells / take photo's to record how crew left MW

1710 KT & NM depart for TS3-4 to replace well caps at and take photos of wells.

1750 KT & NM complete TS site eval and return to Aspen Bunkhouse

1755 NM begins sample inventory and COC

1800 KT ~~etos~~ KT heads to plant office to close out work permit

1820 KT arrives at main office to return radio.

1830 KT & NM break for dinner

1855 KT & NM continue sample management and notes

Sample Summary	time	Notes
SRF39-FS39G-0719	1110	Hot-LNAPL
SRF39-TS39T-0719	1150	POL odor-LNAPL
SRF39-TS39V-0719	1250	
SRF39-TS39VZ-0719	1150	Duplicate
SRF39-TS39U-0719	~~1400~~ 1440 KT	POL odor
SRF39-TS39CR-0719	1440	POL odor
SRF39-TS39F-0719	1640	POL odor & LNAPL

Rite in the Rain

7/12/19

Waste Summary

10.75 gal of purge water* and decon water* From FS3-9G, TS3-9T, TS3-9V, TS3-9U, ~~FS3-9CR~~ KT TS3-9CR, TS3-9F was GAC'd and released to vegetated upland areas > 200 ft From a surface water areas.

* => No sheen or odor was observed after the GAC process

All Pumps (bladder) were decontaminated and new bladders were installed for each well. Alconox and DI water were used to decon.

2145 KT completes Sample and waste summary. KT prepared GAC for treatment/waste storage. KT & NM create list of wells to do final inspection and documentation.

EOD 2145 KT 7/12/19

7/13/19

0600 KT Fills out permit to work form.

0620 KT departs to main office to sign in.

0630 KT departs to plant office to File Permit to work Form

0640 KT departs to X and Y to meet south operator and intern David.

0650 a plan to enter the three southern Flare pits at TS3-4, TS1-9, and TS3-9 is discussed

0655 KT returns to Aspen Bunkhouse to discuss plan with NM

0710 KT & NM Depart for TS3-4 to bail product from FS3-4D

0720 Begin product recovery at FS3-4D using 1-inch bailer. DTP at 12.55 ft btoc.

1755 Bailed with 1" bailer 50 times. DTP at 19.32 ft bTOC Approximately 2.5 gallons of product bailed.

0810 ~~Begin bailing Product at TS3-4D~~ KT DTW 16.74' interface probe did not indicate Product

~~Sock has 8.5"~~ KT

Rite in the Rain

7/13/19

0815 TS3-4D sock absorbed .85' of LNAPL since install by Brice crew on 6/27/19

0820 Depart TS3-4 ~~for~~ TS1-9

0830 ~~Arrive~~ KT Arrived at FS1-9F and waited for intern david to arrive

KT ~~Gauged FS1-9F with inter-face probe~~ KT

0845 entered flare pit, labeled well with name, inspected sock installed by brice crew - sock was 0.5' saturated with product and dedicated bailed left down well was full of product

0855 KT and NM depart for TS3-9 FS3-9E..

Upon inspection of ~~FS3-R~~ FS3-9E sock was saturated to 50% of length interface probe determined ~~DTP~~ DTW KT to be 12.63' BTOC

sock at FS3-~~RE~~ 9E was flipped

0925 TS3-9A DTP 19.81' BTOC

Bailed ~~3~~ 5 times, recovered approximately 1-2 inches of product from each bail Bailer coated in product and required cleaning w/paper towel in between each bail. Bailed until no product was observed in water. All IDW used during product recovery from TS3-9 was disposed of in the oily waste bin at the TS 3-9 facility.

0955 Completed product recovery at TS3-9A and added lock to TS3-9CR.

1015 Arrive at Electric Shop

1018 Inspect KSW-5. Well plug added.

1024 Inspect KSW-2. DTP: 45.30 ft btoc. Solid Signal. Bailing product and must wipe bailer clean of product coating between each bail. Bailed 6 times before limited product recovery. Approximately 1 gallon of water/product mixture recovered

Rite in the Rain

well plug added. Sock completely saturated w/product.

1056 Inspect ESMW-A ~~DTW 12.20~~ NM
DTW: 11.70 ft btoc. Water signal.
Sock completely saturated w/product. well plug added

1103 Complete inspection at Electric Shop and head to TSI-4 to start inspection there. ~~Well~~ NM

1113 Inspect TSI-4F. Water in monument
DTW: 12.22 ft btoc. Water signal. IF probe

1122 Inspect TSI-4J. DTW: 11.08. Water signal on interface probe. Visable LNAPL on interface probe. ~~Eapre~~ Kit Well plug replaced

1138 FSI-4M jacked to point where lid cannot close. PVC needs to be cut down. ~~Both~~ need locks

1141 KSW-3 PVC needs to be cut ~~down~~
PVC jacked to point where lid cannot close. Needs lock.

1150 Labeled KSW-4

1200 Labeled/Photographed at TSI-27

1210 Labeled/Photographed at TS2-15

1220 Labeled/Photographed at TSI-33.
TSI-33 KK needs a lock.

1225 Depart I-33 for Bunkhouse

1228 Arrive at Bunkhouse and take lunch.

1245 Begin waste management
Final waste stream slated to relinquish to G+I facility

Site/Name	Contents
TSI-33	2 LNAPL Socks
TSI-4	2 LNAPL Socks
Electric Shop	1 LNAPL Sock
TSI-9	2 LNAPL Socks and tubing
TS3-4	2 LNAPL Sock and tubing
GAC Filter Fabric	

→ The above waste streams were combined into one oily waste bag

Spent GAC	1 6-gallon bucket (full) and 1 bucket - 5 gallons full (2 total buckets)
Ethylene Glycol TSI-4	~~4 gallons~~ NM (1 bucket) 5.5 gallons
TSI-9	1.5 gallons of product in 1 bucket.
FS3-4D	2 gallons of product in 1 bucket
TS3-9	1 gallon of product in 1 bucket
Electric Shop	1.5 gallons of product in 1 bucket.

Rite in the Rain

1350 Depart Lodging to dispose of IDW at Waste Man Dumpster at HOA. Spoke w/ lead Operator (Car 26) to relinquish waste streams. ~~all waste~~ NM Met at main office.

1405 Relinquished waste streams to lead operator (Jake). Took product buckets to skim pit and oily waste to incinerator. LO stated that each waste stream would be manifested upon disposal by each tank setting.

1410 HOA to return tools and keys to Plant Max (PM). Turned in work permit I signed. keys belong in a lock box in the main office

1420 Return to lodging to pack personal belongings for departure and demob SRF.

1450 Completed sampling and gauging efforts at SRF. End of this portion at 110701/110702. Will meet in Kenai to finish HB0001 efforts and return later to cut PVC. ~~EOD~~ NM Sign out at main office. EOD.

NM

18 JULY 2019 KL & NM

SWANSON RIVER FIELD 70°F CLEAR

MODIFIED LEVEL D PPE + FRC

0930 DEPART LODGING FOR SRF

1020 SIGN IN @ SRF MAIN OFFICE

1100 ESTABLISH WORK PERMIT

1115 SRF TS 1-4: FLARE PIT

- PLACE PLUG IN FS1-4E & LOCK ON MONUMENT
- FS1-4H MONUMENT LID DOES NOT CLOSE (MISALIGNMENT) PLACED LOCKING PLUG W/LOCK @ TOP OF WELL

1130 SRF TS 3-4: FLARE PIT

- PLACE 1" SOCK IN FS3-4D W/WEIGHT (FRICTION PREVENTED SOCK TO DESCEND ALONE)

1145 ELECTRIC SHOP/TS1-4

- REMOVE SATURATED SOCK FROM KSW-2 & REPLACED NEW 2" SOCK
- CUT 0.25' FROM KSW-3. PLACED PLUG IN WELL & LOCK ON MONUMENT.
- REMOVE SATURATED SOCK FROM ESMW-A & REPLACED NEW 2" SOCK
- CUT 0.27' FROM KSW-7, PLACED NEW PLUG
- CUT 0.24' FROM KSW-6.
- CONFIRMED LOCKS IN TS1-4F & TS1-4J

1320 SRF TS 1-33

- PLACED LOCK ON TS1-33IK

Rita in the Rain

~~• CUT Ø.' FROM TST-330~~ (K2)
(DID NOT CUT. MONUMENT CLOSES AND LOCKS WITHOUT TROUBLE & WITHOUT IMPACTING PLUG.)
• PLACED PLUG ON TST-335. MONUMENT & LID ARE DAMAGED & SHOULD BE REPLACED

1345 RETURNED KEYS TO MAIN OFFICE
1350 CLOSE OUT PERMIT & TRANSFER WASTE (2 SATURATED PETRO SOCKS & 1 BAG IDW) @ COMPRESSOR PLANT.
1355 SIGN OUT & RETURN RADIO @ MAIN OFFICE
1400 DEPART SRF. RETURN TO KENAI FOR VEHICLE MAINTENANCE & WAREHOUSE ORGANIZATION
1500 GMC OIL CHANGE
1800 TO WAREHOUSE: SEPARATE EQUIPMENT & SUPPLIES FOR DEMOBILIZATION
2030 RETURN TO LODGING: QC, DAILY

MODIFIED LEVEL D PPE.
0730 PACK UP & DEMOB' FROM LODGING
0930 PACK UP & DEMOB' FROM WAREHOUSE
SUPPLIES LEFT @ WAREHOUSE:
- ☐ 2 COOLERS GEL ICE
- ☐ 1 COOLER SW SAMPLE KITS
- ☐ 48+ UNPRESERVED AMBERS + BUBBLE BAGS
- ☐ 1 COOLER MISC. SAFETY (BEAR SPRAY, OUTLET STRIPS, EXTENSION CORDS, ...)
- ☐ 1 COOLER MISC. PACKING/OFFICE (DUCT TAPE, STRAPPING TAPE, PENS, SHARPIES) + 40+ TEFLON BLADDERS, LT. SLEEVES, & 2 EACH 1" & 2" PETRO SOCKS
- ☐ 1 COOLER MISC SAMPLE JARS (PRESERVED VOAs, PRESERVED AMBERS, UNPRESERVED AMBERS, BUBBLE BAGS)
- ☐ 2x YELLOW GAC BUCKETS (~35-GAL)
- ☐ ~10x PURGE BUCKETS (5-GAL W/SCREW TOP LIDS)
- ☐ 2" BAILERS (~10+) & BAILING LINE (4+ SPOOLS)
- ☐ 1,500+ LF BLADDER TUBING (0.17"x0.25" BONDED 0.25"x0.375" FEP)
- ☐ 2x 5-GAL GAC BUCKET SYSTEMS W/ GEO FABRIC FILTER
- ☐ SLED, LOPPERS, BOLT CUTTERS

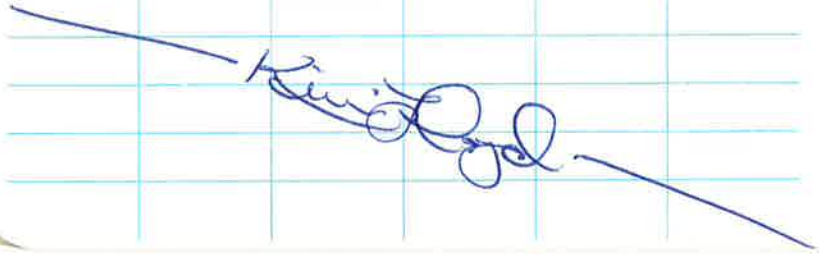
Rite in the Rain

19 JULY 2019 KL & NM
KENAI, AK ~75°F CLEAR

* NOTES FOR NEXT EVENT *

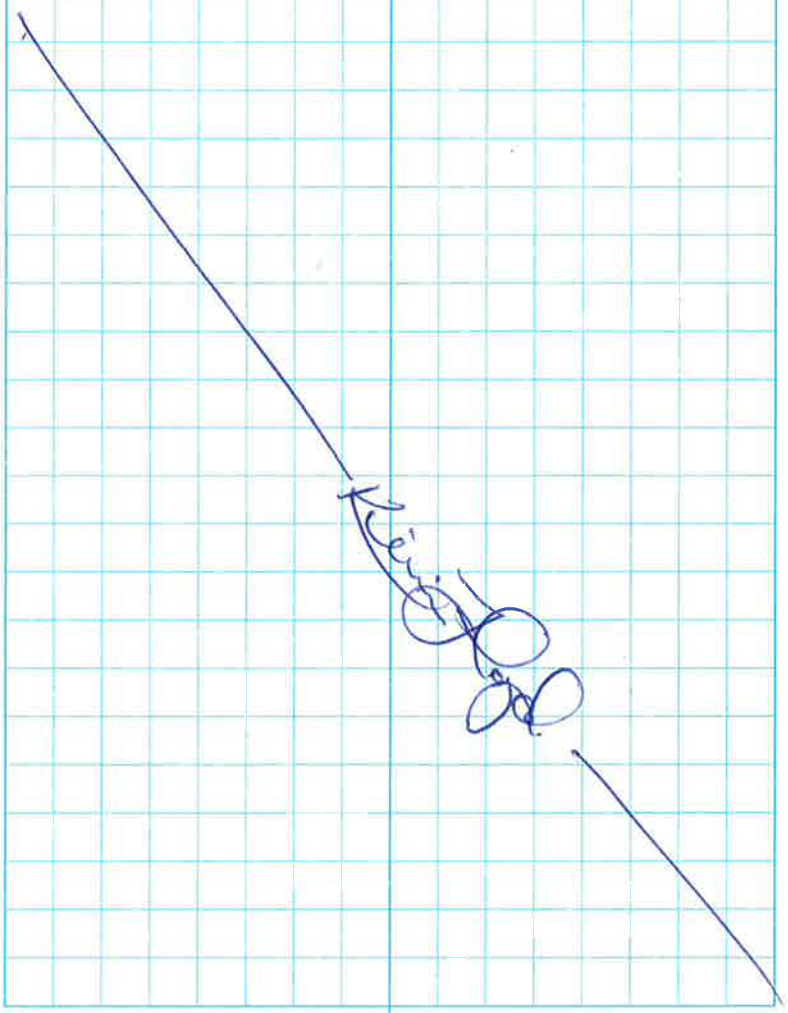
- ☐ 2ND SLED FOR SRF TEAM
- ☐ CLEAR/GRUB PATH TO ELECTRIC SHOP WELLS
- ☐ THERMACELL FOR EACH CREW (SURPRISINGLY EFFECTIVE AGAINST MOSQUITOES)
- ☐ FISHING WEIGHTS FOR SNUG-FITTING SOCKS
- ☐ SPARE BOLTS FOR FLUSH MTS
- ☐ SPARE GASKETS, ORINGS, & BALL VALVES FOR BLADDER PUMPS
- ☐ PERI PUMP NECESSARY FOR SOME WELLS

1130 NM W/EQUIPMENT TO TTT (ANCHORAGE)
KL TO ALYESKA TIRE (REPLACE PUNCTURED TIRE)
1300 AIH PURCHASE FLUSH MOUNT BOLTS
1500 REPLACE BOLTS @ SRF ELECTRIC SHOP KSN-7
1505 CONFIRMED NM ARR ANCHORAGE
1515 KL SIGN OUT @ SRF MAIN OFFICE & DEMOB' TO STERLING
1610 EoD



21 JULY 2019 KL
KENAI, AK ~70°F HAZY

1715 KL DEMOBILIZE FROM STERLING TO ANCHORAGE
2000 ARR ANCHORAGE
2015 EoD



Rite in the Rain

Confirmed LNAPL Wells

Elect. Shop No Flare pit

ESMW-A : sock flipped trace product

KSW-2 replaced sock

KSW-5 trace product inspect
↳ sock flipped

TS1-4 No flare pit
↳ replaced sock - inspect

~~TS1-4F~~ + ~~TS1-4S~~
↳ replaced sock - inspect

TS1-9 1 flare pit well

√ ~~TS1-9B~~ No product signal sock replaced √

√ ~~TS1-9D~~ Flipped sock need signal note* S

~~ES1-9F~~ Bailed, no LNAPL recovered. New sock √

√ ~~TS1-9A~~ 2014 designation (No removal)
sock replaced inspect

TS3-4 1 flare pit

~~TS3-4D~~ replaced sock - pull sock then bail

~~ES3-4D~~ 4ft of product needs bailing*
↳ ↳ baby bailer

TS3-9 1 flare pit

~~TS3-9A~~ 1.32' of product ~~needs bailing~~ needs bailing

√ TS3-9F - ~~btu~~ Perry pump S bailed no Product

√ TS3-9U - pulled sock ~~bailed~~ no LNAPL S

~~ES3-9E~~ inspect sock replaced
↳ flare pit

*S = Sampled

MADE IN TACOMA — SINCE 1916 —

Rite in the Rain®

— DEFYING MOTHER NATURE —



Yes, Rite in the Rain is a wood-based & recyclable paper, but unlike plain paper... it won't turn to mush when exposed to:



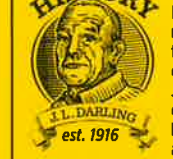
ALL-WEATHER TOUGH!

USE WET OR DRY
most pens stop writing when wet
- ALL PENCILS
- *RITE IN THE RAIN PENS*
- WAX MARKERS
- CRAYONS
- OIL PASTELS / PAINT

WHEN DRY ONLY
what you write won't wash off
- PERMANENT MARKERS
- STANDARD BALLPOINTS

WON'T WORK
water-based inks bead off sheet
- GEL PENS
- MOST HIGHLIGHTERS
- FOUNTAIN PENS
- WATER COLORS
- ACRYLIC PAINT

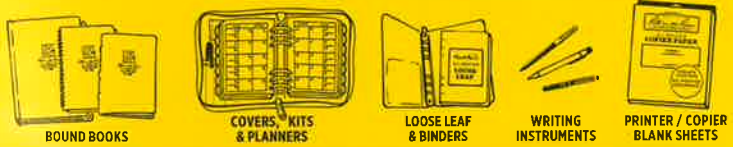
BRAND HISTORY



The *Rite in the Rain* story began a century ago in the forests of the Great Pacific Northwest. Entrepreneur Jerry Darling recognized the logging industry's need for a durable material that could be written on and survive in poor weather conditions. Jerry developed a special coating that created a unique moisture shield on the hand-dipped sheets of paper that he and his wife, Mary, processed at their home. From these humble beginnings our first all-weather paper was born. Over the many years we've perfected and patented our environmentally responsible coating process. Still located in Tacoma, our continued mission is to provide innovative products for professionals and enthusiasts who brave the outdoors.

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APPENDIX F:
CHEMICAL DATA QUALITY REVIEW

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Attachment F-2 2019 Data Summary Tables
Attachment F-3 ADEC Laboratory Data Review Checklists

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ACRONYMS AND ABBREVIATIONS

°C	degree(s) Celsius
>	greater than
%	percent
ADEC	Alaska Department of Environmental Conservation
Brice	Brice Environmental Services Corporation
CoC	chain-of-custody
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOQ	limit of quantitation
MS	matrix spike
MSD	matrix spike duplicate
ND	non-detect
QA	quality assurance
QC	quality control
RPD	relative percent difference
SDG	sample delivery group
SGS	SGS North America, Inc. – Alaska Division
SIM	selected ion monitoring
SRF	Swanson River Field
VOA	volatile organic analysis

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1.0 INTRODUCTION

This quality assurance (QA)/quality control (QC) report summarizes the evaluation of laboratory data collected to support the 2019 groundwater monitoring at the Swanson River Field (SRF) Unit. These data have been reviewed and validated to evaluate compliance with QA/QC criteria based on data quality objectives (DQOs) specified in the *2019 Groundwater Monitoring Program Work Plan, Swanson River Field Contaminated Sites, Kenai, Alaska* (Brice Environmental Services Corporation [Brice] 2019).

This Chemical Data Quality Report is provided as Appendix F to the 2019 Groundwater Monitoring Report and includes the following attachments:

- Attachment F-1: Sample Summary
- Attachment F-2: 2019 Analytical Data Tables
- Attachment F-3: Alaska Department of Environmental Conservation (ADEC) Laboratory Data Review Checklists for each sample delivery group (SDG)

All samples collected from SRF were submitted to SGS North America, Inc. – Alaska Division (SGS), which is an ADEC-approved laboratory. Results are reported under SDGs 1193574, 1193674, 1193675, 1193786, 1193788, 1193792, 1193793, and 1193796. Table F-1 summarizes the numbers of samples, QC samples, and analytical methods for the project. Laboratory analytical data packages are included in Appendix G.

TABLE F-1 QUALITY CONTROL SAMPLE SUMMARY

ANALYTICAL METHOD	PRIMARY SAMPLES	FIELD DUPLICATES	MATRIX SPIKE/ MATRIX SPIKE DUPLICATE	TRIP BLANKS
SW8260C	46	10	7	8
SW8270D SIM	46	10	7	-
SW8015B (glycols)	2	1	1	-

Notes:
For definitions, see the Acronyms and Abbreviations section

2.0 DATA REVIEW, VERIFICATION, VALIDATION, AND QUALIFICATION

SGS performed chemical analyses for all parameters, except ethylene glycol analysis by SW8015B. Samples analyzed for ethylene glycol were transferred to Bio-Chem Laboratories, Inc., in Grand Rapids, Michigan. Samples were prepared and analyzed in accordance with analytical methods specified in *Test Methods for Evaluating Solid Waste SW-846* (U.S. Environmental Protection Agency [EPA] 2015) and laboratory standard operating procedures.

Data review, verification, and validation were performed by an experienced QA chemist independent of the analytical laboratory. This evaluation included completion of the ADEC Laboratory Data Review Checklist for each SDG, review of analytical data including QC sample results, field and laboratory documentation, and all data submittals.

All project data were reviewed on an analytical-batch basis by assessing QC samples and associated field sample results. This project did not have a project-specific QA plan with specified DQOs. In general, data validation and usability assessments were conducted in accordance with the following documents.

- *Test Methods for Evaluating Solid Waste, SW-846*, through Final Update V (EPA 2015)
- *USEPA Contract Laboratory Program National Functional Guidelines (NFG) for Organic Superfund Methods Data Review* (EPA 2017)

The following information was reviewed as part of the data validation:

- Sample handling and chain-of-custody (CoC)
- Sample preservation and holding time compliance
- Field QC samples (including trip blanks and field duplicates)
- Laboratory reporting limits, including limits of quantitation (LOQ)
- Method blanks
- Laboratory control sample (LCS) and LCS duplicate (LCSD) recoveries
- Surrogate spike recoveries
- Matrix spike (MS) and MS duplicate (MSD) recoveries
- Precision, including relative percent difference (RPD) values for duplicate analyses
- Case narrative review

The following qualifiers in Table F-2 were applied to the analytical data set, as appropriate.

TABLE F-2 DATA VALIDATION QUALIFIERS

QUALIFIER	DESCRIPTION
ND [LOQ]	The analyte was not detected above the level of the associated value. The associated value is the LOQ.
J (±)	Analyte result is considered an estimated value because the level is above the detection limit (DL) and below the LOQ, or the analyte result is considered an estimated value biased high/low due to a QC failure.
H	Analyte result is considered an estimated value due to holding time exceedance.
R	Analyte result is rejected – result is not usable. Note that "R" replaces the chemical result (no result shall be reported with an "R" flag).

Notes:
For definitions, see the Acronyms and Abbreviations section

This review document summarizes the review of QC criteria as they relate to the following data quality indicators: precision, accuracy, representativeness, comparability, completeness, and sensitivity, commonly referred to as PARCCS parameters.

3.0 DATA QUALITY REVIEW

This is an exception report. Complete details for the review and evaluation of field samples and associated QC samples are included in the ADEC Laboratory Data Review Checklist for each SDG (Attachment F-3). During the data validation, analytical results or recoveries that fell outside acceptance criteria were identified and validation flags were applied to the results, where appropriate. Qualified results are considered estimated and, whenever possible, direction of potential bias was assigned. Potential effects on data usability are discussed in this report.

3.1 Sample Handling and Chain-of-Custody

CoC forms and laboratory case narratives were reviewed to assess sample handling procedures that may affect the integrity of the samples and quality of the resulting data. Copies of CoCs and cooler receipt forms were included in the final laboratory report (Appendix G). Samples were required to be maintained at 0 to 6 degrees Celsius (°C) following collection, during storage, and upon receipt at the laboratory.

All samples were received with proper preservation, and all coolers arrived at the laboratory within the recommended temperature range of 0 to 6°C. Several volatile organic analysis (VOA) vials were received with headspace greater than (>) 6 millimeters, but in all cases, there was sufficient volume remaining to perform the analysis without using these vials. One trip blank for volatile analyses was submitted in each cooler that contained samples for volatiles analysis, and the trip blanks were documented on the CoC forms.

3.2 Sample Collection, Preservation, and Holding Time Compliance

All samples were extracted and/or analyzed within the recommended holding times and were properly preserved for the analytical procedures utilized for this project, with the following exceptions that required results to be qualified.

- SDG 1193675 – The case narrative indicated that the VOA vials for volatile sample SRF14-TS14GR-0719 and its duplicate, SRF14-TS14GRZ-0719, had a pH >2 at the time of analysis. However, the analyses were performed on Day 7; therefore, no qualifications were made based on holding times/preservatives.

3.3 Precision

Precision was assessed by calculating the RPD between the primary and duplicate of field samples, LCS/LCSD samples, and MS/MSD samples.

3.3.1 Field Duplicate Precision

Field duplicates were submitted at the project-required frequency of one per matrix, analysis, and 10 or fewer project samples for methods SW8015B (ethylene glycol), SW8260C, and SW8270D selected ion monitoring (SIM).

RPDs were calculated for all analytes detected at or above their respective reporting limit for the primary and duplicate field sample pairs. RPDs were not calculated for duplicate pairs with both results below the

reporting limit (J-flagged results and/or non-detect results). The following pairs of duplicate results were qualified as estimated "J" due to calculated RPDs that exceeded the RPD limit of 30 percent (%) for waters:

- SDG 1193674 – Two field duplicate pairs were submitted for this SDG.
  - The RPD (36%) for 1,2,4-trimethylbenzene in duplicate pair SRF19-FS19N-0719/SRF19-FS19NZ-0719 exceeded the limit of 30%. The results for this analyte in both samples were qualified "J," indeterminate bias.
  - The RPD for acenaphthene in duplicate pair SRF19-TS19D-0719/SRF19-TS19DZ-0719 could not be calculated; however, the difference between the non-detect result in one sample and the detection greater than the LOQ in the duplicate was significant enough to warrant qualification. The results for this analyte in both samples were qualified "J," indeterminate bias.
- SDG 1193786 – Two field duplicate pairs were submitted for this SDG.
  - The RPDs for benzene (51%), P&M-xylene (39%), and ultimately total xylenes, in duplicate pair SRF133-FS133F-0719/ SRF133-FS133FZ-0719 exceeded the limit of 30%. The results for these analytes in both samples were qualified "J," indeterminate bias.
- SDG 1193793
  - The RPD for acenaphthylene in duplicate pair SRF127-FS127K-0719/ SRF127-FS127KZ-0719 could not be calculated; however, the difference between the non-detect result in one sample and the detection greater than the LOQ in the duplicate was significant enough to warrant qualification. The results for this analyte in both samples were qualified "J," indeterminate bias.
- SDG 1193796
  - The RPD for 1,3,5-trimethylbenzene in duplicate pair SRF39-TS39V-0719/SRF39-TS39VZ-0719 could not be calculated; however, the difference between the non-detect result in one sample and the detection greater than the LOQ in the duplicate was significant enough to warrant qualification. The results for this analyte in both samples were qualified "J," indeterminate bias.

The variance in results is likely due to heterogeneity in the sample matrix. In all cases, the higher of the two results was used for decision-making purposes. The majority of calculated RPDs for field duplicate results were within QC limits, and the qualified results were either well above or well below the cleanup levels, or non-detect with LOQs below the cleanup levels. Therefore, the effect on data was minimal.

3.3.2 Laboratory Control Sample Duplicate

Calculated RPDs for LCS/LCSD pairs were within the recommended RPD limit for all compounds, with no exceptions.

3.3.3 Matrix Spike Duplicate

Calculated RPDs for MS/MSD pairs were within the recommended RPD limit for all compounds, with the following exceptions:

- SDG 1193674
    - SW8270 SIM – Indeno[1,2,3-c,d] pyrene, dibenzo[a,h]anthracene and benzo[g,h,i]perylene RPDs were above the acceptable RPD of 20% for the MS/MSD for sample SRF19-FS19M-0719. These results were non-detect in the parent sample, and the individual recoveries were within limits; therefore, no qualifications were made.
- SDG 1193675
    - SW8270D SIM – The RPDs for benzo[g,h,i]perylene and dibenzo[a,h]anthracene exceeded the limit of 30%. No qualifications were made for benzo[g,h,i]perylene as the individual recoveries were within acceptance criteria. The non-detect result for dibenzo[a,h]anthracene was flagged "J-" to indicate a possible low bias due to the low MS recovery. Usability was not affected as the qualified results were non-detect with LOQs well below the cleanup level.

3.4 Accuracy

Accuracy was assessed by reviewing method blank results, LCS/LCSD recoveries, and surrogate recoveries.

3.4.1 Method Blanks

The method blanks were analyzed at the required frequencies of one per matrix, analysis, and 20 or fewer samples. No analytes were detected in the method blanks above the LOQ.

3.4.2 Laboratory Control Sample Recoveries

Recovery of LCS and/or LCSD spike compounds were all within QC limits.

3.4.3 Matrix Spike Recoveries

Recovery of MS/MSD spike compounds were within QC limits, with the following exceptions.

- SDG 1193574
    - SW8270 SIM – Dibenzo(a,h)anthracene (40%) recovered below the lower control limit (44%) in the MS performed on sample SRF39-FS39B-0719. This analyte was flagged "J-" in the parent sample to indicate a possible low bias. Usability was not affected as the qualified result is non-detect with an LOQ well below the cleanup level.
- SDG 1193675
    - SW8260C – All analytes except naphthalene recovered below their respective lower control limits in the MS and/or MSD performed on sample SRF14-TS14EE-0719. These analytes were flagged "J-" in the parent sample to indicate a low bias. Usability was not affected as the qualified results were non-detect with LOQs well below the cleanup level.
    - SW8270D SIM – Benzo(a)anthracene and dibenzo[a,h]anthracene recovered below the lower control limits in the MS/MSD performed on sample SRF14-TS14EE-0719. These analytes were flagged "J-" in the parent sample to indicate a possible low bias. Usability was not affected as the qualified results were non-detect with LOQs well below the cleanup level.

- SDG 1193786
    - SW8260C – Benzene recovered below the lower control limit of 79% at 70% and 67%, respectively, and n-Butylbenzene recovered above the upper control limit of 128% at 131% in the MS performed on sample SRF133-TS133Q-0719. The detected result for benzene was flagged "J-" in the parent sample to indicate a possible low bias. Usability was not affected as the qualified result is well above the cleanup level. N-Butylbenzene was non-detect in the parent sample and was not affected by a high bias.
    - SW8270D SIM – Benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, and indeno[1,2,3-c,d]pyrene recovered below their respective lower control limits, and naphthalene recovered above the upper control limit of 114% at 298% and 162% in the MS/MSD performed on sample SRF133-TS133Q-0719. These analytes were flagged "J-" or "J+" in the parent sample to indicate the respective bias. Usability was not affected as the qualified results were non-detect with LOQs well below the cleanup level.
- SDG 1193788
    - SW8270D SIM – Benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, indeno[1,2,3-c,d]pyrene and phenanthrene recovered below their respective lower control limits in the MS/MSD performed on sample SRF34-FS34A-0719. These analytes were flagged "J-" in the parent sample to indicate a possible low bias. Usability was not affected as the qualified results were non-detect with LOQs well below the cleanup level.
- SDG 1193792
    - SW8270D SIM – Benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, and indeno[1,2,3-c,d]pyrene recovered below their respective lower control limits in the MS/MSD performed on sample SRF215-TS215P-0719. These analytes were flagged "J-" in the parent sample to indicate a possible low bias. Usability was not affected as the qualified results were non-detect with LOQs well below the cleanup level.
- SDG 1193793
    - 8260C – 1,2,4-trimethylbenzene, ethylbenzene, isopropyl benzene, P&M-xylene, and total xylenes recovered below their respective lower control limits in the MS/MSD performed on sample SRF127-FS127G-0719. These analytes are qualified "J-" in the parent sample to indicate a possible low bias. Usability was not affected as the qualified results are either non-detect with LOQs well below the cleanup levels or detected well above/below the cleanup levels.
    - 8270D SIM – Benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]-perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, indeno[1,2,3-c,d]pyrene, and naphthalene recovered below their respective lower control limits in the MS/MSD performed on sample SRF127-FS127G-0719. These analytes were flagged "J-" in the parent sample to indicate a possible low bias. Usability was not affected as the qualified results are non-detect with LOQs well below the cleanup levels or detected well above the cleanup level (naphthalene).

3.4.4 Trip Blanks

One trip blank was submitted with each cooler containing volatile samples. No target analytes were detected above the LOQ in the trip blanks.

3.4.5 Surrogate Recoveries

Surrogate recoveries were all within acceptable limits with the following exceptions:

- SDG 1193796
    - SW8270D SIM – Surrogate 2-methylnaphthalene d10 (36.7%) recovered below the lower control limit (47%) in sample SRF39-TS39CR-0719. Associated analytes were flagged "J-" in this sample to indicate a possible low bias. Usability was not affected as the qualified results are either non-detect, or well above/below the cleanup levels.
- SDG 1193675
    - SW8270D SIM – Surrogate 2-methylnaphthalene d10 recovered below the lower control limit (47%) in samples SRF14-TS14GR-0719 (41.9%) and SRF14-TS14GRZ-0719 (46.2%). Samples were re-extracted past holding time with comparable results and surrogate recoveries within QC criteria. Initial analysis is reported. Associated analytes that are from 10X dilutions are not qualified. All other associated results were flagged "J-" in this sample to indicate a possible low bias. Usability was not affected as the qualified results are either non-detect or detected well below the cleanup levels.
- SDG 1193786
    - SW8270D SIM – Surrogate 2-methylnaphthalene d10 (42.6%) recovered below the lower control limit (47%) in sample SRF133-TS133JJ-0719. The sample was re-extracted past holding time with comparable results and surrogate recoveries within QC criteria. Associated analytes were flagged "J-" in this sample to indicate a possible low bias. Usability was not affected as the qualified results are non-detect with an LOQ well below the cleanup levels.
- SDG 1193788
    - SW8270D SIM – Surrogate 2-methylnaphthalene d10 (46.2%) recovered below the lower control limit (47%) in sample SRF34-FS34F-0719. The sample was re-extracted past holding time with comparable results and surrogate recoveries within QC criteria. Results for 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene were flagged "J-" in this sample to indicate a possible low bias. Usability was not affected as the qualified results are non-detect with an LOQ well below the cleanup levels.
    - SW8260C – Surrogate 4-bromofluorobenzene recovered above the upper control limit or 114% in the MS and MSD. All associated analytes were non-detect; therefore, no qualifications were made.

3.5 Representativeness

Representativeness is a qualitative parameter used to assess whether sample results are representative of true site conditions. Representativeness relative to analytical measurements is primarily influenced by application of consistent sampling and analytical methodology. Samples were collected for this project in accordance with the Work Plan and analyzed using standard methods.

3.6 Comparability

Comparability is a qualitative indicator of the confidence with which one data set can be compared to another. Project data-set comparability is considered acceptable based on the following:

- Standard methods were used for sampling and analysis, and analytical results were reported in standard units.
- Laboratory analyses were performed in accordance with analytical method and laboratory QA/QC procedures.
- Sample collection, documentation, and handling were performed in accordance with the approved Work Plan.
- Field instruments were operated within their calibrated range according to established procedures based on approved methodology.
- Standard and comprehensive reporting formats were used.

3.7 Completeness

All data necessary to complete a level II data validation on this SDG were provided. No data were rejected, and 100% of results are usable.

3.8 Sensitivity

Sensitivity describes the lowest concentration that the analytical method can reliably quantitate and is evaluated by verifying that the detected results and/or reporting limits meet the project action levels. All laboratory reporting limits were below the cleanup level.

Sensitivity requirements were considered met.

3.9 Overall Assessment

In general, the overall quality of the project data was acceptable. No data were rejected. All results are considered usable, with the limitations discussed in this report in regard to the qualifiers applied to the results.

4.0 REFERENCES

Brice Environmental Services Corporation (Brice). 2019. *2019 Groundwater Monitoring Program Work Plan, Swanson River Field Contaminated Sites, Kenai, Alaska.* May.

U.S. Environmental Protection Agency (EPA). 2017. *National Functional Guidelines (NFG) for Organic Superfund Methods Data Review.* EPA-540-R-2017-002. January.

EPA. 2015. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846, Third Edition,* Final Updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008) and V (2015).

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ATTACHMENT F-1:
SAMPLE SUMMARY

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ATTACHMENT F-1 SAMPLE SUMMARY
2019 GROUNDWATER SAMPLES - SWANSON RIVER FIELD CONTAMINATED SITES

Sample ID	Collected Date/Time	QC Type	Lab ID	Project ID	8270D SIM	SW8260C
SRF39-TS39AA-0719	06/30/2019 16:45	PS	1193574001	SRF TS 3-9 2019 HAKCS GWM	X	X
SRF39-TS39BBZ-0719	06/30/2019 16:05	DUP	1193574002	SRF TS 3-9 2019 HAKCS GWM	X	X
SRF39-TS39BB-0719	06/30/2019 17:05	PS	1193574003	SRF TS 3-9 2019 HAKCS GWM	X	X
SRF39-TS39DD-0719	06/30/2019 12:25	PS	1193574004	SRF TS 3-9 2019 HAKCS GWM	X	X
SRF39-FS39B-0719	06/30/2019 11:35	PS, MS/MSD	1193574005	SRF TS 3-9 2019 HAKCS GWM	X	X
SRF39-TB01-0719	06/30/2019 08:00	TB	1193574008	SRF TS 3-9 2019 HAKCS GWM		X
SRF39-TS39F-0719	07/12/2019 16:40	PS	1193796001	SRF TS 3-9 2019 HAKCS GWM	X	X
SRF39-TS39U-0719	07/12/2019 14:40	PS	1193796002	SRF TS 3-9 2019 HAKCS GWM	X	X
SRF39-TS39CR-0719	07/12/2019 14:40	PS	1193796003	SRF TS 3-9 2019 HAKCS GWM	X	X
SRF39-TS39T-0719	07/12/2019 11:50	PS	1193796004	SRF TS 3-9 2019 HAKCS GWM	X	X
SRF39-TS39V-0719	07/12/2019 12:50	PS	1193796005	SRF TS 3-9 2019 HAKCS GWM	X	X
SRF39-TS39VZ-0719	07/12/2019 11:50	DUP	1193796006	SRF TS 3-9 2019 HAKCS GWM	X	X
SRF39-TS39G-0719	07/12/2019 11:10	PS	1193796007	SRF TS 3-9 2019 HAKCS GWM	X	X
SRF39-TB02-0719	07/12/2019 08:00	TB	1193796008	SRF TS 3-9 2019 HAKCS GWM		X
SRF19-FS19I-0719	07/05/2019 07:50	PS	1193674001	SRF TS 1-9 2019 HAKCS GWM	X	X
SRF19-FS19M-0719	07/05/2019 08:10	PS, MS/MSD	1193674002	SRF TS 1-9 2019 HAKCS GWM	X	X
SRF19-FS19D-0719	07/05/2019 10:15	PS	1193674005	SRF TS 1-9 2019 HAKCS GWM	X	X
SRF19-FS19NZ-0719	07/05/2019 09:35	DUP	1193674006	SRF TS 1-9 2019 HAKCS GWM	X	X
SRF19-FS19N-0719	07/05/2019 10:35	PS	1193674007	SRF TS 1-9 2019 HAKCS GWM	X	X
SRF19-TS19U-0719	07/05/2019 16:30	PS	1193674008	SRF TS 1-9 2019 HAKCS GWM	X	X
SRF19-TS19HH-0719	07/05/2019 17:15	PS	1193674009	SRF TS 1-9 2019 HAKCS GWM	X	X
SRF19-TS19C-0719	07/06/2019 08:35	PS	1193674010	SRF TS 1-9 2019 HAKCS GWM	X	X
SRF19-TS19D-0719	07/06/2019 08:35	PS	1193674011	SRF TS 1-9 2019 HAKCS GWM	X	X
SRF19-TS19DZ-0719	07/06/2019 07:35	DUP	1193674012	SRF TS 1-9 2019 HAKCS GWM	X	X
SRF19-TB01-0719	07/06/2019 06:00	TB	1193674013	SRF TS 1-9 2019 HAKCS GWM		X
SRF14-FS14E-0719	07/06/2019 12:15	PS	1193675001	SRF TS 1-4 2019 HAKCS GWM	X	X
SRF14-FS14H-0719	07/06/2019 12:20	PS	1193675002	SRF TS 1-4 2019 HAKCS GWM	X	X
SRF14-TS14EE-0719	07/07/2019 08:25	PS, MS/MSD	1193675003	SRF TS 1-4 2019 HAKCS GWM	X	X
SRF14-TS14GR-0719	07/07/2019 09:30	PS	1193675006	SRF TS 1-4 2019 HAKCS GWM	X	X
SRF14-TS14GRZ-0719	07/07/2019 08:30	DUP	1193675007	SRF TS 1-4 2019 HAKCS GWM	X	X
SRF14-TB01-0719	07/06/2019 08:00	TB	1193675008	SRF TS 1-4 2019 HAKCS GWM		X
SRF133-FS133H-0719	07/11/2019 16:55	PS	1193786001	SRF TS 1-33 2019 HAKCS GWM	X	X
SRF133-TS133UR-0719	07/11/2019 15:20	PS	1193786002	SRF TS 1-33 2019 HAKCS GWM	X	X
SRF133-TS13302-0719	07/11/2019 15:00	PS	1193786003	SRF TS 1-33 2019 HAKCS GWM	X	X
SRF133-FS133S-0719	07/11/2019 10:15	PS	1193786004	SRF TS 1-33 2019 HAKCS GWM	X	X
SRF133-TS133JJ-0719	07/11/2019 12:10	PS	1193786005	SRF TS 1-33 2019 HAKCS GWM	X	X
SRF133-TS13302Z-0719	07/11/2019 14:00	DUP	1193786006	SRF TS 1-33 2019 HAKCS GWM	X	X
SRF133-FS133W-0719	07/11/2019 17:20	PS	1193786007	SRF TS 1-33 2019 HAKCS GWM	X	X
SRF133-TS133Q-0719	07/11/2019 11:15	PS, MS/MSD	1193786008	SRF TS 1-33 2019 HAKCS GWM	X	X

ATTACHMENT F-1 SAMPLE SUMMARY
2019 GROUNDWATER SAMPLES - SWANSON RIVER FIELD CONTAMINATED SITES

Sample ID	Collected Date/Time	QC Type	Lab ID	Project ID	8270D SIM	SW8260C
SRF133-FS133F-0719	07/11/2019 17:10	PS	1193786011	SRF TS 1-33 2019 HAKCS GWM	X	X
SRF133-FS133FZ-0719	07/09/2019 17:20	DUP	1193786012	SRF TS 1-33 2019 HAKCS GWM	X	X
SRF133-TB01-0719	07/09/2019 08:00	TB	1193786013	SRF TS 1-33 2019 HAKCS GWM		X
SRF34-FS34A-0719	07/09/2019 08:20	PS, MS/MSD	1193788001	SRF TS 3-4 2019 HAKCS GWM	X	X
SRF34-FS34B-0719	07/09/2019 08:25	PS	1193788004	SRF TS 3-4 2019 HAKCS GWM	X	X
SRF34-FS34F-0719	07/09/2019 14:30	PS	1193788005	SRF TS 3-4 2019 HAKCS GWM	X	X
SRF34-TS34CC-0719	07/09/2019 14:20	PS	1193788006	SRF TS 3-4 2019 HAKCS GWM	X	X
SRF34-TS34MM-0719	07/09/2019 12:05	PS	1193788007	SRF TS 3-4 2019 HAKCS GWM	X	X
SRF34-TS3400-0719	07/09/2019 12:00	PS	1193788008	SRF TS 3-4 2019 HAKCS GWM	X	X
SRF34-TS34P-0719	07/09/2019 10:40	PS	1193788009	SRF TS 3-4 2019 HAKCS GWM	X	X
SRF34-TS34PZ-0719	07/09/2019 10:50	DUP	1193788010	SRF TS 3-4 2019 HAKCS GWM	X	X
SRF34-TB01-0719	07/09/2019 08:00	TB	1193788011	SRF TS 3-4 2019 HAKCS GWM		X
SRF215-FS215B-0719	07/10/2019 15:00	PS	1193792001	SRF TS 2-15 2019 HAKCS GWM	X	X
SRF215-TS215O-0719	07/10/2019 10:20	PS	1193792002	SRF TS 2-15 2019 HAKCS GWM	X	X
SRF215-TS215OZ-0720	07/10/2019 09:20	DUP	1193792003	SRF TS 2-15 2019 HAKCS GWM	X	X
SRF215-TS215P-0719	07/10/2019 09:10	PS, MS/MSD	1193792004	SRF TS 2-15 2019 HAKCS GWM	X	X
SRF215-TS215R-0719	07/10/2019 08:50	PS	1193792007	SRF TS 2-15 2019 HAKCS GWM	X	X
SRF215-TB01-0719	07/10/2019 08:50	TB	1193792008	SRF TS 2-15 2019 HAKCS GWM		X
SRF127-FS127C-0719	07/10/2019 16:10	PS	1193793001	SRF TS 1-27 2019 HAKCS GWM	X	X
SRF127-TS127G-0719	07/10/2019 12:10	PS, MS/MSD	1193793002	SRF TS 1-27 2019 HAKCS GWM	X	X
SRF127-TS127K-0719	07/10/2019 12:10	PS	1193793005	SRF TS 1-27 2019 HAKCS GWM	X	X
SRF127-TS127KZ-0719	07/10/2019 11:10	DUP	1193793006	SRF TS 1-27 2019 HAKCS GWM	X	X
SRF127-TS127L-0719	07/10/2019 18:30	PS	1193793007	SRF TS 1-27 2019 HAKCS GWM	X	X
SRF127-TS127M-0719	07/10/2019 18:00	PS	1193793008	SRF TS 1-27 2019 HAKCS GWM	X	X
SRF127-TB01-0719	07/10/2019 08:00	TB	1193793009	SRF TS 1-27 2019 HAKCS GWM		X

ATTACHMENT F-2:
2019 DATA SUMMARY TABLES

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ATTACHMENT F-2 DATA SUMMARY TABLES
2019 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES - SWANSON RIVER FIELD
CONTAMINATED SITES - TS 1-4

				Sample ID QC Type Collection Date Lab Sample ID Matrix	SRF14-FS14E-0719 Primary 07/06/2019 12:15 1193675001 Water	SRF14-FS14H-0719 Primary 07/06/2019 12:20 1193675002 Water	SRF14-TS14EE-0719 Primary, MS/MSD 07/07/2019 08:25 1193675003 Water	SRF14-TS14GR-0719 Primary 07/07/2019 09:30 1193675006 Water	SRF14-TS14GRZ-0719 Dup of SRF14-TS14GR-0719 07/07/2019 08:30 1193675007 Water	SRF14-TB01-0719 Trip Blank 07/06/2019 08:00 1193675008 Water
Method	**Analyte**	**Units**	**ADEC[1]**							
SW8260C	1,2,4-Trimethylbenzene	µg/L	56		**95.6 [1]**	3.33 [1]	ND [1] J-	**586 [20]**	**606 [20]**	ND [1]
SW8260C	1,3,5-Trimethylbenzene	µg/L	60		31.2 [1]	6.44 [1]	ND [1] J-	**360 [20]**	**370 [20]**	ND [1]
SW8260C	Benzene	µg/L	4.6		**44 [0.4]**	**5.03 [0.4]**	ND [0.4] J-	**66.2 [0.4]**	**65.6 [0.4]**	ND [0.4]
SW8260C	Ethylbenzene	µg/L	15		**71.2 [1]**	8.29 [1]	ND [1] J-	**149 [1]**	**149 [1]**	ND [1]
SW8260C	Isopropylbenzene (Cumene)	µg/L	450		14.4 [1]	5.87 [1]	ND [1] J-	130 [1]	129 [1]	ND [1]
SW8260C	Naphthalene	µg/L	1.7		**107 [1]**	**5.51 [1]**	ND [1]	**111 [1]**	**118 [1]**	ND [1]
SW8260C	n-Butylbenzene	µg/L	1000		ND [1]	ND [1]	ND [1] J-	ND [1]	ND [1]	ND [1]
SW8260C	o-Xylene	µg/L	190		0.773 [1] J	3.22 [1]	ND [1] J-	20.2 [1]	20.1 [1]	ND [1]
SW8260C	P & M -Xylene	µg/L	190		161 [2]	1.3 [2] J	ND [2] J-	**213 [2]**	**212 [2]**	ND [2]
SW8260C	sec-Butylbenzene	µg/L	2000		2.93 [1]	5.3 [1]	ND [1] J-	12.2 [1]	12.4 [1]	ND [1]
SW8260C	tert-Butylbenzene	µg/L	690		ND [1]	0.835 [1] J	ND [1] J-	ND [1]	ND [1]	ND [1]
SW8260C	Toluene	µg/L	1100		0.429 [1] J	0.534 [1] J	ND [1] J-	3.77 [1]	3.8 [1]	ND [1]
SW8260C	Xylenes (total)	µg/L	190		161 [3]	4.52 [3]	ND [3] J-	**233 [3]**	**232 [3]**	ND [3]
8270D SIM LV (PAH)	1-Methylnaphthalene	µg/L	11		**20 [0.5]**	3.25 [0.0481]	ND [0.0472]	**30.1 [0.481]**	**35.9 [0.481]**	--
8270D SIM LV (PAH)	2-Methylnaphthalene	µg/L	36		20.6 [0.5]	0.683 [0.0481]	ND [0.0472]	33.9 [0.481]	**41.1 [0.481]**	--
8270D SIM LV (PAH)	Acenaphthene	µg/L	530		0.333 [0.05]	0.204 [0.0481]	ND [0.0472]	0.225 [0.0481] J-	0.271 [0.0481] J-	--
8270D SIM LV (PAH)	Acenaphthylene	µg/L	260		ND [0.05]	ND [0.0481]	ND [0.0472]	ND [0.0481] J-	ND [0.0481] J-	--
8270D SIM LV (PAH)	Anthracene	µg/L	43		ND [0.05]	ND [0.0481]	ND [0.0472]	ND [0.0481] J-	ND [0.0481] J-	--
8270D SIM LV (PAH)	Benzo(a)Anthracene	µg/L	0.3		ND [0.05]	ND [0.0481]	ND [0.0472] J-	ND [0.0481]	ND [0.0481]	--
8270D SIM LV (PAH)	Benzo[a]pyrene	µg/L	0.25		ND [0.02]	ND [0.0192]	ND [0.0189]	ND [0.0192]	ND [0.0192]	--
8270D SIM LV (PAH)	Benzo[b]Fluoranthene	µg/L	2.5		ND [0.05]	ND [0.0481]	ND [0.0472]	ND [0.0481]	ND [0.0481]	--
8270D SIM LV (PAH)	Benzo[g,h,i]perylene	µg/L	0.26		ND [0.05]	ND [0.0481]	ND [0.0472]	ND [0.0481]	ND [0.0481]	--
8270D SIM LV (PAH)	Benzo[k]fluoranthene	µg/L	0.8		ND [0.05]	ND [0.0481]	ND [0.0472]	ND [0.0481]	ND [0.0481]	--
8270D SIM LV (PAH)	Chrysene	µg/L	2		ND [0.05]	ND [0.0481]	ND [0.0472]	ND [0.0481]	ND [0.0481]	--
8270D SIM LV (PAH)	Dibenzo[a,h]anthracene	µg/L	0.25		ND [0.02]	ND [0.0192]	ND [0.0189] J-	ND [0.0192]	ND [0.0192]	--
8270D SIM LV (PAH)	Fluoranthene	µg/L	260		ND [0.05]	ND [0.0481]	ND [0.0472]	ND [0.0481]	ND [0.0481]	--
8270D SIM LV (PAH)	Fluorene	µg/L	290		0.828 [0.05]	0.37 [0.0481]	ND [0.0472]	1.14 [0.0481] J-	1.28 [0.0481] J-	--
8270D SIM LV (PAH)	Indeno[1,2,3-c,d] pyrene	µg/L	0.19		ND [0.05]	ND [0.0481]	ND [0.0472]	ND [0.0481]	ND [0.0481]	--
8270D SIM LV (PAH)	Naphthalene	µg/L	1.7		**52.8 [1]**	0.462 [0.0962]	ND [0.0943]	**46.7 [0.962]**	**55.7 [0.962]**	--
8270D SIM LV (PAH)	Phenanthrene	µg/L	170		0.323 [0.05]	ND [0.0481]	ND [0.0472]	0.773 [0.0481] J-	0.892 [0.0481] J-	--
8270D SIM LV (PAH)	Pyrene	µg/L	120		ND [0.05]	ND [0.0481]	ND [0.0472]	ND [0.0481]	ND [0.0481]	--
SW8015C	Ethylene Glycol	ug/L	40000		--	--	ND [10000]	**34000000 [10000]**	**27000000 [10000]**	--

Notes:

Bold red indicates that the result exceeds the cleanup level.

Blue highlighting indicates that the result exceeds 20% of the current ADEC cleanup level.

Italics/gray highlighting indicate that the LOQ for a non-detect result exceeds the cleanup level.

ADEC[1] = 18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018).

[ ] = limit of detection (LOQ)

Dup = field duplicate

B = analyte was detected in the associated blank

J(±) = result is an estimated value greater than the DL and below the LOQ, or the result is estimated due to a QC failure.

ND = not detected

µg/L = microgram(s) per liter

ATTACHMENT F-2 DATA SUMMARY TABLES
2019 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES - SWANSON RIVER FIELD
CONTAMINATED SITES - TS 1-9

				Sample ID	SRF19-FS19D-0719	SRF19-FS19I-0719	SRF19-FS19M-0719	SRF19-FS19N-0719	SRF19-FS19NZ-0719	SRF19-TS19C-0719	SRF19-TS19D-0719	SRF19-TS19DZ-0719
				QC Type	Primary	Primary	Primary, MS/MSD	Primary	Dup of SRF19-FS19Z-0719	Primary	Primary	Dup of SRF19-TS19D-0719
				Collection Date	07/05/2019 10:15	07/05/2019 07:50	07/05/2019 08:10	07/05/2019 10:35	07/05/2019 09:35	07/06/2019 08:35	07/06/2019 08:35	07/06/2019 07:35
				Lab Sample ID	1193674005	1193674001	1193674002	1193674007	1193674006	1193674010	1193674011	1193674012
				Matrix	Water	Water	Water	Water	Water	Water	Water	Water
Method	**Analyte**	**Units**	**ADEC[1]**									
SW8260C	1,2,4-Trimethylbenzene	ug/L	56		0.786 [1] J	ND [1]	ND [1]	2.37 [1] J	3.41 [1] J	**417 [20]**	**534 [20]**	**558 [20]**
SW8260C	1,3,5-Trimethylbenzene	ug/L	60		0.412 [1] J	ND [1]	ND [1]	ND [1]	0.401 [1] J	**320 [20]**	**301 [20]**	**318 [20]**
SW8260C	Benzene	ug/L	4.6		0.442 [0.4]	ND [0.4]	ND [0.4]	0.55 [0.4]	0.51 [0.4]	0.247 [0.4] J	**7.86 [0.4]**	**8.08 [0.4]**
SW8260C	Ethylbenzene	ug/L	15		0.557 [1] J	ND [1]	ND [1]	ND [1]	ND [1]	**22.1 [1]**	**190 [20]**	**197 [20]**
SW8260C	Isopropylbenzene (Cumene)	ug/L	450		0.387 [1] J	ND [1]	ND [1]	1.32 [1]	1.54 [1]	25.5 [1]	103 [1]	104 [1]
SW8260C	Naphthalene	ug/L	1.7		ND [1]	ND [1]	ND [1]	1.34 [1]	**1.9 [1]**	**31 [1]**	**57.4 [1]**	**59.6 [1]**
SW8260C	n-Butylbenzene	ug/L	1000		ND [1]	ND [1]	ND [1]	ND [1]	ND [1]	ND [1]	ND [1]	ND [1]
SW8260C	o-Xylene	ug/L	190		1.76 [1]	ND [1]	ND [1]	ND [1]	ND [1]	**2340 [20]**	103 [20]	109 [20]
SW8260C	P & M -Xylene	ug/L	190		0.96 [2] J	ND [2]	ND [2]	1.75 [2] J	2.31 [2]	**191 [40]**	**625 [40]**	**648 [40]**
SW8260C	sec-Butylbenzene	ug/L	2000		ND [1]	ND [1]	ND [1]	0.447 [1] J	0.533 [1] J	3.96 [1]	5.51 [1]	5.6 [1]
SW8260C	tert-Butylbenzene	ug/L	690		ND [1]	ND [1]	ND [1]	ND [1]	ND [1]	5.02 [1]	5.36 [1]	5.22 [1]
SW8260C	Toluene	ug/L	1100		0.391 [1] J	ND [1]	ND [1]	ND [1]	ND [1]	6.16 [1]	0.359 [1] J	0.356 [1] J
SW8260C	Xylenes (total)	ug/L	190		2.72 [3] J	ND [3]	ND [3]	1.75 [3] J	2.31 [3] J	**2530 [60]**	**728 [60]**	**757 [60]**
8270D SIM LV (PAH)	1-Methylnaphthalene	ug/L	11		0.0586 [0.0472]	ND [0.0455]	ND [0.0472]	0.316 [0.0481]	0.328 [0.049]	**16.9 [0.189]**	10.1 [0.0525]	**11.4 [0.227]**
8270D SIM LV (PAH)	2-Methylnaphthalene	ug/L	36		ND [0.0472]	ND [0.0455]	ND [0.0472]	0.211 [0.0481]	0.212 [0.049]	19.1 [0.189]	12.7 [0.263]	12.1 [0.227]
8270D SIM LV (PAH)	Acenaphthene	ug/L	530		ND [0.0472]	ND [0.0455]	ND [0.0472]	ND [0.0481]	ND [0.049]	0.158 [0.0472]	ND [0.0525] J	0.224 [0.0455] J
8270D SIM LV (PAH)	Acenaphthylene	ug/L	260		ND [0.0472]	ND [0.0455]	ND [0.0472]	ND [0.0481]	ND [0.049]	ND [0.0472]	ND [0.0525]	ND [0.0455]
8270D SIM LV (PAH)	Anthracene	ug/L	43		ND [0.0472]	ND [0.0455]	ND [0.0472]	ND [0.0481]	ND [0.049]	ND [0.0472]	ND [0.0525]	ND [0.0455]
8270D SIM LV (PAH)	Benzo(a)Anthracene	ug/L	0.3		ND [0.0472]	ND [0.0455]	ND [0.0472]	ND [0.0481]	ND [0.049]	ND [0.0472]	ND [0.0525]	ND [0.0455]
8270D SIM LV (PAH)	Benzo[a]pyrene	ug/L	0.25		ND [0.0189]	ND [0.0182]	ND [0.0189]	ND [0.0192]	ND [0.0196]	ND [0.0189]	ND [0.021]	ND [0.0182]
8270D SIM LV (PAH)	Benzo[b]Fluoranthene	ug/L	2.5		ND [0.0472]	ND [0.0455]	ND [0.0472]	ND [0.0481]	ND [0.049]	ND [0.0472]	ND [0.0525]	ND [0.0455]
8270D SIM LV (PAH)	Benzo[g,h,i]perylene	ug/L	0.26		ND [0.0472]	ND [0.0455]	ND [0.0472]	ND [0.0481]	ND [0.049]	ND [0.0472]	ND [0.0525]	ND [0.0455]
8270D SIM LV (PAH)	Benzo[k]fluoranthene	ug/L	0.8		ND [0.0472]	ND [0.0455]	ND [0.0472]	ND [0.0481]	ND [0.049]	ND [0.0472]	ND [0.0525]	ND [0.0455]
8270D SIM LV (PAH)	Chrysene	ug/L	2		ND [0.0472]	ND [0.0455]	ND [0.0472]	ND [0.0481]	ND [0.049]	ND [0.0472]	ND [0.0525]	ND [0.0455]
8270D SIM LV (PAH)	Dibenzo[a,h]anthracene	ug/L	0.25		ND [0.0189]	ND [0.0182]	ND [0.0189]	ND [0.0192]	ND [0.0196]	ND [0.0189]	ND [0.021]	ND [0.0182]
8270D SIM LV (PAH)	Fluoranthene	ug/L	260		ND [0.0472]	ND [0.0455]	ND [0.0472]	ND [0.0481]	ND [0.049]	ND [0.0472]	ND [0.0525]	ND [0.0455]
8270D SIM LV (PAH)	Fluorene	ug/L	290		ND [0.0472]	ND [0.0455]	ND [0.0472]	0.0358 [0.0481] J	0.0357 [0.049] J	0.42 [0.0472]	0.475 [0.0525]	0.473 [0.0455]
8270D SIM LV (PAH)	Indeno[1,2,3-c,d] pyrene	ug/L	0.19		ND [0.0472]	ND [0.0455]	ND [0.0472]	ND [0.0481]	ND [0.049]	ND [0.0472]	ND [0.0525]	ND [0.0455]
8270D SIM LV (PAH)	Naphthalene	ug/L	1.7		0.187 [0.0943]	ND [0.0909]	ND [0.0943]	0.837 [0.0962]	0.875 [0.098]	**16.1 [0.377]**	**28.6 [0.525]**	**28.5 [0.455]**
8270D SIM LV (PAH)	Phenanthrene	ug/L	170		ND [0.0472]	ND [0.0455]	ND [0.0472]	ND [0.0481]	ND [0.049]	0.421 [0.0472]	0.268 [0.0525]	0.222 [0.0455]
8270D SIM LV (PAH)	Pyrene	ug/L	120		ND [0.0472]	ND [0.0455]	ND [0.0472]	ND [0.0481]	ND [0.049]	ND [0.0472]	ND [0.0525]	ND [0.0455]

Notes:

Bold red indicates that the result exceeds the cleanup level.

Blue highlighting indicates that the result exceeds 20% of the current ADEC cleanup level.

Italics/gray highlighting indicate that the LOQ for a non-detect result exceeds the cleanup level.

ADEC[1] = 18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018).

[ ] = limit of detection (LOQ)

Dup = field duplicate

B = analyte was detected in the associated blank

J(±) = result is an estimated value greater than the DL and below the LOQ, or the result is estimated due to a QC failure.

ND = not detected

µg/L = microgram(s) per liter

ATTACHMENT F-2 DATA SUMMARY TABLES
2019 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES - SWANSON RIVER FIELD
CONTAMINATED SITES - TS 1-9

				Sample ID	SRF19-TS19HH-0719	SRF19-TS19U-0719	SRF19-TB01-0719
				QC Type	Primary	Primary	Trip Blank
				Collection Date	07/05/2019 17:15	07/05/2019 16:30	07/06/2019 06:00
				Lab Sample ID	1193674009	1193674008	1193674013
				Matrix	Water	Water	Water
Method	**Analyte**	**Units**	**ADEC[1]**				
SW8260C	1,2,4-Trimethylbenzene	ug/L	56		1.63 [1]	**64.2 [1]**	ND [1]
SW8260C	1,3,5-Trimethylbenzene	ug/L	60		4.4 [1]	39.8 [1]	ND [1]
SW8260C	Benzene	ug/L	4.6		0.257 [0.4] J	1.48 [0.4]	ND [0.4]
SW8260C	Ethylbenzene	ug/L	15		ND [1]	5.56 [1]	ND [1]
SW8260C	Isopropylbenzene (Cumene)	ug/L	450		3.42 [1]	11.3 [1]	ND [1]
SW8260C	Naphthalene	ug/L	1.7		0.641 [1] J	**11.8 [1]**	ND [1]
SW8260C	n-Butylbenzene	ug/L	1000		0.762 [1] J	ND [1]	ND [1]
SW8260C	o-Xylene	ug/L	190		ND [1]	2.2 [1]	ND [1]
SW8260C	P & M -Xylene	ug/L	190		0.628 [2] J	8.23 [2]	ND [2]
SW8260C	sec-Butylbenzene	ug/L	2000		2.28 [1]	4.66 [1]	ND [1]
SW8260C	tert-Butylbenzene	ug/L	690		ND [1]	1.35 [1]	ND [1]
SW8260C	Toluene	ug/L	1100		ND [1]	0.357 [1] J	ND [1]
SW8260C	Xylenes (total)	ug/L	190		ND [3]	10.4 [3]	ND [3]
8270D SIM LV (PAH)	1-Methylnaphthalene	ug/L	11		0.249 [0.0472]	**11.5 [0.196]**	--
8270D SIM LV (PAH)	2-Methylnaphthalene	ug/L	36		0.242 [0.0472]	12.6 [0.196]	--
8270D SIM LV (PAH)	Acenaphthene	ug/L	530		ND [0.0472]	0.209 [0.049]	--
8270D SIM LV (PAH)	Acenaphthylene	ug/L	260		ND [0.0472]	ND [0.049]	--
8270D SIM LV (PAH)	Anthracene	ug/L	43		ND [0.0472]	ND [0.049]	--
8270D SIM LV (PAH)	Benzo(a)Anthracene	ug/L	0.3		ND [0.0472]	ND [0.049]	--
8270D SIM LV (PAH)	Benzo[a]pyrene	ug/L	0.25		ND [0.0189]	ND [0.0196]	--
8270D SIM LV (PAH)	Benzo[b]Fluoranthene	ug/L	2.5		ND [0.0472]	ND [0.049]	--
8270D SIM LV (PAH)	Benzo[g,h,i]perylene	ug/L	0.26		ND [0.0472]	ND [0.049]	--
8270D SIM LV (PAH)	Benzo[k]fluoranthene	ug/L	0.8		ND [0.0472]	ND [0.049]	--
8270D SIM LV (PAH)	Chrysene	ug/L	2		ND [0.0472]	ND [0.049]	--
8270D SIM LV (PAH)	Dibenzo[a,h]anthracene	ug/L	0.25		ND [0.0189]	ND [0.0196]	--
8270D SIM LV (PAH)	Fluoranthene	ug/L	260		ND [0.0472]	ND [0.049]	--
8270D SIM LV (PAH)	Fluorene	ug/L	290		ND [0.0472]	0.939 [0.049]	--
8270D SIM LV (PAH)	Indeno[1,2,3-c,d] pyrene	ug/L	0.19		ND [0.0472]	ND [0.049]	--
8270D SIM LV (PAH)	Naphthalene	ug/L	1.7		0.179 [0.0943]	**7.9 [0.098]**	--
8270D SIM LV (PAH)	Phenanthrene	ug/L	170		ND [0.0472]	0.598 [0.049]	--
8270D SIM LV (PAH)	Pyrene	ug/L	120		ND [0.0472]	ND [0.049]	--

Notes:

Bold red indicates that the result exceeds the cleanup level.

Blue highlighting indicates that the result exceeds 20% of the current ADEC cleanup level.

Italics/gray highlighting indicate that the LOQ for a non-detect result exceeds the cleanup level.

ADEC[1] = 18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018).

[ ] = limit of detection (LOQ)

Dup = field duplicate

B = analyte was detected in the associated blank

J(±) = result is an estimated value greater than the DL and below the LOQ, or the result is estimated due to a QC failure.

ND = not detected

µg/L = microgram(s) per liter

ATTACHMENT F-2 DATA SUMMARY TABLES
2019 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES - SWANSON RIVER FIELD
CONTAMINATED SITES - TS 1-27

				Sample ID	SRF127-FS127C-0719	SRF127-TS127G-0719	SRF127-TS127K-0719	SRF127-TS127KZ-0719	SRF127-TS127L-0719	SRF127-TS127M-0719	SRF127-TB01-0719
				QC Type	Primary	Primary, MS/MSD	Primary	Dup of SRF127-TS127K-0719	Primary	Primary	Trip Blank
				Collection Date	07/10/2019 16:10	07/10/2019 12:10	07/10/2019 12:10	07/10/2019 11:10	07/10/2019 18:30	07/10/2019 18:00	07/10/2019 08:00
				Lab Sample ID	1193793001	1193793002	1193793005	1193793006	1193793007	1193793008	1193793009
				Matrix	Water	Water	Water	Water	Water	Water	Water
Method	**Analyte**	**Units**	**ADEC[1]**								
SW8260C	1,2,4-Trimethylbenzene	µg/L	56		ND [1]	**60.6 [1] J-**	**1190 [20]**	**1320 [20]**	ND [1]	**343 [20]**	ND [1]
SW8260C	1,3,5-Trimethylbenzene	µg/L	60		ND [1]	19.6 [1]	**362 [20]**	**394 [20]**	ND [1]	**99.4 [1]**	ND [1]
SW8260C	Benzene	µg/L	4.6		ND [0.4]	**9.24 [0.4]**	**36.6 [0.4]**	**35.7 [0.4]**	ND [0.4]	3.85 [0.4]	ND [0.4]
SW8260C	Ethylbenzene	µg/L	15		ND [1]	**23.2 [1] J-**	**664 [20]**	**704 [20]**	0.67 [1] J	**41.4 [1]**	ND [1]
SW8260C	Isopropylbenzene (Cumene)	µg/L	450		ND [1]	21.9 [1] J-	290 [20]	311 [20]	2.27 [1]	53.6 [1]	ND [1]
SW8260C	Naphthalene	µg/L	1.7		ND [1]	**9.94 [1]**	**272 [20]**	**301 [20]**	**2.47 [1]**	**64.9 [1]**	ND [1]
SW8260C	n-Butylbenzene	µg/L	1000		ND [1]	ND [1]	41.5 [1]	38.8 [1]	ND [1]	1.24 [1]	ND [1]
SW8260C	o-Xylene	µg/L	190		ND [1]	0.336 [1] J	1.29 [1]	1.24 [1]	ND [1]	ND [1]	ND [1]
SW8260C	P & M -Xylene	µg/L	190		ND [2]	**264 [2] J-**	**2420 [40]**	**2590 [40]**	ND [2]	180 [2]	ND [2]
SW8260C	sec-Butylbenzene	µg/L	2000		ND [1]	2.64 [1]	90.1 [1]	90.7 [1]	1.7 [1]	4.6 [1]	ND [1]
SW8260C	tert-Butylbenzene	µg/L	690		ND [1]	0.714 [1] J	15.1 [1]	14.8 [1]	0.39 [1] J	1.31 [1]	ND [1]
SW8260C	Toluene	µg/L	1100		ND [1]	ND [1]	ND [1]	ND [1]	ND [1]	0.33 [1] J	ND [1]
SW8260C	Xylenes (total)	µg/L	190		ND [3]	**265 [3] J-**	**2420 [60]**	**2590 [60]**	ND [3]	180 [3]	ND [3]
8270D SIM LV (PAH)	1-Methylnaphthalene	µg/L	11		ND [0.0525]	0.457 [0.0534]	**58 [1.89]**	**56.5 [1.92]**	0.358 [0.0521]	**15.4 [0.248]**	--
8270D SIM LV (PAH)	2-Methylnaphthalene	µg/L	36		ND [0.0525]	0.181 [0.0534]	**60.9 [1.89]**	**60 [1.92]**	0.248 [0.0521]	15.3 [0.248]	--
8270D SIM LV (PAH)	Acenaphthene	µg/L	530		ND [0.0525]	ND [0.0534]	0.106 [0.0472]	0.109 [0.0481]	ND [0.0521]	0.169 [0.0496]	--
8270D SIM LV (PAH)	Acenaphthylene	µg/L	260		ND [0.0525]	ND [0.0534]	ND [0.0472] J	0.105 [0.0481] J	ND [0.0521]	ND [0.0496]	--
8270D SIM LV (PAH)	Anthracene	µg/L	43		ND [0.0525]	ND [0.0534]	ND [0.0472]	ND [0.0481]	ND [0.0521]	0.0265 [0.0496] J	--
8270D SIM LV (PAH)	Benzo(a)Anthracene	µg/L	0.3		ND [0.0525]	ND [0.0534] J-	ND [0.0472]	ND [0.0481]	ND [0.0521]	ND [0.0496]	--
8270D SIM LV (PAH)	Benzo[a]pyrene	µg/L	0.25		ND [0.021]	ND [0.0214] J-	ND [0.0189]	ND [0.0192]	ND [0.0208]	ND [0.0198]	--
8270D SIM LV (PAH)	Benzo[b]Fluoranthene	µg/L	2.5		ND [0.0525]	ND [0.0534] J-	ND [0.0472]	ND [0.0481]	ND [0.0521]	ND [0.0496]	--
8270D SIM LV (PAH)	Benzo[g,h,i]perylene	µg/L	0.26		ND [0.0525]	ND [0.0534] J-	ND [0.0472]	ND [0.0481]	ND [0.0521]	ND [0.0496]	--
8270D SIM LV (PAH)	Benzo[k]fluoranthene	µg/L	0.8		ND [0.0525]	ND [0.0534] J-	ND [0.0472]	ND [0.0481]	ND [0.0521]	ND [0.0496]	--
8270D SIM LV (PAH)	Chrysene	µg/L	2		ND [0.0525]	ND [0.0534] J-	ND [0.0472]	ND [0.0481]	ND [0.0521]	ND [0.0496]	--
8270D SIM LV (PAH)	Dibenzo[a,h]anthracene	µg/L	0.25		ND [0.021]	ND [0.0214] J-	ND [0.0189]	ND [0.0192]	ND [0.0208]	ND [0.0198]	--
8270D SIM LV (PAH)	Fluoranthene	µg/L	260		ND [0.0525]	ND [0.0534]	ND [0.0472]	ND [0.0481]	ND [0.0521]	ND [0.0496]	--
8270D SIM LV (PAH)	Fluorene	µg/L	290		ND [0.0525]	ND [0.0534]	0.12 [0.0472]	0.123 [0.0481]	ND [0.0521]	0.424 [0.0496]	--
8270D SIM LV (PAH)	Indeno[1,2,3-c,d] pyrene	µg/L	0.19		ND [0.0525]	ND [0.0534] J-	ND [0.0472]	ND [0.0481]	ND [0.0521]	ND [0.0496]	--
8270D SIM LV (PAH)	Naphthalene	µg/L	1.7		ND [0.105]	**7.29 [0.107] J-**	**170 [3.77]**	**172 [3.85]**	1.64 [0.104]	**26.1 [0.496]**	--
8270D SIM LV (PAH)	Phenanthrene	µg/L	170		ND [0.0525]	ND [0.0534]	ND [0.0472]	ND [0.0481]	ND [0.0521]	0.429 [0.0496]	--
8270D SIM LV (PAH)	Pyrene	µg/L	120		ND [0.0525]	ND [0.0534]	ND [0.0472]	ND [0.0481]	ND [0.0521]	ND [0.0496]	--

Notes:

Bold red indicates that the result exceeds the cleanup level.

Blue highlighting indicates that the result exceeds 20% of the current ADEC cleanup level.

Italics/gray highlighting indicate that the LOQ for a non-detect result exceeds the cleanup level.

Based on comparison to historical results, results for SRF127-TS127L-0719 and SRF127-TS127M0719 are suspected to be swapped.

ADEC[1] = 18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018).

[ ] = limit of detection (LOQ)

Dup = field duplicate

B = analyte was detected in the associated blank

J(±) = result is an estimated value greater than the DL and below the LOQ, or the result is estimated due to a QC failure (biased low/high).

ND = not detected

µg/L = microgram(s) per liter

ATTACHMENT F-2 DATA SUMMARY TABLES
2019 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES - SWANSON RIVER FIELD
CONTAMINATED SITES - TS 1-33

				Sample ID QC Type Collection Date Lab Sample ID Matrix	SRF133-FS133F-0719 Primary 07/09/2019 17:10 1193786011 Water	SRF133-FS133FZ-0719 Dup of SRF133-FS133F-0719 07/09/2019 17:20 1193786012 Water	SRF133-FS133H-0719 Primary 07/11/2019 16:55 1193786001 Water	SRF133-FS133S-0719 Primary 07/11/2019 10:15 1193786004 Water	SRF133-TS13302-0719 Primary 07/11/2019 15:00 1193786003 Water	SRF133-TS13302Z-0719 Dup of SRF133-TS13302-0719 07/11/2019 14:00 1193786006 Water	SRF133-TS133JJ-0719 Primary 07/11/2019 12:10 1193786005 Water	SRF133-TS133Q-0719 Primary, MS/MSD 07/11/2019 11:15 1193786008 Water
Method	**Analyte**	**Units**	**ADEC[1]**									
SW8260C	1,2,4-Trimethylbenzene	µg/L	56		0.49 [1] J	0.35 [1] J	4.75 [1]	ND [1]	1.42 [1]	1.44 [1]	ND [1]	**542 [20]**
SW8260C	1,3,5-Trimethylbenzene	µg/L	60		ND [1]	ND [1]	12.5 [1]	5.29 [1]	ND [1]	ND [1]	ND [1]	**345 [20]**
SW8260C	Benzene	µg/L	4.6		**123 [0.4] J**	**73.2 [0.4] J**	**9.33 [0.4]**	0.98 [0.4]	**192 [0.4]**	**190 [8]**	0.58 [0.4]	**45.3 [0.4] J-**
SW8260C	Ethylbenzene	µg/L	15		0.68 [1] J	0.42 [1] J	**35.1 [1]**	ND [1]	**164 [1]**	**179 [1]**	ND [1]	**1050 [20]**
SW8260C	Isopropylbenzene (Cumene)	µg/L	450		ND [1]	ND [1]	11.7 [1]	2.68 [1]	44.3 [1]	48.1 [1]	0.73 [1] J	308 [20]
SW8260C	Naphthalene	µg/L	1.7		ND [1]	ND [1]	**4.41 [1]**	ND [1]	**47.3 [1]**	**48.4 [1]**	0.31 [1] J	**41.3 [1]**
SW8260C	n-Butylbenzene	µg/L	1000		ND [1]	ND [1]	2 [1]	ND [1]	2.78 [1]	3.1 [1]	ND [1]	ND [1]
SW8260C	o-Xylene	µg/L	190		ND [1]	ND [1]	0.55 [1] J	ND [1]	2.07 [1]	2.15 [1]	ND [1]	2.28 [1]
SW8260C	P & M -Xylene	µg/L	190		3.22 [2] J	2.17 [2] J	11.6 [2]	ND [2]	26.8 [2]	28.1 [2]	ND [2]	**1760 [40]**
SW8260C	sec-Butylbenzene	µg/L	2000		ND [1]	ND [1]	4.89 [1]	1.68 [1]	10.2 [1]	11.1 [1] J	0.76 [1] J	13.6 [1]
SW8260C	tert-Butylbenzene	µg/L	690		ND [1]	ND [1]	0.76 [1] J	0.55 [1] J	2.55 [1]	2.71 [1]	0.53 [1] J	280 [20]
SW8260C	Toluene	µg/L	1100		ND [1]	ND [1]	0.47 [1] J	ND [1]	0.57 [1] J	0.61 [1] J	ND [1]	0.66 [1] J
SW8260C	Xylenes (total)	µg/L	190		3.22 [3] J	2.17 [3] J, J	12.1 [3]	ND [3]	28.9 [3]	30.3 [3]	ND [3]	**1760 [60]**
8270D SIM LV (PAH)	1-Methylnaphthalene	µg/L	11		0.146 [0.0504] H	0.17 [0.05]	1.72 [0.0525]	ND [0.0553]	**23.7 [0.252]**	**24.4 [0.258]**	ND [0.0558] J-	3.43 [0.0521]
8270D SIM LV (PAH)	2-Methylnaphthalene	µg/L	36		0.132 [0.0504] H	0.148 [0.05]	1.82 [0.0525]	ND [0.0553]	20.1 [0.252]	20.3 [0.258]	ND [0.0558] J-	2.12 [0.0521]
8270D SIM LV (PAH)	Acenaphthene	µg/L	530		ND [0.0504] H	ND [0.05]	ND [0.0525]	ND [0.0553]	0.556 [0.0504]	0.589 [0.0517]	ND [0.0558] J-	ND [0.0521]
8270D SIM LV (PAH)	Acenaphthylene	µg/L	260		ND [0.0504] H	ND [0.05]	ND [0.0525]	ND [0.0553]	ND [0.0504]	ND [0.0517]	ND [0.0558] J-	ND [0.0521]
8270D SIM LV (PAH)	Anthracene	µg/L	43		ND [0.0504] H	ND [0.05]	ND [0.0525]	ND [0.0553]	ND [0.0504]	ND [0.0517]	ND [0.0558] J-	ND [0.0521]
8270D SIM LV (PAH)	Benzo(a)Anthracene	µg/L	0.3		ND [0.0504] H	ND [0.05]	ND [0.0525]	ND [0.0553]	ND [0.0504]	ND [0.0517]	ND [0.0558]	ND [0.0521] J-
8270D SIM LV (PAH)	Benzo[a]pyrene	µg/L	0.25		ND [0.0202] H	ND [0.02]	ND [0.021]	ND [0.0221]	ND [0.0202]	ND [0.0207]	ND [0.0223]	ND [0.0208] J-
8270D SIM LV (PAH)	Benzo[b]Fluoranthene	µg/L	2.5		ND [0.0504] H	ND [0.05]	ND [0.0525]	ND [0.0553]	ND [0.0504]	ND [0.0517]	ND [0.0558]	ND [0.0521] J-
8270D SIM LV (PAH)	Benzo[g,h,i]perylene	µg/L	0.26		ND [0.0504] H	ND [0.05]	ND [0.0525]	ND [0.0553]	ND [0.0504]	ND [0.0517]	ND [0.0558]	ND [0.0521] J-
8270D SIM LV (PAH)	Benzo[k]fluoranthene	µg/L	0.8		ND [0.0504] H	ND [0.05]	ND [0.0525]	ND [0.0553]	ND [0.0504]	ND [0.0517]	ND [0.0558]	ND [0.0521] J-
8270D SIM LV (PAH)	Chrysene	µg/L	2		ND [0.0504] H	ND [0.05]	ND [0.0525]	ND [0.0553]	ND [0.0504]	ND [0.0517]	ND [0.0558]	ND [0.0521] J-
8270D SIM LV (PAH)	Dibenzo[a,h]anthracene	µg/L	0.25		ND [0.0202] H	ND [0.02]	ND [0.021]	ND [0.0221]	ND [0.0202]	ND [0.0207]	ND [0.0223]	ND [0.0208] J-
8270D SIM LV (PAH)	Fluoranthene	µg/L	260		ND [0.0504] H	ND [0.05]	ND [0.0525]	ND [0.0553]	ND [0.0504]	ND [0.0517]	ND [0.0558]	ND [0.0521]
8270D SIM LV (PAH)	Fluorene	µg/L	290		ND [0.0504] H	ND [0.05]	0.197 [0.0525]	ND [0.0553]	0.649 [0.0504]	0.696 [0.0517]	ND [0.0558] J-	ND [0.0521]
8270D SIM LV (PAH)	Indeno[1,2,3-c,d] pyrene	µg/L	0.19		ND [0.0504] H	ND [0.05]	ND [0.0525]	ND [0.0553]	ND [0.0504]	ND [0.0517]	ND [0.0558]	ND [0.0521] J-
8270D SIM LV (PAH)	Naphthalene	µg/L	1.7		0.3 [0.101] H	0.333 [0.1]	**3.77 [0.105]**	ND [0.111]	**27 [0.504]**	**27.7 [0.517]**	ND [0.112] J-	**17 [0.521] J+**
8270D SIM LV (PAH)	Phenanthrene	µg/L	170		ND [0.0504] H	ND [0.05]	0.286 [0.0525]	ND [0.0553]	0.188 [0.0504]	0.201 [0.0517]	ND [0.0558] J-	ND [0.0521]
8270D SIM LV (PAH)	Pyrene	µg/L	120		ND [0.0504] H	ND [0.05]	ND [0.0525]	ND [0.0553]	ND [0.0504]	ND [0.0517]	ND [0.0558]	ND [0.0521]

Notes:

Bold red indicates that the result exceeds the cleanup level.

Blue highlighting indicates that the result exceeds 20% of the current ADEC cleanup level.

Italics/gray highlighting indicate that the LOQ for a non-detect result exceeds the cleanup level.

ADEC[1] = 18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018).

[ ] = limit of detection (LOQ)

Dup = field duplicate

B = analyte was detected in the associated blank

H = estimated; sample was prepared and/or analyzed outside of holding time.

J(±) = result is < LOQ or estimated due to a QC failure (biased low/high).

ND = not detected

µg/L = microgram(s) per liter

ATTACHMENT F-2 DATA SUMMARY TABLES
2019 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES - SWANSON RIVER FIELD
CONTAMINATED SITES - TS 1-33

				Sample ID QC Type Collection Date Lab Sample ID Matrix	SRF133-FS133W-0719 Primary 07/09/2019 17:20 1193786007 Water	SRF133-TS133UR-0719 Primary 07/11/2019 15:20 1193786002 Water	SRF133-TB01-0719 Trip Blank 07/09/2019 08:00 1193786013 Water
Method	**Analyte**	**Units**	**ADEC[1]**				
SW8260C	1,2,4-Trimethylbenzene	µg/L	56		ND [1]	0.75 [1] J	ND [1]
SW8260C	1,3,5-Trimethylbenzene	µg/L	60		ND [1]	ND [1]	ND [1]
SW8260C	Benzene	µg/L	4.6		ND [0.4]	**22.4 [0.4]**	ND [0.4]
SW8260C	Ethylbenzene	µg/L	15		ND [1]	**23.6 [1]**	ND [1]
SW8260C	Isopropylbenzene (Cumene)	µg/L	450		ND [1]	5.54 [1]	ND [1]
SW8260C	Naphthalene	µg/L	1.7		ND [1]	**15.8 [1]**	ND [1]
SW8260C	n-Butylbenzene	µg/L	1000		ND [1]	ND [1]	ND [1]
SW8260C	o-Xylene	µg/L	190		ND [1]	0.87 [1] J	ND [1]
SW8260C	P & M -Xylene	µg/L	190		ND [2]	0.9 [2] J	ND [2]
SW8260C	sec-Butylbenzene	µg/L	2000		ND [1]	0.66 [1] J	ND [1]
SW8260C	tert-Butylbenzene	µg/L	690		ND [1]	0.92 [1] J	ND [1]
SW8260C	Toluene	µg/L	1100		ND [1]	0.34 [1] J	ND [1]
SW8260C	Xylenes (total)	µg/L	190		ND [3]	1.77 [3] J	ND [3]
8270D SIM LV (PAH)	1-Methylnaphthalene	µg/L	11		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	2-Methylnaphthalene	µg/L	36		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	Acenaphthene	µg/L	530		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	Acenaphthylene	µg/L	260		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	Anthracene	µg/L	43		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	Benzo(a)Anthracene	µg/L	0.3		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	Benzo[a]pyrene	µg/L	0.25		ND [0.0192] H	ND [0.0203]	
8270D SIM LV (PAH)	Benzo[b]Fluoranthene	µg/L	2.5		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	Benzo[g,h,i]perylene	µg/L	0.26		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	Benzo[k]fluoranthene	µg/L	0.8		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	Chrysene	µg/L	2		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	Dibenzo[a,h]anthracene	µg/L	0.25		ND [0.0192] H	ND [0.0203]	
8270D SIM LV (PAH)	Fluoranthene	µg/L	260		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	Fluorene	µg/L	290		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	Indeno[1,2,3-c,d] pyrene	µg/L	0.19		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	Naphthalene	µg/L	1.7		ND [0.0962] H	1.04 [0.102]	
8270D SIM LV (PAH)	Phenanthrene	µg/L	170		ND [0.0481] H	ND [0.0508]	
8270D SIM LV (PAH)	Pyrene	µg/L	120		ND [0.0481] H	ND [0.0508]	

Notes:

Bold red indicates that the result exceeds the cleanup level.

Blue highlighting indicates that the result exceeds 20% of the current ADEC cleanup level.

Italics/gray highlighting indicate that the LOQ for a non-detect result exceeds the cleanup level.

ADEC[1] = 18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018).

[ ] = limit of detection (LOQ)

Dup = field duplicate

B = analyte was detected in the associated blank

H = estimated; sample was prepared and/or analyzed outside of holding time.

J(±) = result is < LOQ or estimated due to a QC failure (biased low/high).

ND = not detected

µg/L = microgram(s) per liter

ATTACHMENT F-2 DATA SUMMARY TABLES
2019 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES - SWANSON RIVER FIELD
CONTAMINATED SITES - TS 2-15

					Sample ID	SRF215-FS215B-0719	SRF215-TS215O-0719	SRF215-TS215OZ-0720	SRF215-TS215P-0719	SRF215-TS215R-0719	SRF215-TB01-0719
					QC Type	Primary	Primary	Dup of SRF215-TS215O-0719	Primary, MS/MSD	Primary	Trip Blank
					Collection Date	07/10/2019 15:00	07/10/2019 10:20	07/10/2019 09:20	07/10/2019 09:10	07/10/2019 08:50	07/10/2019 08:50
					Lab Sample ID	1193792001	1193792002	1193792003	1193792004	1193792007	1193792008
					Matrix	Water	Water	Water	Water	Water	Water
Method	**Analyte**	**20% CL**	**Units**	**ADEC[1]**							
SW8260C	1,2,4-Trimethylbenzene	11.2	µg/L	56	ND [1]	**84.7 [1]**	**76.3 [1]**	ND [1]	ND [1]	ND [1]
SW8260C	1,3,5-Trimethylbenzene	12	µg/L	60	ND [1]	26.1 [1]	23.9 [1]	ND [1]	ND [1]	ND [1]
SW8260C	Benzene	0.92	µg/L	4.6	ND [0.4]	**6.44 [0.4]**	**6.02 [0.4]**	ND [0.4]	ND [0.4]	ND [0.4]
SW8260C	Ethylbenzene	3	µg/L	15	ND [1]	**189 [1]**	**179 [1]**	ND [1]	ND [1]	ND [1]
SW8260C	Isopropylbenzene (Cumene)	90	µg/L	450	ND [1]	20.5 [1]	19.5 [1]	ND [1]	ND [1]	ND [1]
SW8260C	Naphthalene	0.34	µg/L	1.7	ND [1]	**14.4 [1]**	**13.4 [1]**	ND [1]	ND [1]	ND [1]
SW8260C	n-Butylbenzene	200	µg/L	1000	ND [1]	1.38 [1]	1.22 [1]	ND [1]	ND [1]	ND [1]
SW8260C	o-Xylene	38	µg/L	190	ND [1]	48.3 [20]	46.5 [20]	ND [1]	ND [1]	ND [1]
SW8260C	P & M -Xylene	38	µg/L	190	ND [2]	**584 [40]**	**547 [40]**	ND [2]	ND [2]	ND [2]
SW8260C	sec-Butylbenzene	400	µg/L	2000	ND [1]	3.71 [1]	3.28 [1]	ND [1]	ND [1]	ND [1]
SW8260C	tert-Butylbenzene	138	µg/L	690	ND [1]	0.65 [1] J	0.57 [1] J	ND [1]	ND [1]	ND [1]
SW8260C	Toluene	220	µg/L	1100	ND [1]	1.24 [1]	1.19 [1]	ND [1]	ND [1]	ND [1]
SW8260C	Xylenes (total)	38	µg/L	190	ND [3]	**633 [60]**	**594 [60]**	ND [3]	ND [3]	ND [3]
8270D SIM LV (PAH)	1-Methylnaphthalene	2.2	µg/L	11	ND [0.0521]	2.62 [0.0512]	2.61 [0.0517]	ND [0.0455]	ND [0.0534]	--
8270D SIM LV (PAH)	2-Methylnaphthalene	7.2	µg/L	36	ND [0.0521]	2.87 [0.0512]	2.86 [0.0517]	ND [0.0455]	ND [0.0534]	--
8270D SIM LV (PAH)	Acenaphthene	106	µg/L	530	ND [0.0521]	ND [0.0512]	ND [0.0517]	ND [0.0455]	ND [0.0534]	--
8270D SIM LV (PAH)	Acenaphthylene	52	µg/L	260	ND [0.0521]	ND [0.0512]	ND [0.0517]	ND [0.0455]	ND [0.0534]	--
8270D SIM LV (PAH)	Anthracene	8.6	µg/L	43	ND [0.0521]	ND [0.0512]	ND [0.0517]	ND [0.0455]	ND [0.0534]	--
8270D SIM LV (PAH)	Benzo(a)Anthracene	0.06	µg/L	0.3	ND [0.0521]	ND [0.0512]	ND [0.0517]	ND [0.0455] J-	ND [0.0534]	--
8270D SIM LV (PAH)	Benzo[a]pyrene	0.05	µg/L	0.25	ND [0.0208]	ND [0.0205]	ND [0.0207]	ND [0.0182] J-	ND [0.0214]	--
8270D SIM LV (PAH)	Benzo[b]Fluoranthene	0.5	µg/L	2.5	ND [0.0521]	ND [0.0512]	ND [0.0517]	ND [0.0455] J-	ND [0.0534]	--
8270D SIM LV (PAH)	Benzo[g,h,i]perylene	0.052	µg/L	0.26	ND [0.0521]	ND [0.0512]	ND [0.0517]	ND [0.0455] J-	ND [0.0534]	--
8270D SIM LV (PAH)	Benzo[k]fluoranthene	0.16	µg/L	0.8	ND [0.0521]	ND [0.0512]	ND [0.0517]	ND [0.0455] J-	ND [0.0534]	--
8270D SIM LV (PAH)	Chrysene	0.4	µg/L	2	ND [0.0521]	ND [0.0512]	ND [0.0517]	ND [0.0455] J-	ND [0.0534]	--
8270D SIM LV (PAH)	Dibenzo[a,h]anthracene	0.05	µg/L	0.25	ND [0.0208]	ND [0.0205]	ND [0.0207]	ND [0.0182] J-	ND [0.0214]	--
8270D SIM LV (PAH)	Fluoranthene	52	µg/L	260	ND [0.0521]	ND [0.0512]	ND [0.0517]	ND [0.0455]	ND [0.0534]	--
8270D SIM LV (PAH)	Fluorene	58	µg/L	290	ND [0.0521]	ND [0.0512]	ND [0.0517]	ND [0.0455]	ND [0.0534]	--
8270D SIM LV (PAH)	Indeno[1,2,3-c,d] pyrene	0.038	µg/L	0.19	ND [0.0521]	ND [0.0512]	ND [0.0517]	ND [0.0455] J-	ND [0.0534]	--
8270D SIM LV (PAH)	Naphthalene	0.34	µg/L	1.7	ND [0.104]	**8.64 [0.102]**	**8.5 [0.103]**	ND [0.0909]	ND [0.107]	--
8270D SIM LV (PAH)	Phenanthrene	34	µg/L	170	ND [0.0521]	ND [0.0512]	ND [0.0517]	ND [0.0455]	ND [0.0534]	--
8270D SIM LV (PAH)	Pyrene	24	µg/L	120	ND [0.0521]	ND [0.0512]	ND [0.0517]	ND [0.0455]	ND [0.0534]	--

Notes:

Bold red indicates that the result exceeds the cleanup level.

Blue highlighting indicates that the result exceeds 20% of the current ADEC cleanup level.

Italics/gray highlighting indicate that the LOQ for a non-detect result exceeds the cleanup level.

ADEC[1] = 18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018).

[ ] = limit of detection (LOQ)

Dup = field duplicate

B = analyte was detected in the associated blank

J(±) = result is an estimated value greater than the DL and below the LOQ, or the result is estimated due to a QC failure (biased low/high).

ND = not detected

µg/L = microgram(s) per liter

ATTACHMENT F-2 DATA SUMMARY TABLES
2019 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES - SWANSON RIVER FIELD
CONTAMINATED SITES - TS 3-4

				Sample ID	SRF34-FS34A-0719	SRF34-FS34B-0719	SRF34-FS34F-0719	SRF34-TS3400-0719	SRF34-TS34CC-0719	SRF34-TS34MM-0719	SRF34-TS34P-0719	SRF34-TS34PZ-0719	SRF34-TB01-0719
				QC Type	Primary, MS/MSD	Primary	Primary	Primary	Primary	Primary	Primary	Dup of SRF34-TS34P-0719	Trip Blank
				Collection Date	07/09/2019 08:20	07/09/2019 08:25	07/09/2019 14:30	07/09/2019 12:00	07/09/2019 14:20	07/09/2019 12:05	07/09/2019 10:40	07/09/2019 10:50	07/09/2019 08:00
				Lab Sample ID	1193788001	1193788004	1193788005	1193788008	1193788006	1193788007	1193788009	1193788010	1193788011
				Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water
Method	**Analyte**	**Units**	**ADEC[1]**										
SW8260C	1,2,4-Trimethylbenzene	µg/L	56		ND [1]	ND [1]	ND [1]	ND [1]	28.5 [1]	ND [1]	27.4 [1]	27.2 [1]	ND [1]
SW8260C	1,3,5-Trimethylbenzene	µg/L	60		ND [1]	ND [1]	ND [1]	ND [1]	17.3 [1]	ND [1]	48.6 [1]	49 [1]	ND [1]
SW8260C	Benzene	µg/L	4.6		2.05 [0.4]	0.56 [0.4]	ND [0.4]	ND [0.4]	0.44 [0.4]	ND [0.4]	**586 [8]**	**595 [8]**	ND [0.4]
SW8260C	Ethylbenzene	µg/L	15		0.46 [1] J,	ND [1]	ND [1]	ND [1]	11.5 [1]	ND [1]	**176 [1]**	**172 [1]**	ND [1]
SW8260C	Isopropylbenzene (Cumene)	µg/L	450		4.07 [1]	ND [1]	ND [1]	ND [1]	7.56 [1]	ND [1]	22.9 [1]	22.1 [1]	ND [1]
SW8260C	Naphthalene	µg/L	1.7		ND [1]	ND [1]	ND [1]	ND [1]	**3.08 [1]**	ND [1]	**29.4 [1]**	**30.1 [1]**	ND [1]
SW8260C	n-Butylbenzene	µg/L	1000		ND [1]	ND [1]	ND [1]	ND [1]	ND [1]	ND [1]	2.62 [1]	2.63 [1]	ND [1]
SW8260C	o-Xylene	µg/L	190		ND [1]	ND [1]	ND [1]	ND [1]	0.47 [1] J	ND [1]	5.72 [1]	5.65 [1]	ND [1]
SW8260C	P & M -Xylene	µg/L	190		ND [2]	ND [2]	ND [2]	ND [2]	21 [2]	ND [2]	137 [2]	134 [2]	ND [2]
SW8260C	sec-Butylbenzene	µg/L	2000		ND [1]	ND [1]	ND [1]	ND [1]	1.2 [1]	ND [1]	6.71 [1]	6.95 [1]	ND [1]
SW8260C	tert-Butylbenzene	µg/L	690		ND [1]	ND [1]	ND [1]	ND [1]	ND [1]	ND [1]	1.32 [1]	1.38 [1]	ND [1]
SW8260C	Toluene	µg/L	1100		ND [1]	ND [1]	ND [1]	ND [1]	ND [1]	ND [1]	33 [1]	32.2 [1]	ND [1]
SW8260C	Xylenes (total)	µg/L	190		ND [3]	ND [3]	ND [3]	ND [3]	21.5 [3]	ND [3]	142 [3]	140 [3]	ND [3]
8270D SIM LV (PAH)	1-Methylnaphthalene	µg/L	11		0.0194 [0.0472] J	ND [0.0496]	ND [0.0455] J-	ND [0.0534]	2.9 [0.0525]	ND [0.0508]	1.7 [0.0525]	1.56 [0.0548]	--
8270D SIM LV (PAH)	2-Methylnaphthalene	µg/L	36		0.0269 [0.0472] J	ND [0.0496]	ND [0.0455] J-	ND [0.0534]	2.8 [0.0525]	ND [0.0508]	0.731 [0.0525]	0.597 [0.0548]	--
8270D SIM LV (PAH)	Acenaphthene	µg/L	530		ND [0.0472]	ND [0.0496]	ND [0.0455] J-	ND [0.0534]	0.0197 [0.0525] J	ND [0.0508]	0.118 [0.0525]	0.124 [0.0548]	--
8270D SIM LV (PAH)	Acenaphthylene	µg/L	260		ND [0.0472]	ND [0.0496]	ND [0.0455] J-	ND [0.0534]	ND [0.0525]	ND [0.0508]	ND [0.0525]	ND [0.0548]	--
8270D SIM LV (PAH)	Anthracene	µg/L	43		ND [0.0472]	ND [0.0496]	ND [0.0455] J-	ND [0.0534]	ND [0.0525]	ND [0.0508]	ND [0.0525]	ND [0.0548]	--
8270D SIM LV (PAH)	Benzo(a)Anthracene	µg/L	0.3		ND [0.0472] J-	ND [0.0496]	ND [0.0455]	ND [0.0534]	ND [0.0525]	ND [0.0508]	ND [0.0525]	ND [0.0548]	--
8270D SIM LV (PAH)	Benzo[a]pyrene	µg/L	0.25		ND [0.0189] J-	ND [0.0198]	ND [0.0182]	ND [0.0214]	ND [0.021]	ND [0.0203]	ND [0.021]	ND [0.0219]	--
8270D SIM LV (PAH)	Benzo[b]Fluoranthene	µg/L	2.5		ND [0.0472] J-	ND [0.0496]	ND [0.0455]	ND [0.0534]	ND [0.0525]	ND [0.0508]	ND [0.0525]	ND [0.0548]	--
8270D SIM LV (PAH)	Benzo[g,h,i]perylene	µg/L	0.26		ND [0.0472] J-	ND [0.0496]	ND [0.0455]	ND [0.0534]	ND [0.0525]	ND [0.0508]	ND [0.0525]	ND [0.0548]	--
8270D SIM LV (PAH)	Benzo[k]fluoranthene	µg/L	0.8		ND [0.0472] J-	ND [0.0496]	ND [0.0455]	ND [0.0534]	ND [0.0525]	ND [0.0508]	ND [0.0525]	ND [0.0548]	--
8270D SIM LV (PAH)	Chrysene	µg/L	2		ND [0.0472] J-	ND [0.0496]	ND [0.0455]	ND [0.0534]	ND [0.0525]	ND [0.0508]	ND [0.0525]	ND [0.0548]	--
8270D SIM LV (PAH)	Dibenzo[a,h]anthracene	µg/L	0.25		ND [0.0189] J-	ND [0.0198]	ND [0.0182]	ND [0.0214]	ND [0.021]	ND [0.0203]	ND [0.021]	ND [0.0219]	--
8270D SIM LV (PAH)	Fluoranthene	µg/L	260		ND [0.0472] J-	ND [0.0496]	ND [0.0455]	ND [0.0534]	ND [0.0525]	ND [0.0508]	ND [0.0525]	ND [0.0548]	--
8270D SIM LV (PAH)	Fluorene	µg/L	290		ND [0.0472]	ND [0.0496]	ND [0.0455] J-	ND [0.0534]	0.0647 [0.0525]	ND [0.0508]	ND [0.0525]	ND [0.0548]	--
8270D SIM LV (PAH)	Indeno[1,2,3-c,d] pyrene	µg/L	0.19		ND [0.0472] J-	ND [0.0496]	ND [0.0455]	ND [0.0534]	ND [0.0525]	ND [0.0508]	ND [0.0525]	ND [0.0548]	--
8270D SIM LV (PAH)	Naphthalene	µg/L	1.7		ND [0.0943]	ND [0.0992]	ND [0.0909] J-	ND [0.107]	**6.55 [0.105]**	ND [0.102]	**11.6 [0.21]**	**11.8 [0.219]**	--
8270D SIM LV (PAH)	Phenanthrene	µg/L	170		ND [0.0472] J-	ND [0.0496]	ND [0.0455] J-	ND [0.0534]	0.0687 [0.0525]	ND [0.0508]	ND [0.0525]	ND [0.0548]	--
8270D SIM LV (PAH)	Pyrene	µg/L	120		ND [0.0472]	ND [0.0496]	ND [0.0455]	ND [0.0534]	ND [0.0525]	ND [0.0508]	ND [0.0525]	ND [0.0548]	--

Notes:

Bold red indicates that the result exceeds the cleanup level.

Blue highlighting indicates that the result exceeds 20% of the current ADEC cleanup level.

Italics/gray highlighting indicate that the LOQ for a non-detect result exceeds the cleanup level.

ADEC[1] = 18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018).

[ ] = limit of detection (LOQ)

Dup = field duplicate

B = analyte was detected in the associated blank

J(±) = result is an estimated value greater than the DL and below the LOQ, or the result is estimated due to a QC failure (biased low/high).

ND = not detected

µg/L = microgram(s) per liter

ATTACHMENT F-2 DATA SUMMARY TABLES
2019 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES - SWANSON RIVER FIELD
CONTAMINATED SITES - TS 3-9

				Sample ID QC Type Collection Date Lab Sample ID Matrix	SRF39-FS39B-0719 Primary, MS/MSD 06/30/2019 11:35 1193574005 Water	SRF39-TS39AA-0719 Primary 06/30/2019 16:45 1193574001 Water	SRF39-TS39BB-0719 Primary 06/30/2019 17:05 1193574003 Water	SRF39-TS39BBZ-0719 Dup of SRF39-TS39BB-0719 06/30/2019 16:05 1193574002 Water	SRF39-TS39CR-0719 Primary 07/12/2019 14:40 1193796003 Water	SRF39-TS39DD-0719 Primary 06/30/2019 12:25 1193574004 Water	SRF39-TS39F-0719 Primary 07/12/2019 16:40 1193796001 Water	SRF39-TS39G-0719 Primary 07/12/2019 11:10 1193796007 Water	SRF39-TS39T-0719 Primary 07/12/2019 11:50 1193796004 Water	SRF39-TS39U-0719 Primary 07/12/2019 14:40 1193796002 Water
Method	**Analyte**	**Units**	**ADEC[1]**											
SW8260C	1,2,4-Trimethylbenzene	µg/L	56		ND [1]	ND [1]	ND [1]	ND [1]	**424 [5]**	ND [1]	**536 [5]**	ND [1]	7.76 [1]	2.11 [1]
SW8260C	1,3,5-Trimethylbenzene	µg/L	60		ND [1]	0.413 [1] J	2.27 [1]	2.17 [1]	**395 [5]**	ND [1]	**290 [5]**	ND [1]	9.31 [1]	0.9 [1] J
SW8260C	Benzene	µg/L	4.6		ND [0.4]	0.786 [0.4]	**5.34 [0.4]**	**5.25 [0.4]**	**8.55 [2]**	ND [0.4]	**13.7 [2]**	ND [0.4]	3.19 [0.4]	1.05 [0.4]
SW8260C	Ethylbenzene	µg/L	15		ND [1]	2.87 [1]	**35.9 [1]**	**33.5 [1]**	7.86 [5]	ND [1]	**493 [5]**	ND [1]	**31.7 [1]**	1.73 [1]
SW8260C	Isopropylbenzene (Cumene)	µg/L	450		ND [1]	4.88 [1]	16.4 [1]	15.7 [1]	3.27 [5] J	ND [1]	77.1 [5]	ND [1]	19.3 [1]	0.345 [1] J
SW8260C	Naphthalene	µg/L	1.7		ND [1]	0.42 [1] J	0.842 [1] J	0.803 [1] J	**21.1 [5]**	ND [1]	**89.7 [5]**	ND [1]	**3.82 [1]**	0.913 [1] J
SW8260C	n-Butylbenzene	µg/L	1000		ND [1]	ND [1]	ND [1]	ND [1]	ND [5]	ND [1]	ND [5]	ND [1]	ND [1]	ND [1]
SW8260C	o-Xylene	µg/L	190		ND [1]	ND [1]	ND [1]	ND [1]	**571 [5]**	ND [1]	26.9 [5]	ND [1]	ND [1]	ND [1]
SW8260C	P & M -Xylene	µg/L	190		ND [2]	ND [2]	ND [2]	ND [2]	**323 [10]**	ND [2]	**1550 [10]**	ND [2]	2.55 [2]	3.37 [2]
SW8260C	sec-Butylbenzene	µg/L	2000		ND [1]	3.6 [1]	3.73 [1]	3.69 [1]	ND [5]	ND [1]	3.82 [5] J	ND [1]	5.47 [1]	ND [1]
SW8260C	tert-Butylbenzene	µg/L	690		ND [1]	0.438 [1] J	0.908 [1] J	0.888 [1] J	ND [5]	ND [1]	ND [5]	ND [1]	1.49 [1]	ND [1]
SW8260C	Toluene	µg/L	1100		ND [1]	0.449 [1] J	0.388 [1] J	0.383 [1] J	ND [5]	ND [1]	ND [5]	ND [1]	0.341 [1] J	ND [1]
SW8260C	Xylenes (total)	µg/L	190		ND [3]	ND [3]	ND [3]	ND [3]	**894 [15]**	ND [3]	**1580 [15]**	ND [3]	2.55 [3] J	3.37 [3]
8270D SIM LV (PAH)	1-Methylnaphthalene	µg/L	11		ND [0.0463]	0.033 [0.0463] J	ND [0.0481]	ND [0.0463]	5.02 [0.0563] J-	ND [0.0463]	**24.2 [0.534]**	ND [0.0504]	3.3 [0.053]	ND [0.049]
8270D SIM LV (PAH)	2-Methylnaphthalene	µg/L	36		ND [0.0463]	0.037 [0.0463] J	ND [0.0481]	ND [0.0463]	4.14 [0.0563] J-	ND [0.0463]	24 [0.534]	ND [0.0504]	2.64 [0.053]	ND [0.049]
8270D SIM LV (PAH)	Acenaphthene	µg/L	530		ND [0.0463]	ND [0.0463]	ND [0.0481]	ND [0.0463]	ND [0.0563] J-	ND [0.0463]	0.21 [0.0534]	ND [0.0504]	ND [0.053]	ND [0.049]
8270D SIM LV (PAH)	Acenaphthylene	µg/L	260		ND [0.0463]	ND [0.0463]	ND [0.0481]	ND [0.0463]	ND [0.0563] J-	ND [0.0463]	ND [0.0534]	ND [0.0504]	ND [0.053]	ND [0.049]
8270D SIM LV (PAH)	Anthracene	µg/L	43		ND [0.0463]	ND [0.0463]	ND [0.0481]	ND [0.0463]	ND [0.0563] J-	ND [0.0463]	ND [0.0534]	ND [0.0504]	ND [0.053]	ND [0.049]
8270D SIM LV (PAH)	Benzo(a)Anthracene	µg/L	0.3		ND [0.0463]	ND [0.0463]	ND [0.0481]	ND [0.0463]	ND [0.0563]	ND [0.0463]	ND [0.0534]	ND [0.0504]	ND [0.053]	ND [0.049]
8270D SIM LV (PAH)	Benzo[a]pyrene	µg/L	0.25		ND [0.0185]	ND [0.0185]	ND [0.0192]	ND [0.0185]	ND [0.0225]	ND [0.0185]	ND [0.0214]	ND [0.0202]	ND [0.0212]	ND [0.0196]
8270D SIM LV (PAH)	Benzo[b]Fluoranthene	µg/L	2.5		ND [0.0463]	ND [0.0463]	ND [0.0481]	ND [0.0463]	ND [0.0563]	ND [0.0463]	ND [0.0534]	ND [0.0504]	ND [0.053]	ND [0.049]
8270D SIM LV (PAH)	Benzo[g,h,i]perylene	µg/L	0.26		ND [0.0463]	ND [0.0463]	ND [0.0481]	ND [0.0463]	ND [0.0563]	ND [0.0463]	ND [0.0534]	ND [0.0504]	ND [0.053]	ND [0.049]
8270D SIM LV (PAH)	Benzo[k]fluoranthene	µg/L	0.8		ND [0.0463]	ND [0.0463]	ND [0.0481]	ND [0.0463]	ND [0.0563]	ND [0.0463]	ND [0.0534]	ND [0.0504]	ND [0.053]	ND [0.049]
8270D SIM LV (PAH)	Chrysene	µg/L	2		ND [0.0463]	ND [0.0463]	ND [0.0481]	ND [0.0463]	ND [0.0563]	ND [0.0463]	ND [0.0534]	ND [0.0504]	ND [0.053]	ND [0.049]
8270D SIM LV (PAH)	Dibenzo[a,h]anthracene	µg/L	0.25		ND [0.0185] J-	ND [0.0185]	ND [0.0192]	ND [0.0185]	ND [0.0225]	ND [0.0185]	ND [0.0214]	ND [0.0202]	ND [0.0212]	ND [0.0196]
8270D SIM LV (PAH)	Fluoranthene	µg/L	260		ND [0.0463]	ND [0.0463]	ND [0.0481]	ND [0.0463]	ND [0.0563]	ND [0.0463]	ND [0.0534]	ND [0.0504]	ND [0.053]	ND [0.049]
8270D SIM LV (PAH)	Fluorene	µg/L	290		ND [0.0463]	ND [0.0463]	ND [0.0481]	ND [0.0463]	0.385 [0.0563] J-	ND [0.0463]	0.804 [0.0534]	ND [0.0504]	0.389 [0.053]	ND [0.049]
8270D SIM LV (PAH)	Indeno[1,2,3-c,d] pyrene	µg/L	0.19		ND [0.0463]	ND [0.0463]	ND [0.0481]	ND [0.0463]	ND [0.0563]	ND [0.0463]	ND [0.0534]	ND [0.0504]	ND [0.053]	ND [0.049]
8270D SIM LV (PAH)	Naphthalene	µg/L	1.7		ND [0.0926]	0.272 [0.0926]	0.633 [0.0962]	0.547 [0.0926]	**4.62 [0.113] J-**	ND [0.0926]	**63 [1.07]**	ND [0.101]	**2 [0.106]**	0.315 [0.098]
8270D SIM LV (PAH)	Phenanthrene	µg/L	170		ND [0.0463]	ND [0.0463]	ND [0.0481]	ND [0.0463]	0.225 [0.0563] J-	ND [0.0463]	0.628 [0.0534]	ND [0.0504]	0.325 [0.053]	ND [0.049]
8270D SIM LV (PAH)	Pyrene	µg/L	120		ND [0.0463]	ND [0.0463]	ND [0.0481]	ND [0.0463]	ND [0.0563]	ND [0.0463]	ND [0.0534]	ND [0.0504]	ND [0.053]	0.145 [0.049]

Notes:

Bold red indicates that the result exceeds the cleanup level.

Blue highlighting indicates that the result exceeds 20% of the current ADEC cleanup level.

Italics/ gray highlighting indicate that the LOQ for a nondetect result exceeds the cleanup level.

ADEC[1] = 18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018).

[ ] = limit of detection (LOQ)

Dup = field duplicate

B = analyte was detected in the associated blank

J(±) = result is an estimated value greater than the DL and below the LOQ, or the result is estimated due to a QC failure (biased low/high).

ND = not detected

µg/L = microgram(s) per liter

ATTACHMENT F-2 DATA SUMMARY TABLES
2019 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES - SWANSON RIVER FIELD
CONTAMINATED SITES - TS 3-9

		Sample ID	SRF39-TS39V-0719	SRF39-TS39VZ-0719	SRF39-TB01-0719	SRF39-TB02-0719
		QC Type	Primary	Dup of SRF39-TS39V-0719	Trip Blank	Trip Blank
		Collection Date	07/12/2019 12:50	07/12/2019 11:50	06/30/2019 08:00	07/12/2019 08:00
		Lab Sample ID	1193796005	1193796006	1193574008	1193796008
		Matrix	Water	Water	Water	Water
Method	**Analyte**	**Units**	**ADEC[1]**			
SW8260C	1,2,4-Trimethylbenzene	µg/L	56	18.5 [1]	18.1 [1]	ND [1]	ND [1]
SW8260C	1,3,5-Trimethylbenzene	µg/L	60	ND [1] J	17.1 [1] J	ND [1]	ND [1]
SW8260C	Benzene	µg/L	4.6	**17.5 [0.4]**	**17.2 [0.4]**	ND [0.4]	ND [0.4]
SW8260C	Ethylbenzene	µg/L	15	2.34 [1]	2.28 [1]	ND [1]	ND [1]
SW8260C	Isopropylbenzene (Cumene)	µg/L	450	6.04 [1]	5.91 [1]	ND [1]	ND [1]
SW8260C	Naphthalene	µg/L	1.7	**17.1 [1]**	**17.8 [1]**	ND [1]	ND [1]
SW8260C	n-Butylbenzene	µg/L	1000	0.694 [1] J	0.667 [1] J	ND [1]	ND [1]
SW8260C	o-Xylene	µg/L	190	0.542 [1] J	0.445 [1] J	ND [1]	ND [1]
SW8260C	P & M -Xylene	µg/L	190	15.4 [2]	14.9 [2]	ND [2]	ND [2]
SW8260C	sec-Butylbenzene	µg/L	2000	3.72 [1]	3.68 [1]	ND [1]	ND [1]
SW8260C	tert-Butylbenzene	µg/L	690	0.684 [1] J	0.672 [1] J	ND [1]	ND [1]
SW8260C	Toluene	µg/L	1100	ND [1]	ND [1]	ND [1]	ND [1]
SW8260C	Xylenes (total)	µg/L	190	15.9 [3]	15.3 [3]	ND [3]	ND [3]
8270D SIM LV (PAH)	1-Methylnaphthalene	µg/L	11	2.46 [0.0517]	2.74 [0.0517]	--	--
8270D SIM LV (PAH)	2-Methylnaphthalene	µg/L	36	2.01 [0.0517]	2.28 [0.0517]	--	--
8270D SIM LV (PAH)	Acenaphthene	µg/L	530	ND [0.0517]	ND [0.0517]	--	--
8270D SIM LV (PAH)	Acenaphthylene	µg/L	260	ND [0.0517]	ND [0.0517]	--	--
8270D SIM LV (PAH)	Anthracene	µg/L	43	ND [0.0517]	ND [0.0517]	--	--
8270D SIM LV (PAH)	Benzo(a)Anthracene	µg/L	0.3	ND [0.0517]	ND [0.0517]	--	--
8270D SIM LV (PAH)	Benzo[a]pyrene	µg/L	0.25	ND [0.0207]	ND [0.0207]	--	--
8270D SIM LV (PAH)	Benzo[b]Fluoranthene	µg/L	2.5	ND [0.0517]	ND [0.0517]	--	--
8270D SIM LV (PAH)	Benzo[g,h,i]perylene	µg/L	0.26	ND [0.0517]	ND [0.0517]	--	--
8270D SIM LV (PAH)	Benzo[k]fluoranthene	µg/L	0.8	ND [0.0517]	ND [0.0517]	--	--
8270D SIM LV (PAH)	Chrysene	µg/L	2	ND [0.0517]	ND [0.0517]	--	--
8270D SIM LV (PAH)	Dibenzo[a,h]anthracene	µg/L	0.25	ND [0.0207]	ND [0.0207]	--	--
8270D SIM LV (PAH)	Fluoranthene	µg/L	260	ND [0.0517]	ND [0.0517]	--	--
8270D SIM LV (PAH)	Fluorene	µg/L	290	0.164 [0.0517]	0.18 [0.0517]	--	--
8270D SIM LV (PAH)	Indeno[1,2,3-c,d] pyrene	µg/L	0.19	ND [0.0517]	ND [0.0517]	--	--
8270D SIM LV (PAH)	Naphthalene	µg/L	1.7	**7.8 [0.103]**	**8.65 [0.103]**	--	--
8270D SIM LV (PAH)	Phenanthrene	µg/L	170	ND [0.0517]	ND [0.0517]	--	--
8270D SIM LV (PAH)	Pyrene	µg/L	120	ND [0.0517]	ND [0.0517]	--	--

Notes:

Bold red indicates that the result exceeds the cleanup level.

Blue highlighting indicates that the result exceeds 20% of the current ADEC cleanup level.

Italics/ gray highlighting indicate that the LOQ for a nondetect result exceeds the cleanup level.

ADEC[1] = 18 AAC 75, Table C Groundwater Cleanup Levels (ADEC 2018).

[ ] = limit of detection (LOQ)

Dup = field duplicate

B = analyte was detected in the associated blank

J(±) = result is an estimated value greater than the DL and below the LOQ, or the result is estimated due to a QC failure (biased low/high).

ND = not detected

µg/L = microgram(s) per liter

ATTACHMENT F-3:
ADEC LABORATORY DATA REVIEW CHECKLISTS

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Laboratory Data Review Checklist

Completed By:

Victoria Pennick

Title:

Project Chemist

Date:

10 October 2019

CS Report Name:

2019 Groundwater Monitoring Report, Swanson River Fields TS 3-9

Report Date:

15 July 2019

Consultant Firm:

Brice Environmental Services Corporation

Laboratory Name:

SGS North America, Inc. – Anchorage, AK (SGS)

Laboratory Report Number:

1193574

ADEC File Number:

2334.38.018

Hazard Identification Number:

441

1193574

1. Laboratory

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

   (•) Yes ( ) No Comments:

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

   ( ) Yes (•) No Comments:

   Not applicable-all analyses performed at SGS AK.

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:

   "Snickers" received at 4.6°C

   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:

   Sample TS39BBZ - one VOA vial broke during transit and samples TS39DD and FS39B had headspace in one of the vials.; sufficient volume remained for analysis. No qualifications were made.

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 no discrepancies noted.

e. Data quality or usability affected?

Comments:

There was no effect on data quality or usability as no results were qualified.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

QC items identified in the case narrative are discussed in the relevant sections of this checklist. Any additional items of note are included in this checklist.

c. Were all corrective actions documented?

(•) Yes ( ) No Comments:

BMS/RPD recoveries outside QC criteria

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

Comments:

Usability is discussed in the appropriate sections below.

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:

Not applicable. No soil samples were submitted or analyzed for this SDG.

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

◉ Yes ○ No Comments:

e. Data quality or usability affected?

◉ Yes ○ No Comments:

Usability is not affected as no results were qualified.

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:

iii. If above LOQ, what samples are affected?

Comments:

NA - all MB < LOQ

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

◉ Yes ○ No Comments:

v. Data quality or usability affected?

Comments:

Usability is not affected as no data are qualified.

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 for PAH, LCS/LCSD for VOCs.
MS/MSD requested on SRF39-FS39B-0719 (1193574-005)

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

( ) Yes (•) No Comments:

No samples in this SDG were submitted or analyzed for metals analyses.

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:

All LCS and/or LCSD recoveries met acceptance criteria.
Dibenzo[a,h]anthracene BMS recovered below the QC criteria.

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:

All LCS/LCSD RPDs met acceptance criteria.
The RPD for 6 PAH compounds exceed the limit. No additional qualifications were made based on RPDs.

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

Comments:

SRF39-FS39B-0719 (1193574-005)

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

(•) Yes ( ) No Comments:

Yes, a "J-" has been applied to Dibenzo[a,h]anthracene results to indicate a possible low bias.

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

Comments:

Data quality and usability is not affected as the parent sample result was ND with an LOQ below the cleanup criteria.

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:

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

(•) Yes ( ) No Comments:

NA - all recoveries met acceptance criteria.

iv. Data quality or usability affected?

Comments:

Usability is not affected as no results were qualified.

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:

Only one cooler

iii. All results less than LOQ?

(•) Yes ( ) No Comments:

iv. If above LOQ, what samples are affected?

Comments:

NA

v. Data quality or usability affected?

Comments:

Usability is not affected as no results were qualified.

e. Field Duplicate

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

◉ Yes ○ No Comments:

1 FD for 4 primary samples

ii. Submitted blind to lab?

◉ Yes ○ No Comments:

SRF39-TS39BB-0719/ SRF39-TS39BBZ-0719

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

RPD (%) = 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:

				SRF39-TS39BB-0719 Primary 1193574003	SRF39-TS39BBZ-0719 Duplicate 1193574002	RPD	Qual
Method	**Analyte**	**Units**	**ADEC[1]**				
SW8260C	1,3,5-Trimethylbenzene	ug/L	60	2.27	2.17	5	--
SW8260C	Benzene	ug/L	4.6	5.34	5.25	2	--
SW8260C	Ethylbenzene	ug/L	15	35.9	33.5	7	--
SW8260C	Isopropylbenzene (Cumene)	ug/L	450	16.4	15.7	4	--
SW8260C	Naphthalene	ug/L	1.7	**0.842 J**	**0.803 J**	**NC**	**--**
SW8260C	sec-Butylbenzene	ug/L	2000	3.73	3.69	1	--
SW8260C	tert-Butylbenzene	ug/L	690	**0.908 J**	**0.888 J**	**NC**	**--**
SW8260C	Toluene	ug/L	1100	**0.388 J**	**0.383 J**	**NC**	**--**
8270D SIM	Naphthalene	ug/L	1.7	0.633	0.547	15	--

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

Comments:

Data quality and usability were not affected as all RPDs met acceptance criteria.

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

○ Yes ○ No ◉ Not Applicable

Equipment blanks were not required for this project.

i. All results less than LOQ?

○ Yes ○ No Comments:

Not applicable.

ii. If above LOQ, what samples are affected?

Comments:

Not applicable.

iii. Data quality or usability affected?

Comments:

Data quality or usability was not affected.

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

a. Defined and appropriate?

○ Yes ○ No Comments:

Not applicable.

Laboratory Data Review Checklist

Completed By:

Victoria Pennick

Title:

Project Chemist

Date:

10 October 2019

CS Report Name:

2019 Groundwater Monitoring Report, Swanson River Fields TS 3-9

Report Date:

25 July 2019

Consultant Firm:

Brice Environmental Services Corporation

Laboratory Name:

SGS North America, Inc. – Anchorage, AK (SGS)

Laboratory Report Number:

1193796

ADEC File Number:

2334.38.018

Hazard Identification Number:

441

1193796

1. Laboratory

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

   (•) Yes ( ) No Comments:

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

   ( ) Yes (•) No Comments:

   Not applicable-all analyses performed at SGS AK.

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:

   No name cooler, received at 0.0°C (no mention of ice on receipt form)

   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 SRF39-TS39V-0719, SRF39-TS39VZ-0719, and the TB SRF39-TB02-0719 had headspace > 6mm in one of the three vials.; sufficient volume remained for analysis. No qualifications were made.

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 no discrepancies noted.

e. Data quality or usability affected?

Comments:

There was no effect on data quality or usability as no results were qualified.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

QC items identified in the case narrative are discussed in the relevant sections of this checklist. Any additional items of note are included in this checklist.

c. Were all corrective actions documented?

(•) Yes ( ) No Comments:

Surrogate recovery and MS/MSD/RPD recoveries outside QC criteria

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

Comments:

Usability is discussed in the appropriate sections below.

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:

Not applicable. No soil samples were submitted or analyzed for this SDG.

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

◉ Yes ○ No Comments:

e. Data quality or usability affected?

◉ Yes ○ No Comments:

Usability is not affected as no results were qualified.

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:

iii. If above LOQ, what samples are affected?

Comments:

NA - all MB < LOQ

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

◉ Yes ○ No Comments:

v. Data quality or usability affected?

Comments:

Usability is not affected as no data are qualified.

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 for PAH, LCS/LCSD for VOCs.
MS/MSD was not requested for this SDG. 12 primary/dup samples were collected from this site and reported under SDG 1193574 and 1193796. MS/MSD frequency was met.

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

( ) Yes (●) No Comments:

No samples in this SDG were submitted or analyzed for metals analyses.

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:

All LCS and/or LCSD recoveries met acceptance criteria.
Several MSs and RPDs recovered below the QC criteria; however, the MS/MSD was performed on a sample from a different project and qualifications do not apply to samples from this SDG.

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:

All LCS/LCSD RPDs met acceptance criteria.
Non-site-specific QC qualifications do not apply to samples from this SDG.

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

Comments:

Non-site-specific QC qualifications do not apply to samples from this SDG.

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

(●) Yes ( ) No Comments:

NA - Non-site-specific QC qualifications do not apply to samples from this SDG.

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

Comments:

Data quality and usability is not affected as non-site-specific QC qualifications do not apply to samples from this SDG.

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:

2-Methylnaphthalene d10 in sample SRF39-TS39CR-0719 recovered below the LCL of 47% at 36.7%. Associated analytes 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene results are qualified as estimated.

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

(•) Yes ( ) No Comments:

Results in sample SRF39-TS39CR-0719 are qualified "J-" to indicate a potential low bias.

iv. Data quality or usability affected?

Comments:

Usability is not affected as the results are either ND or detected results are well below the cleanup levels.

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:

Only one cooler

iii. All results less than LOQ?

(•) Yes ( ) No Comments:

1193796

iv. If above LOQ, what samples are affected?

Comments:

NA

v. Data quality or usability affected?

Comments:

Usability is not affected as no results were qualified.

e. Field Duplicate

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

(•) Yes ( ) No Comments:

1 FD for 6 primary samples

ii. Submitted blind to lab?

(•) Yes ( ) No Comments:

SRF39-TS39BB-0719/ SRF39-TS39BBZ-0719

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

RPD (%) = 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:

1,3,5-trimethylbenzene RPD cannot be calculated, but the difference between the ND result and the detected result > the LOQ warrants qualification.

				SRF39-TS39V-0719 Primary 1193796005	SRF39-TS39VZ-0719 Duplicate 1193796006	RPD	Qual
Method	**Analyte**	**Units**	**ADEC[1]**				
SW8260C	1,2,4-Trimethylbenzene	ug/L	56	18.5	18.1	2	
SW8260C	**1,3,5-Trimethylbenzene**	**ug/L**	**60**	**ND [1]**	**17.1**	**NC**	**J**
SW8260C	Benzene	ug/L	4.6	17.5	17.2	2	--
SW8260C	Ethylbenzene	ug/L	15	2.34	2.28	3	--
SW8260C	Isopropylbenzene (Cumene)	ug/L	450	6.04	5.91	2	--
SW8260C	Naphthalene	ug/L	1.7	17.1	17.8	4	--
SW8260C	n-Butylbenzene	ug/L	1000	0.694 J	0.667 J	NC	--
SW8260C	o-Xylene	ug/L	190	0.542 J	0.445 J	NC	--
SW8260C	P & M -Xylene	ug/L	190	15.4	14.9	3	--
SW8260C	sec-Butylbenzene	ug/L	2000	3.72	3.68	1	--
SW8260C	tert-Butylbenzene	ug/L	690	0.684 J	0.672 J	NC	--
SW8260C	Xylenes (total)	ug/L	190	15.9	15.3	4	--
8270D SIM	1-Methylnaphthalene	ug/L	11	2.46	2.74	11	--
8270D SIM	2-Methylnaphthalene	ug/L	36	2.01	2.28	13	--
8270D SIM	Fluorene	ug/L	290	0.164	0.18	9	--
8270D SIM	Naphthalene	ug/L	1.7	7.8	8.65	10	--

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

Comments:

Data quality and usability were not affected as both results/RLs are well below the cleanup criteria.

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

○ Yes ○ No ◉ Not Applicable

Equipment blanks were not required for this project.

i. All results less than LOQ?

○ Yes ○ No Comments:

Not applicable.

ii. If above LOQ, what samples are affected?

Comments:

Not applicable.

iii. Data quality or usability affected?

Comments:

Data quality or usability was not affected.

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

a. Defined and appropriate?

○ Yes ○ No Comments:

Not applicable.

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Laboratory Data Review Checklist

Completed By:

Victoria Pennick

Title:

Project Chemist

Date:

10 October 2019

CS Report Name:

2019 Groundwater Monitoring Report, Swanson River Fields TS 1-9

Report Date:

17 July 2019

Consultant Firm:

Brice Environmental Services Corporation

Laboratory Name:

SGS North America, Inc. – Anchorage, AK (SGS)

Laboratory Report Number:

1193674

ADEC File Number:

2334.38.018

Hazard Identification Number:

441

1193674

1. Laboratory

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

   (•) Yes ( ) No Comments:

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

   ( ) Yes (•) No Comments:

   Not applicable-all analyses performed at SGS AK.

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:

   "Mars" received at 5.9°C

   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:

   No discrepancies or issues with sample receipt condition noted.

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 no discrepancies noted.

e. Data quality or usability affected?

Comments:

There was no effect on data quality or usability as no results were qualified.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

QC items identified in the case narrative are discussed in the relevant sections of this checklist. Any additional items of note are included in this checklist.

c. Were all corrective actions documented?

(•) Yes ( ) No Comments:

BMS/MBSD RPD recoveries outside QC criteria

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

Comments:

Usability is discussed in the appropriate sections below.

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:

Not applicable. No soil samples were submitted or analyzed for this SDG.

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

◉ Yes ○ No Comments:

e. Data quality or usability affected?

◉ Yes ○ No Comments:

Usability is not affected as no results were qualified.

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:

iii. If above LOQ, what samples are affected?

Comments:

NA - all MB < LOQ

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

◉ Yes ○ No Comments:

v. Data quality or usability affected?

Comments:

Usability is not affected as no data are qualified.

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 for PAH, LCS/LCSD for VOCs.
MS/MSD requested on SRF19-FS19M-0719 (1193674-002)

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

( ) Yes (●) No Comments:

No samples in this SDG were submitted or analyzed for metals analyses.

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:

All LCS and/or LCSD recoveries met acceptance criteria.
All MS and/or MSD recoveries met acceptance criteria.

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:

All LCS/LCSD RPDs met acceptance criteria.
The RPD for 3 PAH compounds exceed the limit. No qualifications were made based on RPDs as all recoveries were within criteria.

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

Comments:

None are affected as all recoveries were within criteria.

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

(●) Yes ( ) No Comments:

NA

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

Comments:

Data quality and usability is not affected as no results are qualified.

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:

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

(•) Yes ( ) No Comments:

NA - all recoveries met acceptance criteria.

iv. Data quality or usability affected?

Comments:

Usability is not affected as no results were qualified.

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:

Only one cooler

iii. All results less than LOQ?

(•) Yes ( ) No Comments:

iv. If above LOQ, what samples are affected?

Comments:

NA

v. Data quality or usability affected?

Comments:

Usability is not affected as no results were qualified.

e. Field Duplicate

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

(•) Yes ( ) No Comments:

2 FD for 8 primary samples

ii. Submitted blind to lab?

(•) Yes ( ) No Comments:

SRF19-FS19N-0719/ SRF19-FS19NZ-0719; SRF19-TS19D-0719/ SRF19-TS19DZ-0719

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 following RPDs in red below exceed 30%, or cannot be calculated with a difference large enough to warrant qualification:

				SRF19-FS19N-0719 Primary 1193674007	SRF19-FS19NZ-0719 Duplicate 1193674006	RPD	Qual
Method	**Analyte**	**Units**	**ADEC[1]**				
SW8260C	1,2,4-Trimethylbenzene	ug/L	56	2.37	3.41	36	J
SW8260C	1,3,5-Trimethylbenzene	ug/L	60	ND [1]	**0.401 J**	NC	--
SW8260C	Benzene	ug/L	4.6	0.55	0.51	8	--
SW8260C	Isopropylbenzene (Cumene)	ug/L	450	1.32	1.54	15	--
SW8260C	Naphthalene	ug/L	1.7	1.34	1.9	**NC**	**--**
SW8260C	P & M -Xylene	ug/L	190	**1.75 J**	2.31	28	--
SW8260C	sec-Butylbenzene	ug/L	2000	**0.447 J**	**0.533 J**	NC	--
SW8260C	Xylenes (total)	ug/L	190	**1.75 J**	**2.31 J**	NC	--
8270D SIM	1-Methylnaphthalene	ug/L	11	0.316	0.328	4	--
8270D SIM	2-Methylnaphthalene	ug/L	36	0.211	0.212	0	--
8270D SIM	Fluorene	ug/L	290	**0.0358 J**	**0.0357 J**	NC	--
8270D SIM	Naphthalene	ug/L	1.7	0.837	0.875	4	--

				SRF19-TS19D-0719 Primary 1193674011	SRF19-TS19DZ-0719 Duplicate 1193674012	RPD	Qual
Method	**Analyte**	**Units**	**ADEC[1]**				
SW8260C	1,2,4-Trimethylbenzene	ug/L	56	534	558	4	--
SW8260C	1,3,5-Trimethylbenzene	ug/L	60	301	318	5	--
SW8260C	Benzene	ug/L	4.6	7.86	8.08	3	--
SW8260C	Ethylbenzene	ug/L	15	190	197	4	--
SW8260C	Isopropylbenzene (Cumene)	ug/L	450	103	104	1	--
SW8260C	Naphthalene	ug/L	1.7	57.4	59.6	4	--
SW8260C	o-Xylene	ug/L	190	103	109	6	--
SW8260C	P & M -Xylene	ug/L	190	625	648	4	--
SW8260C	sec-Butylbenzene	ug/L	2000	5.51	5.6	2	--
SW8260C	tert-Butylbenzene	ug/L	690	5.36	5.22	3	--
SW8260C	Toluene	ug/L	1100	0.359 J	0.356 J	NC	--
SW8260C	Xylenes (total)	ug/L	190	728	757	4	--
8270D SIM	1-Methylnaphthalene	ug/L	11	10.1	11.4	12	--
8270D SIM	2-Methylnaphthalene	ug/L	36	12.7	12.1	5	--
8270D SIM	Acenaphthene	ug/L	530	ND [0.0525]	0.224	NC	J
8270D SIM	Fluorene	ug/L	290	0.475	0.473	0	--
8270D SIM	Naphthalene	ug/L	1.7	28.6	28.5	0	--
8270D SIM	Phenanthrene	ug/L	170	0.268	0.222	19	--

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

Comments:

Data quality and usability were not affected as the qualified results are detected or ND with LOQs less than the cleanup levels.

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

○ Yes ○ No ◉ Not Applicable

Equipment blanks were not required for this project.

i. All results less than LOQ?

○ Yes ○ No Comments:

Not applicable.

ii. If above LOQ, what samples are affected?

Comments:

Not applicable.

iii. Data quality or usability affected?

Comments:

Data quality or usability was not affected.

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

a. Defined and appropriate?

○ Yes ○ No Comments:

Not applicable.

Laboratory Data Review Checklist

Completed By:

Victoria Pennick

Title:

Project Chemist

Date:

10 October 2019

CS Report Name:

2019 Groundwater Monitoring Report, Swanson River Fields TS 1-4

Report Date:

31 July 2019

Consultant Firm:

Brice Environmental Services Corporation

Laboratory Name:

SGS North America, Inc. – Anchorage, AK (SGS)

Laboratory Report Number:

1193675

ADEC File Number:

2334.38.018

Hazard Identification Number:

441

1193675

1. Laboratory

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

   (•) Yes ( ) No Comments:

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

   ( ) Yes (•) No Comments:

   Ethylene Glycol was analyzed by SW8015C by BioChem labs in Grand Rapids, MI. This analysis is not certified by ADEC.

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:

   "MaryJane" received at 3.7°C
   Cooler received at BioChem at 2.9 °C

   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:

   Sample SRF14-FS14H-0719 received with one vial with excessive headspace. Sufficient volume remained for analysis.

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:

Sample SRF14-TS14EE-0719 received with missing vials for MS/MSD. The missing vials were received on 7/15/19.

e. Data quality or usability affected?

Comments:

There was no effect on data quality or usability as no results were qualified.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

QC items identified in the case narrative are discussed in the relevant sections of this checklist. Any additional items of note are included in this checklist.

c. Were all corrective actions documented?

(•) Yes ( ) No Comments:

VOC samples with pH > 2; VOC, PAH BMS/MBSD RPD recoveries outside QC criteria

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

Comments:

Usability is discussed in the appropriate sections below.

5. Samples Results

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

(•) Yes ( ) No Comments:

b. All applicable holding times met?

(●) Yes ( ) No Comments:

The pH on VOC samples is checked just prior to analysis. The pH for two samples, SRF14-TS14GR-0719 and duplicate SRF14-TS14GRZ-0719 was above 2, which drops the holding time to 7 days. The samples were analyzed on day 7; therefore, usability is not impacted and no qualifications were made.

c. All soils reported on a dry weight basis?

( ) Yes (●) No Comments:

Not applicable. No soil samples were submitted or analyzed for this SDG.

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

(●) Yes ( ) No Comments:

e. Data quality or usability affected?

(●) Yes ( ) No Comments:

Usability is not affected as no results were qualified.

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:

iii. If above LOQ, what samples are affected?

Comments:

NA - all MB < LOQ

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

(●) Yes ( ) No Comments:

v. Data quality or usability affected?

Comments:

Usability is not affected as no data are qualified.

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 for PAH, LCS/LCSD for VOCs.
MS/MSD requested on SRF14-TS14EE-0719 (1193675-003)

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

( ) Yes (●) No Comments:

No samples in this SDG were submitted or analyzed for metals analyses.

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:

All LCS and/or LCSD recoveries met acceptance criteria.
MS recoveries for benzo(a)anthracene and dibenzo[a,h]anthracene recovered below their LCLs.

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:

All LCS/LCSD RPDs met acceptance criteria.
The RPD for benzo[g,h,i]perylene and dibenzo[a,h]anthracene exceed the limit. The recoveries for Benzo[g,h,i]perylene were within criteria; no further qualifications were made based on RPDs as all recoveries were within criteria.

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

Comments:

SRF14-TS14EE-0719

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

(●) Yes ( ) No Comments:

Non-detect reporting limits for benzo(a)anthracene and dibenzo[a,h]anthracene are qualified "J-" to indicate a possible low bias.

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

Comments:

Data quality and usability is not affected as results are ND with LOQs well below the cleanup levels.

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:

2-methylnaphthalene d10 recovery in samples SRF14-TS14GR-0719 and duplicate SRF14-TS14GRZ-0719 recovered below the LCL. The samples were re-extracted past holding time with surrogate recovery within criteria, and comparable results. The in-hold data is reported, and associated UNDILUTED results are qualified as estimated, "J-".

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

(•) Yes ( ) No Comments:

Associated results are qualified as estimated, "J-".

iv. Data quality or usability affected?

Comments:

Data quality and usability is not affected as results/ LOQs well below the cleanup levels.

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:

Only one cooler

iii. All results less than LOQ?

(•) Yes ( ) No Comments:

iv. If above LOQ, what samples are affected?

Comments:

NA

v. Data quality or usability affected?

Comments:

Usability is not affected as no results were qualified.

e. Field Duplicate

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

(•) Yes ( ) No Comments:

1 FD for 4 primary samples

ii. Submitted blind to lab?

(•) Yes ( ) No Comments:

SRF14-TS14GR-0719/SRF14-TS14GRZ-0719

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

RPD (%) = 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:

All RPDs for detected results met criteria:

				SRF14-TS14GR-0719 Primary 1193675006	SRF14-TS14GRZ-0719 Duplicate 1193675007	RPD	Qual
Method	**Analyte**	**Units**	**ADEC[1]**				
SW8260C	1,2,4-Trimethylbenzene	ug/L	56	586	606	3	--
SW8260C	1,3,5-Trimethylbenzene	ug/L	60	360	370	3	--
SW8260C	Benzene	ug/L	4.6	66.2	65.6	1	--
SW8260C	Ethylbenzene	ug/L	15	149	149	0	--
SW8260C	Isopropylbenzene (Cumene)	ug/L	450	130	129	1	--
SW8260C	Naphthalene	ug/L	1.7	111	118	6	--
SW8260C	o-Xylene	ug/L	190	20.2	20.1	0	--
SW8260C	P & M -Xylene	ug/L	190	213	212	0	--
SW8260C	sec-Butylbenzene	ug/L	2000	12.2	12.4	2	--
SW8260C	Toluene	ug/L	1100	3.77	3.8	1	--
SW8260C	Xylenes (total)	ug/L	190	233	232	0	--
8270D SIM	1-Methylnaphthalene	ug/L	11	30.1	35.9	18	--
8270D SIM	2-Methylnaphthalene	ug/L	36	33.9	41.1	19	--
8270D SIM	Acenaphthene	ug/L	530	0.225	0.271	19	--
8270D SIM	Fluorene	ug/L	290	1.14	1.28	12	--
8270D SIM	Naphthalene	ug/L	1.7	46.7	55.7	18	--
8270D SIM	Phenanthrene	ug/L	170	0.773	0.892	14	--
SW8015C	Ethylene Glycol	ug/L	40000	34000000	27000000	23	--

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

Comments:

Data quality and usability were not affected as no results are qualified

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

( ) Yes ( ) No (•) Not Applicable

Equipment blanks were not required for this project.

i. All results less than LOQ?

○ Yes ○ No Comments:

Not applicable.

ii. If above LOQ, what samples are affected?

Comments:

Not applicable.

iii. Data quality or usability affected?

Comments:

Data quality or usability was not affected.

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

a. Defined and appropriate?

○ Yes ○ No Comments:

Not applicable.

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Laboratory Data Review Checklist

Completed By:

Victoria Pennick

Title:

Project Chemist

Date:

10 October 2019

CS Report Name:

2019 Groundwater Monitoring Report, Swanson River Fields TS 1-33

Report Date:

30 July 2019

Consultant Firm:

Brice Environmental Services Corporation

Laboratory Name:

SGS North America, Inc. – Anchorage, AK (SGS)

Laboratory Report Number:

1193786

ADEC File Number:

2334.38.018

Hazard Identification Number:

441

1193786

1. Laboratory

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

   (•) Yes ( ) No Comments:

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

   ( ) Yes (•) No Comments:

   NA - all samples were analyzed at SGS

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:

   "Oscar" received at 2.8°C

   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:

   No discrepancies/issues noted.

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:

Missing vials from 1193675 (SRF14-TS14EE-0719) were received with these samples.

e. Data quality or usability affected?

Comments:

There was no effect on data quality or usability as no results were qualified.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

QC items identified in the case narrative are discussed in the relevant sections of this checklist. Any additional items of note are included in this checklist.

c. Were all corrective actions documented?

(•) Yes ( ) No Comments:

Surrogate recoveries and BMS/MBSD RPD recoveries outside QC criteria

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

Comments:

Usability is discussed in the appropriate sections below.

5. Samples Results

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

(•) Yes ( ) No Comments:

b. All applicable holding times met?

○ Yes ◉ No Comments:

All samples were prepared and analyzed within holding times, with the following exceptions: SW8270D SIM - Samples SRF133-FS133W-0719 and SRF133-FS133F-0719 were initially logged in as collected on 7/11/2019. However, the collection times were later identified as incorrect in the laboratory report, and the samples were actually collected on 7/9/2019. As a result, both of these samples were extracted outside of holding time. All PAH results for samples SRF133-FS133W-0719 and SRF133-FS133F-0719 were qualified "H" to indicate a potential low bias.

c. All soils reported on a dry weight basis?

○ Yes ◉ No Comments:

Not applicable. No soil samples were submitted or analyzed for this SDG.

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

◉ Yes ○ No Comments:

e. Data quality or usability affected?

○ Yes ◉ No Comments:

PAH results in samples SRF133-FS133W-0719 and SRF133-FS133F-0719 were qualified "H" for potential low bias due to extraction outside of holding time. PAH results for SRF133-FS133F-0719 and its duplicate, which was extracted within holding time, are comparable and met precision criteria, indicating that there was little to no effect on the results.

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:

iii. If above LOQ, what samples are affected?

Comments:

NA - all MB < LOQ

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

(•) Yes ( ) No Comments:

v. Data quality or usability affected?

Comments:

Usability is not affected as no data are qualified.

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 for PAH, LCS/LCSD for VOCs.
MS/MSD requested on SRF133-TS133Q-0719 (1193786008)

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

( ) Yes (•) No Comments:

No samples in this SDG were submitted or analyzed for metals analyses.

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:

All LCS and/or LCSD recoveries met acceptance criteria.
8260C: MS/MSDs for benzene recovered below the LCL in SRF133-TS133Q-0719. MS for n-butylbenzene recovered above the UCL in SRF133-TS133Q-0719.
8270DSIM: MS/MSDs for several analytes recovered below their respective LCLs in SRF133-TS133Q-0719. Naphthalene MS/MSD recovered above the UCL in SRF133-TS133Q-0719.
Several Non-site-specific MS/MSD recoveries do not meet criteria.

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:

All LCS/LCSD RPDs met acceptance criteria.
Several Non-site-specific MS/MSD RPDs do not meet criteria. All Site-specific RPDs meet criteria.
No qualifications were made.

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

Comments:

SRF133-TS133Q-0719

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

(•) Yes ( ) No Comments:

Non-detect results with a high bias are not qualified.
Benzene in sample SRF133-TS133Q-0719 is qualified "J-".
Benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, and indeno[1,2,3-c,d]pyrene are qualified "J-"; naphthalene in sample SRF133-TS133Q-0719 is qualified "J+"

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

Comments:

Data quality and usability is not affected as qualified results/ LOQs are well above or below the cleanup levels.

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:

PAH surrogate 2-methylnaphthalene d10 (42.6%) recovered below the LCL (47%) in sample SRF133-TS133JJ-0719.
VOC surrogate 4-BFB recovered above the UCL of 114% at 115% in the LCS associated with all samples (batch VXX34456) and 117% in the LCS associated with batch VXX34466.

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

(•) Yes ( ) No Comments:

Associated PAH results in sample SRF133-TS133JJ-0719 are qualified as estimated, "J-".
All VOC recoveries were within QC criteria; therefore, no qualifications were made based on the VOC surrogates.

iv. Data quality or usability affected?

Comments:

Data quality and usability is not affected as the qualified results are ND with LOQs well below the cleanup levels.

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:

Only one cooler

iii. All results less than LOQ?

◉ Yes ○ No Comments:

iv. If above LOQ, what samples are affected?

Comments:

NA

v. Data quality or usability affected?

Comments:

Usability is not affected as no results were qualified.

e. Field Duplicate

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

◉ Yes ○ No Comments:

2 FD for 8 primary samples

ii. Submitted blind to lab?

◉ Yes ○ No Comments:

SRF133-FS133F-0719/ SRF133-FS133FZ-0719; SRF133-TS13302-0719/ SRF133-TS13302Z-0719

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

RPD (%) = 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 following RPDs (highlighted Red) do not meet QC criteria:

				SRF133-FS133F-0719 Primary 1193786011	SRF133-FS133FZ-0719 Duplicate 1193786012	RPD	Qual
Method	**Analyte**	**Units**	**ADEC[1]**				
SW8260C	1,2,4-Trimethylbenzene	ug/L	56	**0.49 J**	**0.35 J**	NC	--
SW8260C	Benzene	ug/L	4.6	123	73.2	51	J
SW8260C	Ethylbenzene	ug/L	15	**0.68 J**	**0.42 J**	NC	--
SW8260C	P & M -Xylene	ug/L	190	3.22	2.17	39	J
SW8260C	Xylenes (total)	ug/L	190	3.22	**2.17 J**	39	J
8270D SIM	1-Methylnaphthalene	ug/L	11	0.146	0.17	15	--
8270D SIM	2-Methylnaphthalene	ug/L	36	0.132	0.148	11	--
8270D SIM	Naphthalene	ug/L	1.7	0.3	0.333	10	--

				SRF133-TS13302-0719 Primary 1193786003	SRF133-TS13302Z-0719 Duplicate 1193786006	RPD	Qual
Method	**Analyte**	**Units**	**ADEC[1]**				
SW8260C	1,2,4-Trimethylbenzene	ug/L	56	1.42	1.44	1	--
SW8260C	Benzene	ug/L	4.6	192	190	1	--
SW8260C	Ethylbenzene	ug/L	15	164	179	9	--
SW8260C	Isopropylbenzene (Cumene)	ug/L	450	44.3	48.1	8	--
SW8260C	Naphthalene	ug/L	1.7	47.3	48.4	2	--
SW8260C	n-Butylbenzene	ug/L	1000	2.78	3.1	11	--
SW8260C	o-Xylene	ug/L	190	2.07	2.15	4	--
SW8260C	P & M -Xylene	ug/L	190	26.8	28.1	5	--
SW8260C	sec-Butylbenzene	ug/L	2000	10.2	11.1	8	--
SW8260C	tert-Butylbenzene	ug/L	690	2.55	2.71	6	--
SW8260C	Toluene	ug/L	1100	0.57 J	0.61 J	NC	--
SW8260C	Xylenes (total)	ug/L	190	28.9	30.3	5	--
8270D SIM	1-Methylnaphthalene	ug/L	11	23.7	24.4	3	--
8270D SIM	2-Methylnaphthalene	ug/L	36	20.1	20.3	1	--
8270D SIM	Acenaphthene	ug/L	530	0.556	0.589	6	--
8270D SIM	Fluorene	ug/L	290	0.649	0.696	7	--
8270D SIM	Naphthalene	ug/L	1.7	27	27.7	3	--
8270D SIM	Phenanthrene	ug/L	170	0.188	0.201	7	--

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

Comments:

Data quality and usability were not affected as qualified results are either well above or well below the cleanup levels.

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

○ Yes ○ No ◉ Not Applicable

Equipment blanks were not required for this project.

i. All results less than LOQ?

○ Yes ○ No Comments:

Not applicable.

ii. If above LOQ, what samples are affected?

Comments:

Not applicable.

iii. Data quality or usability affected?

Comments:

Data quality or usability was not affected.

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

a. Defined and appropriate?

○ Yes ○ No Comments:

Not applicable.

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Laboratory Data Review Checklist

Completed By:

Victoria Pennick

Title:

Project Chemist

Date:

10 October 2019

CS Report Name:

2019 Groundwater Monitoring Report, Swanson River Fields TS 3-4

Report Date:

25 July 2019

Consultant Firm:

Brice Environmental Services Corporation

Laboratory Name:

SGS North America, Inc. – Anchorage, AK (SGS)

Laboratory Report Number:

1193788

ADEC File Number:

2334.38.018

Hazard Identification Number:

441

1193788

1. Laboratory

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

   (•) Yes ( ) No Comments:

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

   ( ) Yes (•) No Comments:

   NA - all samples were analyzed at SGS

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:

   "Halibut" received at 0.4°C

   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:

   Several voa vials contained headspace > 6mm; sufficient volume remained to perform the analysis.

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:

Missing vials from 1193675 (SRF14-TS14EE-0719) were received with these samples.

e. Data quality or usability affected?

Comments:

There was no effect on data quality or usability as no results were qualified.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

QC items identified in the case narrative are discussed in the relevant sections of this checklist. Any additional items of note are included in this checklist.

c. Were all corrective actions documented?

(•) Yes ( ) No Comments:

Surrogate recoveries and BMS/MBSD RPD recoveries outside QC criteria

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

Comments:

Usability is discussed in the appropriate sections below.

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:

Not applicable. No soil samples were submitted or analyzed for this SDG.

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

◉ Yes ○ No Comments:

e. Data quality or usability affected?

◉ Yes ○ No Comments:

Usability is not affected as no results were qualified.

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:

iii. If above LOQ, what samples are affected?

Comments:

NA - all MB < LOQ

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

◉ Yes ○ No Comments:

v. Data quality or usability affected?

Comments:

Usability is not affected as no data are qualified.

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 for PAH, LCS/LCSD for VOCs.
MS/MSD requested on SRF34-FS34A-0719 (1193788001)

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

( ) Yes (●) No Comments:

No samples in this SDG were submitted or analyzed for metals analyses.

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:

All LCS and/or LCSD recoveries met acceptance criteria.
8270DSIM: several analytes recovered below the LCL in the MS and/or MSD performed on sample SRF34-FS34A-0719.

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:

All LCS/LCSD RPDs met acceptance criteria.
Several BMS/BMSD RPDs performed on 8270DSIM sample SRF34-FS34A-0719 exceeded the limit of 20%.

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

Comments:

SRF34-FS34A-0719

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

(●) Yes ( ) No Comments:

Where only the RPD is outside QC limits, no qualifications were made.
Benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, indeno[1,2,3-c,d]pyrene and phenanthrene are flagged "J-" in sample SRF34-FS34A-0719 to indicate a possible low bias.

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

Comments:

Data quality and usability is not affected as qualified results are ND with LOQs well below the cleanup levels.

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:

PAH surrogate 2-methylnaphthalene d10 (46.2%) recovered below the LCL (47%) in sample SRF34-FS34F-0719.
VOC surrogate 4-BFB recovered above the UCL of 114% at 115% in the LCS associated with all samples (batch VXX34456) and 117/115% in the MS/MSD performed on sample SRF34-FS34F-0719.

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

(•) Yes ( ) No Comments:

1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene are flagged "J-" in sample SRF34-FS34F-0719 to indicate a possible low bias.
All VOC recoveries associate with 4-BFB in the LCS were within QC criteria; no qualifications were made.
All VOC analytes associated with 4-BFB in the MS/MSD SRF34-FS34A-0719 are non-detect and individual recoveries met QC criteria; no qualifications were made.

iv. Data quality or usability affected?

Comments:

Data quality and usability is not affected as the qualified results are ND with LOQs well below the cleanup levels.

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:

1193788

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:

Only one cooler

iii. All results less than LOQ?

(•) Yes ( ) No Comments:

iv. If above LOQ, what samples are affected?

Comments:

NA

v. Data quality or usability affected?

Comments:

Usability is not affected as no results were qualified.

e. Field Duplicate

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

(•) Yes ( ) No Comments:

1 FD for 7 primary samples

ii. Submitted blind to lab?

(•) Yes ( ) No Comments:

SRF34-TS34P-0719/SRF34-TS34PZ-0719

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

RPD (%) = 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:

				SRF34-TS34P-0719 Primary 1193788009	SRF34-TS34PZ-0719 Duplicate 1193788010	RPD	Qual
Method	**Analyte**	**Units**	**ADEC[1]**				
SW8260C	1,2,4-Trimethylbenzene	ug/L	56	27.4	27.2	1	--
SW8260C	1,3,5-Trimethylbenzene	ug/L	60	48.6	49	1	--
SW8260C	Benzene	ug/L	4.6	586	595	2	--
SW8260C	Ethylbenzene	ug/L	15	176	172	2	--
SW8260C	Isopropylbenzene (Cumene)	ug/L	450	22.9	22.1	4	--
SW8260C	Naphthalene	ug/L	1.7	29.4	30.1	2	--
SW8260C	n-Butylbenzene	ug/L	1000	2.62	2.63	0	--
SW8260C	o-Xylene	ug/L	190	5.72	5.65	1	--
SW8260C	P & M -Xylene	ug/L	190	137	134	2	--
SW8260C	sec-Butylbenzene	ug/L	2000	6.71	6.95	4	--
SW8260C	tert-Butylbenzene	ug/L	690	1.32	1.38	4	--
SW8260C	Toluene	ug/L	1100	33	32.2	2	--
SW8260C	Xylenes (total)	ug/L	190	142	140	1	--
8270D SIM	1-Methylnaphthalene	ug/L	11	1.7	1.56	9	--
8270D SIM	2-Methylnaphthalene	ug/L	36	0.731	0.597	20	--
8270D SIM	Acenaphthene	ug/L	530	0.118	0.124	5	--
8270D SIM	Naphthalene	ug/L	1.7	11.6	11.8	2	--

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

Comments:

Usability is not affected as all RPDs were within QC criteria.

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

○ Yes ○ No ◉ Not Applicable

Equipment blanks were not required for this project.

i. All results less than LOQ?

○ Yes ○ No Comments:

Not applicable.

ii. If above LOQ, what samples are affected?

Comments:

Not applicable.

iii. Data quality or usability affected?

Comments:

Data quality or usability was not affected.

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

a. Defined and appropriate?

○ Yes ○ No Comments:

Not applicable.

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Laboratory Data Review Checklist

Completed By:

Victoria Pennick

Title:

Project Chemist

Date:

10 October 2019

CS Report Name:

2019 Groundwater Monitoring Report, Swanson River Fields TS 2-15

Report Date:

23 July 2019

Consultant Firm:

Brice Environmental Services Corporation

Laboratory Name:

SGS North America, Inc. – Anchorage, AK (SGS)

Laboratory Report Number:

1193792

ADEC File Number:

2334.38.018

Hazard Identification Number:

441

1193792

1. Laboratory

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

   (•) Yes ( ) No Comments:

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

   ( ) Yes (•) No Comments:

   NA - all samples were analyzed at SGS

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:

   "A Computa! Took Your Job" received at 0.7°C

   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:

   No discrepancies or issues noted.

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:

No discrepancies or issues noted.

e. Data quality or usability affected?

Comments:

There was no effect on data quality or usability as no results were qualified.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

QC items identified in the case narrative are discussed in the relevant sections of this checklist. Any additional items of note are included in this checklist.

c. Were all corrective actions documented?

(•) Yes ( ) No Comments:

BMS/MBSD recoveries outside QC criteria

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

Comments:

Usability is discussed in the appropriate sections below.

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:

Not applicable. No soil samples were submitted or analyzed for this SDG.

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

◉ Yes ○ No Comments:

e. Data quality or usability affected?

◉ Yes ○ No Comments:

Usability is not affected as no results were qualified.

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:

iii. If above LOQ, what samples are affected?

Comments:

NA - all MB < LOQ

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

◉ Yes ○ No Comments:

v. Data quality or usability affected?

Comments:

Usability is not affected as no data are qualified.

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 for PAH, LCS/LCSD for VOCs.
MS/MSD requested on SRF215-TS215P-0719 (1193792004)

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

( ) Yes (●) No Comments:

No samples in this SDG were submitted or analyzed for metals analyses.

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:

All LCS and/or LCSD recoveries met acceptance criteria.
8270DSIM: several analytes recovered below the LCL in the MS/MSD performed on sample SRF215-TS215P-0719.

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:

All LCS/LCSD RPDs met acceptance criteria.
All MS/MSD RPDs met acceptance criteria.

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

Comments:

SRF215-TS215P-0719.

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

(●) Yes ( ) No Comments:

Benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, and indeno[1,2,3-c,d]pyrene are flagged "J-" in sample SRF215-TS215P-0719 to indicate a possible low bias.

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

Comments:

Data quality and usability is not affected as qualified results are ND with LOQs well below the cleanup levels.

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:

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

(•) Yes ( ) No Comments:

NA - all surrogate recoveries met QC criteria.

iv. Data quality or usability affected?

Comments:

Data quality and usability is not affected as no qualifications were made.

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:

Only one cooler

iii. All results less than LOQ?

(•) Yes ( ) No Comments:

iv. If above LOQ, what samples are affected?

Comments:

NA

v. Data quality or usability affected?

Comments:

Usability is not affected as no results were qualified.

e. Field Duplicate

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

(•) Yes ( ) No Comments:

1 FD for 4 primary samples

ii. Submitted blind to lab?

(•) Yes ( ) No Comments:

SRF215-TS215O-0719/ SRF215-TS215OZ-0719

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

RPD (%) = 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:

				SRF215-TS215O-0719 Primary 1193792002	SRF215-TS215OZ-0720 Duplicate 1193792003	RPD	Qual
Method	**Analyte**	**Units**	**ADEC[1]**				
SW8260C	1,2,4-Trimethylbenzene	ug/L	56	84.7	76.3	10	--
SW8260C	1,3,5-Trimethylbenzene	ug/L	60	26.1	23.9	9	--
SW8260C	Benzene	ug/L	4.6	6.44	6.02	7	--
SW8260C	Ethylbenzene	ug/L	15	189	179	5	--
SW8260C	Isopropylbenzene (Cumene)	ug/L	450	20.5	19.5	5	--
SW8260C	Naphthalene	ug/L	1.7	14.4	13.4	7	--
SW8260C	n-Butylbenzene	ug/L	1000	1.38	1.22	12	--
SW8260C	o-Xylene	ug/L	190	48.3	46.5	4	--
SW8260C	P & M -Xylene	ug/L	190	584	547	7	--
SW8260C	sec-Butylbenzene	ug/L	2000	3.71	3.28	12	--
SW8260C	tert-Butylbenzene	ug/L	690	0.65 J	0.57 J	NC	--
SW8260C	Toluene	ug/L	1100	1.24	1.19	4	--
SW8260C	Xylenes (total)	ug/L	190	633	594	6	--
8270D SIM	1-Methylnaphthalene	ug/L	11	2.62	2.61	0	--
8270D SIM	2-Methylnaphthalene	ug/L	36	2.87	2.86	0	--
8270D SIM	Naphthalene	ug/L	1.7	8.64	8.5	2	--

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

Comments:

Usability is not affected as all RPDs were within QC criteria.

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

( ) Yes ( ) No (•) Not Applicable

Equipment blanks were not required for this project.

i. All results less than LOQ?

( ) Yes ( ) No Comments:

Not applicable.

ii. If above LOQ, what samples are affected?

Comments:

Not applicable.

iii. Data quality or usability affected?

Comments:

Data quality or usability was not affected.

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

a. Defined and appropriate?

○ Yes ○ No Comments:

Not applicable.

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Laboratory Data Review Checklist

Completed By:

Victoria Pennick

Title:

Project Chemist

Date:

10 October 2019

CS Report Name:

2019 Groundwater Monitoring Report, Swanson River Fields TS 1-27

Report Date:

23 July 2019

Consultant Firm:

Brice Environmental Services Corporation

Laboratory Name:

SGS North America, Inc. – Anchorage, AK (SGS)

Laboratory Report Number:

1193793

ADEC File Number:

2334.38.018

Hazard Identification Number:

441

1193793

1. Laboratory

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

   ◉ Yes ○ No Comments:

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

   ○ Yes ◉ No Comments:

   NA - all samples were analyzed at SGS

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:

   "Dusty Rhodes" received at 0.1°C

   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:

   No discrepancies or issues noted.

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:

No discrepancies or issues noted.

e. Data quality or usability affected?

Comments:

There was no effect on data quality or usability as no results were qualified.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

QC items identified in the case narrative are discussed in the relevant sections of this checklist. Any additional items of note are included in this checklist.

c. Were all corrective actions documented?

(•) Yes ( ) No Comments:

LCSD surrogate recovery; BMS/MBSD recoveries outside QC criteria

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

Comments:

Usability is discussed in the appropriate sections below.

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:

Not applicable. No soil samples were submitted or analyzed for this SDG.

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

◉ Yes ○ No Comments:

e. Data quality or usability affected?

◉ Yes ○ No Comments:

Usability is not affected as no results were qualified.

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:

iii. If above LOQ, what samples are affected?

Comments:

NA - all MB < LOQ

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

◉ Yes ○ No Comments:

v. Data quality or usability affected?

Comments:

Usability is not affected as no data are qualified.

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 for PAH, LCS/LCSD for VOCs.
MS/MSD requested on SRF127-TS127G-0719 (1193793002)

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

( ) Yes (●) No Comments:

No samples in this SDG were submitted or analyzed for metals analyses.

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:

All LCS and/or LCSD recoveries met acceptance criteria.
8260C: five analytes recovered below the LCL in the MS and/or MSD performed on sample SRF127-TS127G-0719.
8270DSIM: several analytes recovered below the LCL in the MS and/or MSD performed on sample SRF127-TS127G-0719.
Several non-site-specific MS/MSD recoveries did not meet QC criteria.

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:

All LCS/LCSD RPDs met acceptance criteria.
All site-specific MS/MSD RPDs met acceptance criteria.
(several non-site-specific MS/MSD RPDs did not meet QC criteria.)

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

Comments:

SRF127-TS127G-0719

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

◉ Yes ○ No Comments:

8260C: 1,2,4-trimethylbenzene, ethylbenzene, isopropyl benzene, P&M-xylene, and total xylenes are qualified "J-" in sample SRF127-TS127G-0719 to indicate a possible low bias.
8270DSIM: Benzo(a)anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, indeno[1,2,3-c,d]pyrene and naphthalene are flagged "J-" in sample SRF127-TS127G-0719 to indicate a possible low bias.

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

Comments:

Data quality and usability is not affected as qualified results are either ND with LOQs well below the cleanup levels or detected well above/below the cleanup levels.

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:

8260C: 4-BFB surrogate recovery (115%) in LCSD associated with batch VXX34456 recovered above the UCL of 114%. Recoveries of associated analytes were within QC criteria; no qualifications were made.

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

◉ Yes ○ No Comments:

NA - no qualifications were made.

iv. Data quality or usability affected?

Comments:

Data quality and usability is not affected as no qualifications were made.

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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:

Only one cooler

iii. All results less than LOQ?

(•) Yes ( ) No Comments:

iv. If above LOQ, what samples are affected?

Comments:

NA

v. Data quality or usability affected?

Comments:

Usability is not affected as no results were qualified.

e. Field Duplicate

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

(•) Yes ( ) No Comments:

1 FD for 5 primary samples

ii. Submitted blind to lab?

(•) Yes ( ) No Comments:

SRF127-TS127K-0719/ SRF127-TS127KZ-0719

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

RPD (%) = 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:

Analytes highlighted in red do not meet the RPD of 30%:

				SRF127-TS127K-0719 Primary 1193793005	SRF127-TS127KZ-0719 Duplicate 1193793006	RPD	Qual
Method	**Analyte**	**Units**	**ADEC[1]**				
SW8260C	1,2,4-Trimethylbenzene	ug/L	56	1190	1320	10	--
SW8260C	1,3,5-Trimethylbenzene	ug/L	60	362	394	8	--
SW8260C	Benzene	ug/L	4.6	36.6	35.7	2	--
SW8260C	Ethylbenzene	ug/L	15	664	704	6	--
SW8260C	Isopropylbenzene (Cumene)	ug/L	450	290	311	7	--
SW8260C	Naphthalene	ug/L	1.7	272	301	10	--
SW8260C	n-Butylbenzene	ug/L	1000	41.5	38.8	7	--
SW8260C	o-Xylene	ug/L	190	1.29	1.24	4	--
SW8260C	P & M -Xylene	ug/L	190	2420	2590	7	--
SW8260C	sec-Butylbenzene	ug/L	2000	90.1	90.7	1	--
SW8260C	tert-Butylbenzene	ug/L	690	15.1	14.8	NC	--
SW8260C	Xylenes (total)	ug/L	190	2420	2590	7	--
8270D SIM	1-Methylnaphthalene	ug/L	11	58	56.5	3	--
8270D SIM	2-Methylnaphthalene	ug/L	36	60.9	60	1	--
8270D SIM	Acenaphthene	ug/L	530	0.106	0.109	3	--
8270D SIM	**Acenaphthylene**	**ug/L**	**260**	**ND [0.0472]**	**0.105**	**NC**	**J**
8270D SIM	Fluorene	ug/L	290	0.12	0.123	2	--
8270D SIM	Naphthalene	ug/L	1.7	170	172	1	--

The RPD could not be calculated as one result is ND and the other above the LOQ; however, the difference between those values is significant enough to qualify the results as estimated.

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

Comments:

Usability is not affected as both acenaphthylene results are well below the cleanup levels.

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

○ Yes ○ No ◉ Not Applicable

Equipment blanks were not required for this project.

i. All results less than LOQ?

○ Yes ○ No Comments:

Not applicable.

ii. If above LOQ, what samples are affected?

Comments:

Not applicable.

iii. Data quality or usability affected?

Comments:

Data quality or usability was not affected.

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

a. Defined and appropriate?

○ Yes ○ No Comments:

Not applicable.

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APPENDIX G:
LABORATORY DATA PACKAGES

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Laboratory Report of Analysis

To: Hilcorp Alaska, LLC
3800 Centerpoint Dr. Suite 400
Anchorage, AK 99503
(907)277-7297

Report Number: **1193675**

Client Project: **SRF TS1-4 2019 HAK CS GWM Prog**

Dear Kelly Carson,

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 Justin 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.

SGS North America Inc.
Environmental Services – Alaska Division
Project Manager

Justin Nelson
2019.07.31
12:00:21 -08'00'

Justin Nelson Date
Project Manager
Justin.Nelson@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

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Case Narrative

SGS Client: **Hilcorp Alaska, LLC**
SGS Project: **1193675**
Project Name/Site: **SRF TS1-4 2019 HAK CS GWM Prog**
Project Contact: **Kelly Carson**

Refer to sample receipt form for information on sample condition.

Ethylene Glycol 8015M was analyzed by Bio-Chem of Grand Rapids, MI.

SRF14-TS14GR-0719 (1193675006) PS

8260C - Sample has a pH greater than 2.
8270D SIM - PAH surrogate recovery for 2-Methylnaphthalene-d10 does not meet QC criteria. The sample was re-extracted past hold-time. Surrogate recovery was within QC criteria and results are comparable. The in-hold data is reported.

SRF14-TS14GRZ-0719 (1193675007) PS

8260C - Sample has a pH greater than 2.
8270D SIM - PAH surrogate recovery for 2-Methylnaphthalene-d10 does not meet QC criteria. The sample was re-extracted past hold-time. Surrogate recovery was within QC criteria and results are comparable. The in-hold data is reported.

SRF14-TS14EE-0719 - MS (1193675004) BMS

8260C - BMS recovery for several analytes does not meet QC criteria. See LCS for accuracy requirements.
8270D SIM - PAH BMS recovery for Benzo(a)anthracene and Dibenzo[a,h]anthracene do not meet QC criteria. Refer to the LCS for accuracy requirements.

SRF14-TS14EE-0719 - MSD (1193675005) BMSD

8260C - BMSD recovery for several analytes does not meet QC criteria. See LCS for accuracy requirements.
8270D SIM - PAH BMS/BMSD RPD for Dibenzo[a,h]anthracene and Benzo[g,h,i]perylene do not meet QC criteria. Results for this analyte are considered estimated in the parent sample.

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

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Report of Manual Integrations

Laboratory ID	Client Sample ID	Analytical Batch	Analyte	Reason
8270D SIM LV (PAH)				
1193675002	SRF14-FS14H-0719	XMS11535	Naphthalene	BLC

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Laboratory Qualifiers

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

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry (DW Chemistry (Provisionally Certified as of 6/20/19 for Turbidity by SM 2130B, and Copper by EPA 200.8) & 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). SGS is only certified for the analytes listed on our Drinking Water Certification, and only those analytes will be reported to the State of Alaska for compliance. Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
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
SRF14-FS14E-0719	1193675001	07/06/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF14-FS14H-0719	1193675002	07/06/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF14-TS14EE-0719	1193675003	07/07/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF14-TS14EE-0719 - MS	1193675004	07/07/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF14-TS14EE-0719 - MSD	1193675005	07/07/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF14-TS14GR-0719	1193675006	07/07/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF14-TS14GRZ-0719	1193675007	07/07/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF14-TB01-0719	1193675008	07/06/2019	07/09/2019	Water (Surface, Eff., Ground)

Method	Method Description
SW8260C	8021B by 8260 (W)
8270D SIM LV (PAH)	8270 PAH SIM GC/MS Liq/Liq ext. LV

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Detectable Results Summary

Client Sample ID: **SRF14-FS14E-0719**
Lab Sample ID: 1193675001

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	20.0	ug/L
	2-Methylnaphthalene	20.6	ug/L
	Acenaphthene	0.333	ug/L
	Fluorene	0.828	ug/L
	Naphthalene	52.8	ug/L
	Phenanthrene	0.323	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	95.6	ug/L
	1,3,5-Trimethylbenzene	31.2	ug/L
	Benzene	44.0	ug/L
	Ethylbenzene	71.2	ug/L
	Isopropylbenzene (Cumene)	14.4	ug/L
	Naphthalene	107	ug/L
	o-Xylene	0.773J	ug/L
	P & M -Xylene	161	ug/L
	sec-Butylbenzene	2.93	ug/L
	Toluene	0.429J	ug/L
	Xylenes (total)	161	ug/L

Client Sample ID: **SRF14-FS14H-0719**
Lab Sample ID: 1193675002

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	3.25	ug/L
	2-Methylnaphthalene	0.683	ug/L
	Acenaphthene	0.204	ug/L
	Fluorene	0.370	ug/L
	Naphthalene	0.462	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	3.33	ug/L
	1,3,5-Trimethylbenzene	6.44	ug/L
	Benzene	5.03	ug/L
	Ethylbenzene	8.29	ug/L
	Isopropylbenzene (Cumene)	5.87	ug/L
	Naphthalene	5.51	ug/L
	o-Xylene	3.22	ug/L
	P & M -Xylene	1.30J	ug/L
	sec-Butylbenzene	5.30	ug/L
	tert-Butylbenzene	0.835J	ug/L
	Toluene	0.534J	ug/L
	Xylenes (total)	4.52	ug/L

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Detectable Results Summary

Client Sample ID: **SRF14-TS14GR-0719**
Lab Sample ID: 1193675006

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	30.1	ug/L
	2-Methylnaphthalene	33.9	ug/L
	Acenaphthene	0.225	ug/L
	Fluorene	1.14	ug/L
	Naphthalene	46.7	ug/L
	Phenanthrene	0.773	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	586	ug/L
	1,3,5-Trimethylbenzene	360	ug/L
	Benzene	66.2	ug/L
	Ethylbenzene	149	ug/L
	Isopropylbenzene (Cumene)	130	ug/L
	Naphthalene	111	ug/L
	o-Xylene	20.2	ug/L
	P & M -Xylene	213	ug/L
	sec-Butylbenzene	12.2	ug/L
	Toluene	3.77	ug/L
	Xylenes (total)	233	ug/L

Client Sample ID: **SRF14-TS14GRZ-0719**
Lab Sample ID: 1193675007

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	35.9	ug/L
	2-Methylnaphthalene	41.1	ug/L
	Acenaphthene	0.271	ug/L
	Fluorene	1.28	ug/L
	Naphthalene	55.7	ug/L
	Phenanthrene	0.892	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	606	ug/L
	1,3,5-Trimethylbenzene	370	ug/L
	Benzene	65.6	ug/L
	Ethylbenzene	149	ug/L
	Isopropylbenzene (Cumene)	129	ug/L
	Naphthalene	118	ug/L
	o-Xylene	20.1	ug/L
	P & M -Xylene	212	ug/L
	sec-Butylbenzene	12.4	ug/L
	Toluene	3.80	ug/L
	Xylenes (total)	232	ug/L

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Results of **SRF14-FS14E-0719**

Client Sample ID: **SRF14-FS14E-0719**
Client Project ID: **SRF TS1-4 2019 HAK CS GWM Prog**
Lab Sample ID: 1193675001
Lab Project ID: 1193675

Collection Date: 07/06/19 12:15
Received Date: 07/09/19 16:15
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	20.0		0.500	0.150	ug/L	10		07/19/19 22:42
2-Methylnaphthalene	20.6		0.500	0.150	ug/L	10		07/19/19 22:42
Acenaphthene	0.333		0.0500	0.0150	ug/L	1		07/18/19 17:02
Acenaphthylene	0.0250	U	0.0500	0.0150	ug/L	1		07/18/19 17:02
Anthracene	0.0250	U	0.0500	0.0150	ug/L	1		07/18/19 17:02
Benzo(a)Anthracene	0.0250	U	0.0500	0.0150	ug/L	1		07/18/19 17:02
Benzo[a]pyrene	0.0100	U	0.0200	0.00620	ug/L	1		07/18/19 17:02
Benzo[b]Fluoranthene	0.0250	U	0.0500	0.0150	ug/L	1		07/18/19 17:02
Benzo[g,h,i]perylene	0.0250	U	0.0500	0.0150	ug/L	1		07/18/19 17:02
Benzo[k]fluoranthene	0.0250	U	0.0500	0.0150	ug/L	1		07/18/19 17:02
Chrysene	0.0250	U	0.0500	0.0150	ug/L	1		07/18/19 17:02
Dibenzo[a,h]anthracene	0.0100	U	0.0200	0.00620	ug/L	1		07/18/19 17:02
Fluoranthene	0.0250	U	0.0500	0.0150	ug/L	1		07/18/19 17:02
Fluorene	0.828		0.0500	0.0150	ug/L	1		07/18/19 17:02
Indeno[1,2,3-c,d] pyrene	0.0250	U	0.0500	0.0150	ug/L	1		07/18/19 17:02
Naphthalene	52.8		1.00	0.310	ug/L	10		07/19/19 22:42
Phenanthrene	0.323		0.0500	0.0150	ug/L	1		07/18/19 17:02
Pyrene	0.0250	U	0.0500	0.0150	ug/L	1		07/18/19 17:02
Surrogates								
2-Methylnaphthalene-d10 (surr)	76.2		47-106		%	1		07/18/19 17:02
Fluoranthene-d10 (surr)	45.2		24-116		%	1		07/18/19 17:02

Batch Information

Analytical Batch: XMS11535
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 17:02
Container ID: 1193675001-A

Prep Batch: XXX41739
Prep Method: SW3520C
Prep Date/Time: 07/11/19 10:14
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11540
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/19/19 22:42
Container ID: 1193675001-A

Prep Batch: XXX41739
Prep Method: SW3520C
Prep Date/Time: 07/11/19 10:14
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Print Date: 07/31/2019 11:26:27AM

J flagging is activated

Results of **SRF14-FS14E-0719**

Client Sample ID: **SRF14-FS14E-0719**
Client Project ID: **SRF TS1-4 2019 HAK CS GWM Prog**
Lab Sample ID: 1193675001
Lab Project ID: 1193675

Collection Date: 07/06/19 12:15
Received Date: 07/09/19 16:15
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	95.6		1.00	0.310	ug/L	1		07/12/19 21:11
1,3,5-Trimethylbenzene	31.2		1.00	0.310	ug/L	1		07/12/19 21:11
Benzene	44.0		0.400	0.120	ug/L	1		07/12/19 21:11
Ethylbenzene	71.2		1.00	0.310	ug/L	1		07/12/19 21:11
Isopropylbenzene (Cumene)	14.4		1.00	0.310	ug/L	1		07/12/19 21:11
Naphthalene	107		1.00	0.310	ug/L	1		07/12/19 21:11
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/12/19 21:11
o-Xylene	0.773 J		1.00	0.310	ug/L	1		07/12/19 21:11
P & M -Xylene	161		2.00	0.620	ug/L	1		07/12/19 21:11
sec-Butylbenzene	2.93		1.00	0.310	ug/L	1		07/12/19 21:11
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/12/19 21:11
Toluene	0.429 J		1.00	0.310	ug/L	1		07/12/19 21:11
Xylenes (total)	161		3.00	1.00	ug/L	1		07/12/19 21:11
Surrogates								
1,2-Dichloroethane-D4 (surr)	96.3		81-118		%	1		07/12/19 21:11
4-Bromofluorobenzene (surr)	101		85-114		%	1		07/12/19 21:11
Toluene-d8 (surr)	97.2		89-112		%	1		07/12/19 21:11

Batch Information

Analytical Batch: VMS19154
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/12/19 21:11
Container ID: 1193675001-C

Prep Batch: VXX34423
Prep Method: SW5030B
Prep Date/Time: 07/12/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/31/2019 11:26:27AM

J flagging is activated

Results of **SRF14-FS14H-0719**

Client Sample ID: **SRF14-FS14H-0719**
Client Project ID: **SRF TS1-4 2019 HAK CS GWM Prog**
Lab Sample ID: 1193675002
Lab Project ID: 1193675

Collection Date: 07/06/19 12:20
Received Date: 07/09/19 16:15
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	3.25		0.0481	0.0144	ug/L	1		07/18/19 17:22
2-Methylnaphthalene	0.683		0.0481	0.0144	ug/L	1		07/18/19 17:22
Acenaphthene	0.204		0.0481	0.0144	ug/L	1		07/18/19 17:22
Acenaphthylene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 17:22
Anthracene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 17:22
Benzo(a)Anthracene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 17:22
Benzo[a]pyrene	0.00960 U		0.0192	0.00596	ug/L	1		07/18/19 17:22
Benzo[b]Fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 17:22
Benzo[g,h,i]perylene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 17:22
Benzo[k]fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 17:22
Chrysene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 17:22
Dibenzo[a,h]anthracene	0.00960 U		0.0192	0.00596	ug/L	1		07/18/19 17:22
Fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 17:22
Fluorene	0.370		0.0481	0.0144	ug/L	1		07/18/19 17:22
Indeno[1,2,3-c,d] pyrene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 17:22
Naphthalene	0.462		0.0962	0.0298	ug/L	1		07/18/19 17:22
Phenanthrene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 17:22
Pyrene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 17:22
Surrogates								
2-Methylnaphthalene-d10 (surr)	71.5		47-106		%	1		07/18/19 17:22
Fluoranthene-d10 (surr)	59.9		24-116		%	1		07/18/19 17:22

Batch Information

Analytical Batch: XMS11535
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 17:22
Container ID: 1193675002-A

Prep Batch: XXX41739
Prep Method: SW3520C
Prep Date/Time: 07/11/19 10:14
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 07/31/2019 11:26:27AM

J flagging is activated

Results of **SRF14-FS14H-0719**

Client Sample ID: **SRF14-FS14H-0719**
Client Project ID: **SRF TS1-4 2019 HAK CS GWM Prog**
Lab Sample ID: 1193675002
Lab Project ID: 1193675

Collection Date: 07/06/19 12:20
Received Date: 07/09/19 16:15
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	3.33		1.00	0.310	ug/L	1		07/12/19 21:26
1,3,5-Trimethylbenzene	6.44		1.00	0.310	ug/L	1		07/12/19 21:26
Benzene	5.03		0.400	0.120	ug/L	1		07/12/19 21:26
Ethylbenzene	8.29		1.00	0.310	ug/L	1		07/12/19 21:26
Isopropylbenzene (Cumene)	5.87		1.00	0.310	ug/L	1		07/12/19 21:26
Naphthalene	5.51		1.00	0.310	ug/L	1		07/12/19 21:26
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/12/19 21:26
o-Xylene	3.22		1.00	0.310	ug/L	1		07/12/19 21:26
P & M -Xylene	1.30	J	2.00	0.620	ug/L	1		07/12/19 21:26
sec-Butylbenzene	5.30		1.00	0.310	ug/L	1		07/12/19 21:26
tert-Butylbenzene	0.835	J	1.00	0.310	ug/L	1		07/12/19 21:26
Toluene	0.534	J	1.00	0.310	ug/L	1		07/12/19 21:26
Xylenes (total)	4.52		3.00	1.00	ug/L	1		07/12/19 21:26
Surrogates								
1,2-Dichloroethane-D4 (surr)	96.7		81-118		%	1		07/12/19 21:26
4-Bromofluorobenzene (surr)	101		85-114		%	1		07/12/19 21:26
Toluene-d8 (surr)	95.8		89-112		%	1		07/12/19 21:26

Batch Information

Analytical Batch: VMS19154
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/12/19 21:26
Container ID: 1193675002-C

Prep Batch: VXX34423
Prep Method: SW5030B
Prep Date/Time: 07/12/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/31/2019 11:26:27AM

J flagging is activated

Results of **SRF14-TS14EE-0719**

Client Sample ID: **SRF14-TS14EE-0719**
Client Project ID: **SRF TS1-4 2019 HAK CS GWM Prog**
Lab Sample ID: 1193675003
Lab Project ID: 1193675

Collection Date: 07/07/19 08:25
Received Date: 07/09/19 16:15
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	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
2-Methylnaphthalene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Acenaphthene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Acenaphthylene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Anthracene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Benzo(a)Anthracene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Benzo[a]pyrene	0.00945	U	0.0189	0.00585	ug/L	1		07/18/19 17:43
Benzo[b]Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Benzo[g,h,i]perylene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Benzo[k]fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Chrysene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Dibenzo[a,h]anthracene	0.00945	U	0.0189	0.00585	ug/L	1		07/18/19 17:43
Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Fluorene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Indeno[1,2,3-c,d] pyrene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Naphthalene	0.0471	U	0.0943	0.0292	ug/L	1		07/18/19 17:43
Phenanthrene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Pyrene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 17:43
Surrogates								
2-Methylnaphthalene-d10 (surr)	62.9		47-106		%	1		07/18/19 17:43
Fluoranthene-d10 (surr)	61.5		24-116		%	1		07/18/19 17:43

Batch Information

Analytical Batch: XMS11535
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 17:43
Container ID: 1193675003-A

Prep Batch: XXX41739
Prep Method: SW3520C
Prep Date/Time: 07/11/19 10:14
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Print Date: 07/31/2019 11:26:27AM

J flagging is activated

Results of **SRF14-TS14EE-0719**

Client Sample ID: **SRF14-TS14EE-0719**
Client Project ID: **SRF TS1-4 2019 HAK CS GWM Prog**
Lab Sample ID: 1193675003
Lab Project ID: 1193675

Collection Date: 07/07/19 08:25
Received Date: 07/09/19 16:15
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:44
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:44
Benzene	0.200 U		0.400	0.120	ug/L	1		07/14/19 08:44
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:44
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:44
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:44
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:44
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:44
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/14/19 08:44
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:44
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:44
Toluene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:44
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/14/19 08:44
Surrogates								
1,2-Dichloroethane-D4 (surr)	106		81-118		%	1		07/14/19 08:44
4-Bromofluorobenzene (surr)	110		85-114		%	1		07/14/19 08:44
Toluene-d8 (surr)	96.5		89-112		%	1		07/14/19 08:44

Batch Information

Analytical Batch: VMS19160
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/14/19 08:44
Container ID: 1193675003-D

Prep Batch: VXX34430
Prep Method: SW5030B
Prep Date/Time: 07/14/19 00:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF14-TS14GR-0719**

Client Sample ID: **SRF14-TS14GR-0719**
Client Project ID: **SRF TS1-4 2019 HAK CS GWM Prog**
Lab Sample ID: 1193675006
Lab Project ID: 1193675

Collection Date: 07/07/19 09:30
Received Date: 07/09/19 16:15
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	30.1		0.481	0.144	ug/L	10		07/19/19 23:03
2-Methylnaphthalene	33.9		0.481	0.144	ug/L	10		07/19/19 23:03
Acenaphthene	0.225		0.0481	0.0144	ug/L	1		07/18/19 18:45
Acenaphthylene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 18:45
Anthracene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 18:45
Benzo(a)Anthracene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 18:45
Benzo[a]pyrene	0.00960 U		0.0192	0.00596	ug/L	1		07/18/19 18:45
Benzo[b]Fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 18:45
Benzo[g,h,i]perylene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 18:45
Benzo[k]fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 18:45
Chrysene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 18:45
Dibenzo[a,h]anthracene	0.00960 U		0.0192	0.00596	ug/L	1		07/18/19 18:45
Fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 18:45
Fluorene	1.14		0.0481	0.0144	ug/L	1		07/18/19 18:45
Indeno[1,2,3-c,d] pyrene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 18:45
Naphthalene	46.7		0.962	0.298	ug/L	10		07/19/19 23:03
Phenanthrene	0.773		0.0481	0.0144	ug/L	1		07/18/19 18:45
Pyrene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 18:45
Surrogates								
2-Methylnaphthalene-d10 (surr)	41.9	*	47-106		%	1		07/18/19 18:45
Fluoranthene-d10 (surr)	41.5		24-116		%	1		07/18/19 18:45

Batch Information

Analytical Batch: XMS11535
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 18:45
Container ID: 1193675006-A

Prep Batch: XXX41739
Prep Method: SW3520C
Prep Date/Time: 07/11/19 10:14
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11540
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/19/19 23:03
Container ID: 1193675006-A

Prep Batch: XXX41739
Prep Method: SW3520C
Prep Date/Time: 07/11/19 10:14
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 07/31/2019 11:26:27AM

J flagging is activated

Results of **SRF14-TS14GR-0719**

Client Sample ID: **SRF14-TS14GR-0719**
Client Project ID: **SRF TS1-4 2019 HAK CS GWM Prog**
Lab Sample ID: 1193675006
Lab Project ID: 1193675

Collection Date: 07/07/19 09:30
Received Date: 07/09/19 16:15
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	586		20.0	6.20	ug/L	20		07/14/19 10:12
1,3,5-Trimethylbenzene	360		20.0	6.20	ug/L	20		07/14/19 10:12
Benzene	66.2		0.400	0.120	ug/L	1		07/12/19 21:40
Ethylbenzene	149		1.00	0.310	ug/L	1		07/12/19 21:40
Isopropylbenzene (Cumene)	130		1.00	0.310	ug/L	1		07/12/19 21:40
Naphthalene	111		1.00	0.310	ug/L	1		07/12/19 21:40
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/12/19 21:40
o-Xylene	20.2		1.00	0.310	ug/L	1		07/12/19 21:40
P & M -Xylene	213		2.00	0.620	ug/L	1		07/12/19 21:40
sec-Butylbenzene	12.2		1.00	0.310	ug/L	1		07/12/19 21:40
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/12/19 21:40
Toluene	3.77		1.00	0.310	ug/L	1		07/12/19 21:40
Xylenes (total)	233		3.00	1.00	ug/L	1		07/12/19 21:40
Surrogates								
1,2-Dichloroethane-D4 (surr)	93.1		81-118		%	1		07/12/19 21:40
4-Bromofluorobenzene (surr)	100		85-114		%	1		07/12/19 21:40
Toluene-d8 (surr)	99.8		89-112		%	1		07/12/19 21:40

Batch Information

Analytical Batch: VMS19158
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/14/19 10:12
Container ID: 1193675006-D

Prep Batch: VXX34428
Prep Method: SW5030B
Prep Date/Time: 07/14/19 00:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19154
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/12/19 21:40
Container ID: 1193675006-C

Prep Batch: VXX34423
Prep Method: SW5030B
Prep Date/Time: 07/12/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/31/2019 11:26:27AM

J flagging is activated

Results of **SRF14-TS14GRZ-0719**

Client Sample ID: **SRF14-TS14GRZ-0719**
Client Project ID: **SRF TS1-4 2019 HAK CS GWM Prog**
Lab Sample ID: 1193675007
Lab Project ID: 1193675

Collection Date: 07/07/19 08:30
Received Date: 07/09/19 16:15
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	35.9		0.481	0.144	ug/L	10		07/19/19 23:23
2-Methylnaphthalene	41.1		0.481	0.144	ug/L	10		07/19/19 23:23
Acenaphthene	0.271		0.0481	0.0144	ug/L	1		07/18/19 19:05
Acenaphthylene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 19:05
Anthracene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 19:05
Benzo(a)Anthracene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 19:05
Benzo[a]pyrene	0.00960 U		0.0192	0.00596	ug/L	1		07/18/19 19:05
Benzo[b]Fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 19:05
Benzo[g,h,i]perylene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 19:05
Benzo[k]fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 19:05
Chrysene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 19:05
Dibenzo[a,h]anthracene	0.00960 U		0.0192	0.00596	ug/L	1		07/18/19 19:05
Fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 19:05
Fluorene	1.28		0.0481	0.0144	ug/L	1		07/18/19 19:05
Indeno[1,2,3-c,d] pyrene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 19:05
Naphthalene	55.7		0.962	0.298	ug/L	10		07/19/19 23:23
Phenanthrene	0.892		0.0481	0.0144	ug/L	1		07/18/19 19:05
Pyrene	0.0240 U		0.0481	0.0144	ug/L	1		07/18/19 19:05
Surrogates								
2-Methylnaphthalene-d10 (surr)	46.2	*	47-106		%	1		07/18/19 19:05
Fluoranthene-d10 (surr)	45.5		24-116		%	1		07/18/19 19:05

Batch Information

Analytical Batch: XMS11535
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 19:05
Container ID: 1193675007-A

Prep Batch: XXX41739
Prep Method: SW3520C
Prep Date/Time: 07/11/19 10:14
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11540
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/19/19 23:23
Container ID: 1193675007-A

Prep Batch: XXX41739
Prep Method: SW3520C
Prep Date/Time: 07/11/19 10:14
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 07/31/2019 11:26:27AM

J flagging is activated

Results of **SRF14-TS14GRZ-0719**

Client Sample ID: **SRF14-TS14GRZ-0719**
Client Project ID: **SRF TS1-4 2019 HAK CS GWM Prog**
Lab Sample ID: 1193675007
Lab Project ID: 1193675

Collection Date: 07/07/19 08:30
Received Date: 07/09/19 16:15
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	606		20.0	6.20	ug/L	20		07/14/19 10:26
1,3,5-Trimethylbenzene	370		20.0	6.20	ug/L	20		07/14/19 10:26
Benzene	65.6		0.400	0.120	ug/L	1		07/12/19 21:55
Ethylbenzene	149		1.00	0.310	ug/L	1		07/12/19 21:55
Isopropylbenzene (Cumene)	129		1.00	0.310	ug/L	1		07/12/19 21:55
Naphthalene	118		1.00	0.310	ug/L	1		07/12/19 21:55
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/12/19 21:55
o-Xylene	20.1		1.00	0.310	ug/L	1		07/12/19 21:55
P & M -Xylene	212		2.00	0.620	ug/L	1		07/12/19 21:55
sec-Butylbenzene	12.4		1.00	0.310	ug/L	1		07/12/19 21:55
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/12/19 21:55
Toluene	3.80		1.00	0.310	ug/L	1		07/12/19 21:55
Xylenes (total)	232		3.00	1.00	ug/L	1		07/12/19 21:55
Surrogates								
1,2-Dichloroethane-D4 (surr)	90.7		81-118		%	1		07/12/19 21:55
4-Bromofluorobenzene (surr)	102		85-114		%	1		07/12/19 21:55
Toluene-d8 (surr)	98.8		89-112		%	1		07/12/19 21:55

Batch Information

Analytical Batch: VMS19158
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/14/19 10:26
Container ID: 1193675007-D

Prep Batch: VXX34428
Prep Method: SW5030B
Prep Date/Time: 07/14/19 00:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19154
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/12/19 21:55
Container ID: 1193675007-C

Prep Batch: VXX34423
Prep Method: SW5030B
Prep Date/Time: 07/12/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/31/2019 11:26:27AM

J flagging is activated

Results of **SRF14-TB01-0719**

Client Sample ID: **SRF14-TB01-0719**
Client Project ID: **SRF TS1-4 2019 HAK CS GWM Prog**
Lab Sample ID: 1193675008
Lab Project ID: 1193675

Collection Date: 07/06/19 08:00
Received Date: 07/09/19 16:15
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/14/19 07:29
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/14/19 07:29
Benzene	0.200	U	0.400	0.120	ug/L	1		07/12/19 22:10
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/12/19 22:10
Isopropylbenzene (Cumene)	0.500	U	1.00	0.310	ug/L	1		07/12/19 22:10
Naphthalene	0.500	U	1.00	0.310	ug/L	1		07/14/19 07:29
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/12/19 22:10
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/12/19 22:10
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		07/12/19 22:10
sec-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/12/19 22:10
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/12/19 22:10
Toluene	0.500	U	1.00	0.310	ug/L	1		07/12/19 22:10
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/12/19 22:10
Surrogates								
1,2-Dichloroethane-D4 (surr)	98.1		81-118		%	1		07/12/19 22:10
4-Bromofluorobenzene (surr)	102		85-114		%	1		07/12/19 22:10
Toluene-d8 (surr)	96.2		89-112		%	1		07/12/19 22:10

Batch Information

Analytical Batch: VMS19158
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/14/19 07:29
Container ID: 1193675008-B

Prep Batch: VXX34428
Prep Method: SW5030B
Prep Date/Time: 07/14/19 00:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19154
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/12/19 22:10
Container ID: 1193675008-A

Prep Batch: VXX34423
Prep Method: SW5030B
Prep Date/Time: 07/12/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/31/2019 11:26:27AM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1796276 [VXX/34423]
Blank Lab ID: 1518538

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193675001, 1193675002, 1193675006, 1193675007, 1193675008

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	99.1	81-118		%
4-Bromofluorobenzene (surr)	101	85-114		%
Toluene-d8 (surr)	96.2	89-112		%

Batch Information

Analytical Batch: VMS19154
Analytical Method: SW8260C
Instrument: VPA 780/5975 GC/MS
Analyst: NRB
Analytical Date/Time: 7/12/2019 4:59:00PM

Prep Batch: VXX34423
Prep Method: SW5030B
Prep Date/Time: 7/12/2019 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193675 [VXX34423]
Blank Spike Lab ID: 1518539
Date Analyzed: 07/12/2019 17:14

Spike Duplicate ID: LCSD for HBN 1193675 [VXX34423]
Spike Duplicate Lab ID: 1518540
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193675001, 1193675002, 1193675006, 1193675007, 1193675008

Results by **SW8260C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	28.1	94	30	27.9	93	(79-124)	0.77	(< 20)
1,3,5-Trimethylbenzene	30	28.1	94	30	27.7	92	(75-124)	1.40	(< 20)
Benzene	30	28.6	96	30	28.7	96	(79-120)	0.07	(< 20)
Ethylbenzene	30	27.0	90	30	27.1	90	(79-121)	0.28	(< 20)
Isopropylbenzene (Cumene)	30	27.8	93	30	27.1	91	(72-131)	2.30	(< 20)
Naphthalene	30	28.0	93	30	29.0	97	(61-128)	3.60	(< 20)
n-Butylbenzene	30	28.3	94	30	28.5	95	(75-128)	0.48	(< 20)
o-Xylene	30	26.3	88	30	26.4	88	(78-122)	0.40	(< 20)
P & M -Xylene	60	54.6	91	60	53.7	89	(80-121)	1.70	(< 20)
sec-Butylbenzene	30	28.2	94	30	28.0	93	(77-126)	0.72	(< 20)
tert-Butylbenzene	30	28.3	94	30	28.2	94	(78-124)	0.28	(< 20)
Toluene	30	26.3	88	30	26.2	87	(80-121)	0.41	(< 20)
Xylenes (total)	90	80.9	90	90	80.1	89	(79-121)	1.00	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	94.2	94	30	94.8	95	(81-118)	0.67	
4-Bromofluorobenzene (surr)	30	101	101	30	101	101	(85-114)	0.17	
Toluene-d8 (surr)	30	97.5	98	30	98	98	(89-112)	0.58	

Batch Information

Analytical Batch: **VMS19154**
Analytical Method: **SW8260C**
Instrument: **VPA 780/5975 GC/MS**
Analyst: **NRB**

Prep Batch: **VXX34423**
Prep Method: **SW5030B**
Prep Date/Time: **07/12/2019 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1796303 [VXX/34428]
Blank Lab ID: 1518689

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193675006, 1193675007, 1193675008

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	99.2	81-118		%
4-Bromofluorobenzene (surr)	103	85-114		%
Toluene-d8 (surr)	96.6	89-112		%

Batch Information

Analytical Batch: VMS19158
Analytical Method: SW8260C
Instrument: VPA 780/5975 GC/MS
Analyst: NRB
Analytical Date/Time: 7/14/2019 4:14:00AM

Prep Batch: VXX34428
Prep Method: SW5030B
Prep Date/Time: 7/14/2019 12:30:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193675 [VXX34428]
Blank Spike Lab ID: 1518690
Date Analyzed: 07/14/2019 04:29

Spike Duplicate ID: LCSD for HBN 1193675 [VXX34428]
Spike Duplicate Lab ID: 1518691
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193675006, 1193675007, 1193675008

Results by **SW8260C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	28.3	94	30	27.9	93	(79-124)	1.30	(< 20)
1,3,5-Trimethylbenzene	30	28.3	94	30	27.7	92	(75-124)	2.20	(< 20)
Naphthalene	30	27.3	91	30	28.3	94	(61-128)	3.50	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	93.9	94	30	94.2	94	(81-118)	0.33	
4-Bromofluorobenzene (surr)	30	100	100	30	101	101	(85-114)	0.51	
Toluene-d8 (surr)	30	97.8	98	30	97.5	98	(89-112)	0.23	

Batch Information

Analytical Batch: **VMS19158**
Analytical Method: **SW8260C**
Instrument: **V4P A80759A5 / C7MS**
Analyst: **GNB**

Prep Batch: **VRRX3328**
Prep Method: **SW50X0B**
Prep Date/Time: **0A713Z2019 00:X0**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 17962[1 VX/ / 32442] L
Blank ba5 ID: 181Q741

Ma,rti : x a,sr Wh(rfauscEff.cGro(nd)

CS for map els0:
1192678]] 2

Rs0(l,0 5y **SW8260C**

Parap s,sr	Rs0(l,0	bOC3Sb	Db	Unt,0
1c[c4-Trtp s,hyl5snzsns	] .8]] U	1.]]	] .21]	(g3b
1c2c8-Trtp s,hyl5snzsns	] .8]] U	1.]]	] .21]	(g3b
Bsnzsns	] .[ ]] U	] .4]]	] .1[ ]	(g3b
E,hyl5snzsns	] .8]] U	1.]]	] .21]	(g3b
l0oeroeyl5snzsns W8(p sns)	] .8]] U	1.]]	] .21]	(g3b
Naeh,halsns	] .8]] U	1.]]	] .21]	(g3b
n-B(,yl5snzsns	] .8]] U	1.]]	] .21]	(g3b
o-/ ylsns	] .8]] U	1.]]	] .21]	(g3b
P & M -/ ylsns	1.]] U	[.]]	] .6[ ]	(g3b
0su-B(,yl5snzsns	] .8]] U	1.]]	] .21]	(g3b
,sr,-B(,yl5snzsns	] .8]] U	1.]]	] .21]	(g3b
Tol(sns	] .8]] U	1.]]	] .21]	(g3b
/ ylsns0 W,b,al)	1.8] U	2.]]	1.]]	(g3b
Surrogates				
1c[-Dtuhloros,hans-D4 W(rr)	1] Q	Q1-11Q		%
4-Brop ofl(oro5snzsns W(rr)	11]	Q8-114		%
Tol(sns-dQW(rr)	97.6	Q9-11[		%

Batch Information

Analy,tual Ba,uh: XMm1916]
Analy,tual Ms,hod: mx Q[6] S
In0,r(p sn,: Agtlsn, 7Q9] -78Mm
Analy0,: NRB
Analy,tual Da,s3Trtp s: 7314 3[ ] 19 8:42:]] AM

Prse Ba,uh: X/ / 2442]
Prse Ms,hod: mx 8] 2] B
Prse Da,s3Trtp s: 7314 3[ ] 19 1[:2] :]] AM
Prse Int,tal x ,.3Xol.: 8 p b
Prse Ei ,rau, Xol: 8 p b

Blank Spike Summary

Blank Spike ID: LCS for HBN 1193675 [VXX34432]
Blank Spike Lab ID: 151874t
DaAe y nalzde0: 27/14/t 219 25:58

Spike DuplicaAe ID: LCSD for HBN 1193675 [VXX34432]
Spike DuplicaAe Lab ID: 1518743
MaAix: WaAer (Surface, Eff., Groun0)

QC for Samples: 1193675223

ResulAs bz **SW8260C**

	Blank Spike (ug/L)			Spike DuplicaAe (ug/L)					
ParameAer	Spike	ResulA	Rec (%)	Spike	ResulA	Rec (%)	CL	RPD (%)	RPD CL
1,t ,4-TrimeAnzlbendene	32	3t .2	127	32	3t .4	128	(79-1t 4)	1.32	(< t 2)
1,3,5-TrimeAnzlbendene	32	3t .3	128	32	3t .1	127	(75-1t 4)	2.55	(< t 2)
Bendene	32	t 8.8	96	32	t 8.4	95	(79-1t 2)	1.32	(< t 2)
EAnzlbendene	32	t 8.4	95	32	t 8.t	94	(79-1t 1)	2.58	(< t 2)
Isopropzlbendene (Cumene)	32	t 9.6	99	32	t 8.9	96	(7t -131)	t .32	(< t 2)
NaphAnalene	32	t 7.3	91	32	t 9.t	97	(61-1t 8)	6.92	(< t 2)
n-BuAzlbendene	32	3t .5	128	32	3t .9	112	(75-1t 8)	1.12	(< t 2)
o-Xzlene	32	t 8.7	96	32	t 8.t	94	(78-1t t)	t .22	(< t 2)
P & M -Xzlene	62	56.5	94	62	56.1	93	(82-1t 1)	2.75	(< t 2)
sec-BuAzlbendene	32	31.9	126	32	3t .5	128	(77-1t 6)	1.72	(< t 2)
AerABuAzlbendene	32	31.7	126	32	3t .4	128	(78-1t 4)	t .32	(< t 2)
Toluene	32	t 6.6	89	32	t 6.4	88	(82-1t 1)	2.84	(< t 2)
Xzlenes (AoAal)	92	85.t	95	92	84.t	94	(79-1t 1)	1.t 2	(< t 2)
Surrogates									
1,t -DichloroeAnane-D4 (surr)	32	121	121	32	122	122	(81-118)	2.t 6	
4-Bromofluorobendene (surr)	32	111	111	32	11t	11t	(85-114)	1.t 2	
Toluene-08 (surr)	32	95.6	96	32	96.5	97	(89-11t)	2.89	

Batch Information

y nalzAcal BaAch: **VMS19160**
y nalzAcal MeAho0: **SW8260C**
InsAumenA **Agilent 7890-75MS**
y nalzsA **NRB**

Prep BaAch: **VXX34430**
Prep MeAho0: **SW5030B**
Prep DaAe/Time: **07/14/2019 00:30**
Spike IniAWA/Vol.: 32 ug/L ExAracAVol: 5 mL
Dupe IniAWA/Vol.: 32 ug/L ExAracAVol: 5 mL

PrinADaAe: 27/31/t 219 11:t 6:38y M

Billable Matrix Spike Summary

Original Sample ID: 1193675003
MS Sample ID: 1193675004 BMS
MSD Sample ID: 1193675005 BMSD

Analysis Date: 07/14/2019 8:44
Analysis Date: 07/14/2019 6:28
Analysis Date: 07/14/2019 6:43
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by **SW8260C**

		Matrix Spike (ug/L)				Spike Duplicate (ug/L)						
Parameter	Sample	Spike	Result	Rec (%)		Spike	Result	Rec (%)		CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	0.500U	30.0	21.2	71	*	30.0	22.9	76	*	79-124	7.70	(< 20)
1,3,5-Trimethylbenzene	0.500U	30.0	20.4	68	*	30.0	22.2	74	*	75-124	8.30	(< 20)
Benzene	0.200U	30.0	22.1	74	*	30.0	24.5	82		79-120	10.10	(< 20)
Ethylbenzene	0.500U	30.0	18.4	61	*	30.0	20.2	67	*	79-121	9.50	(< 20)
Isopropylbenzene (Cumene)	0.500U	30.0	18	60	*	30.0	19.9	67	*	72-131	10.30	(< 20)
Naphthalene	0.500U	30.0	25.1	84		30.0	27.2	91		61-128	7.80	(< 20)
n-Butylbenzene	0.500U	30.0	18.8	63	*	30.0	21.3	71	*	75-128	12.80	(< 20)
o-Xylene	0.500U	30.0	19.7	66	*	30.0	20.9	70	*	78-122	5.80	(< 20)
P & M -Xylene	1.00U	60.0	36	60	*	60.0	38.9	65	*	80-121	7.80	(< 20)
sec-Butylbenzene	0.500U	30.0	19.2	64	*	30.0	21.3	71	*	77-126	10.40	(< 20)
tert-Butylbenzene	0.500U	30.0	19.9	66	*	30.0	22.1	74	*	78-124	10.30	(< 20)
Toluene	0.500U	30.0	18.3	61	*	30.0	20.0	67	*	80-121	9.30	(< 20)
Xylenes (total)	1.50U	90.0	55.7	62	*	90.0	59.8	66	*	79-121	7.10	(< 20)
Surrogates												
1,2-Dichloroethane-D4 (surr)		30.0	30.4	101		30.0	30.6	102		81-118	0.49	
4-Bromofluorobenzene (surr)		30.0	33.9	113		30.0	33.6	112		85-114	0.70	
Toluene-d8 (surr)		30.0	28.8	96		30.0	29.1	97		89-112	1.20	

Batch Information

Analytical Batch: VMS19160
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: NRB
Analytical Date/Time: 7/14/2019 6:28:00AM

Prep Batch: VXX34430
Prep Method: Volatiles Extraction 8240/8260 FULL
Prep Date/Time: 7/14/2019 12:30:00AM
Prep Initial Wt./Vol.: 5.00mL
Prep Extract Vol: 5.00mL

Print Date: 07/31/2019 11:26:39AM

Method Blank

Blank ID: MB for HBN 1796130 [XXX/41739]
Blank Lab ID: 1517946

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193675001, 1193675002, 1193675003, 1193675006, 1193675007

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)	66.7	47-106		%
Fluoranthene-d10 (surr)	67.9	24-116		%

Batch Information

Analytical Batch: XMS11535
Analytical Method: 8270D SIM LV (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 7/18/2019 1:56:00PM

Prep Batch: XXX41739
Prep Method: SW3520C
Prep Date/Time: 7/11/2019 10:14:13AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193675 [XXX41739]
Blank Spike Lab ID: 1517947
Date Analyzed: 07/18/2019 14:17

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193675001, 1193675002, 1193675003, 1193675006, 1193675007

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

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	2	1.52	76	(41-115)
2-Methylnaphthalene	2	1.47	73	(39-114)
Acenaphthene	2	1.51	76	(48-114)
Acenaphthylene	2	1.58	79	(35-121)
Anthracene	2	1.57	78	(53-119)
Benzo(a)Anthracene	2	1.46	73	(59-120)
Benzo[a]pyrene	2	1.49	74	(53-120)
Benzo[b]Fluoranthene	2	1.54	77	(53-126)
Benzo[g,h,i]perylene	2	1.49	74	(44-128)
Benzo[k]fluoranthene	2	1.52	76	(54-125)
Chrysene	2	1.48	74	(57-120)
Dibenzo[a,h]anthracene	2	1.46	73	(44-131)
Fluoranthene	2	1.51	75	(58-120)
Fluorene	2	1.57	79	(50-118)
Indeno[1,2,3-c,d] pyrene	2	1.58	79	(48-130)
Naphthalene	2	1.52	76	(43-114)
Phenanthrene	2	1.53	77	(53-115)
Pyrene	2	1.59	79	(53-121)
Surrogates				
2-Methylnaphthalene-d10 (surr)	2	71.3	71	(47-106)
Fluoranthene-d10 (surr)	2	69.2	69	(24-116)

Batch Information

Analytical Batch: **XMS11535**
Analytical Method: **8270D SIM LV (PAH)**
Instrument: **SVA Agilent 780/5975 GC/MS**
Analyst: **BMZ**

Prep Batch: **XXX41739**
Prep Method: **SW3520C**
Prep Date/Time: **07/11/2019 10:14**
Spike Init Wt./Vol.: 2 ug/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: Extract Vol:

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Billable Matrix Spike Summary

Original Sample ID: 1193675003
MS Sample ID: 1193675004 BMS
MSD Sample ID: 1193675005 BMSD

Analysis Date: 07/18/2019 17:43
Analysis Date: 07/18/2019 18:04
Analysis Date: 07/18/2019 18:24
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

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	0.0236U	1.89	1.28	68		1.92	1.43	75	41-115	11.50	(< 20)
2-Methylnaphthalene	0.0236U	1.89	1.23	65		1.92	1.40	73	39-114	12.50	(< 20)
Acenaphthene	0.0236U	1.89	1.26	67		1.92	1.41	73	48-114	11.00	(< 20)
Acenaphthylene	0.0236U	1.89	1.34	71		1.92	1.49	78	35-121	11.00	(< 20)
Anthracene	0.0236U	1.89	1.29	69		1.92	1.46	76	53-119	12.10	(< 20)
Benzo(a)Anthracene	0.0236U	1.89	1.1	58	*	1.92	1.27	66	59-120	14.60	(< 20)
Benzo[a]pyrene	0.00945U	1.89	1.03	55		1.92	1.22	63	53-120	17.00	(< 20)
Benzo[b]Fluoranthene	0.0236U	1.89	1.07	57		1.92	1.27	66	53-126	16.70	(< 20)
Benzo[g,h,i]perylene	0.0236U	1.89	.866	46		1.92	1.08	56	44-128	21.70	* (< 20)
Benzo[k]fluoranthene	0.0236U	1.89	1.04	55		1.92	1.24	64	54-125	17.40	(< 20)
Chrysene	0.0236U	1.89	1.12	59		1.92	1.31	68	57-120	15.30	(< 20)
Dibenzo[a,h]anthracene	0.00945U	1.89	.722	38	*	1.92	0.934	49	44-131	25.50	* (< 20)
Fluoranthene	0.0236U	1.89	1.23	65		1.92	1.41	74	58-120	13.90	(< 20)
Fluorene	0.0236U	1.89	1.29	69		1.92	1.47	77	50-118	13.10	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0236U	1.89	.938	50		1.92	1.14	59	48-130	19.30	(< 20)
Naphthalene	0.0471U	1.89	1.28	68		1.92	1.44	75	43-114	11.70	(< 20)
Phenanthrene	0.0236U	1.89	1.26	67		1.92	1.43	74	53-115	12.60	(< 20)
Pyrene	0.0236U	1.89	1.29	68		1.92	1.48	77	53-121	13.50	(< 20)
Surrogates											
2-Methylnaphthalene-d10 (surr)		1.89	1.14	60		1.92	1.26	66	47-106	10.70	
Fluoranthene-d10 (surr)		1.89	1.11	59		1.92	1.26	66	24-116	12.50	

Batch Information

Analytical Batch: XMS11535
Analytical Method: 8270D SIM LV (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 7/18/2019 6:04:00PM

Prep Batch: XXX41739
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/11/2019 10:14:13AM
Prep Initial Wt./Vol.: 265.00mL
Prep Extract Vol: 1.00mL

Print Date: 07/31/2019 11:26:42AM

SGS

CI 1193675 D

Locations Nationwide

Alaska	Maryland
New Jersey	New York
North Carolina	Indiana
West Virgina	Kentucky

www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Page 1 of 1

Section 1

CLIENT: Brice Environmental

CONTACT: Kimi Lloyd PHONE NO: 907-317-7999

PROJECT NAME: 2019 HAK CS GWM Program PROJECT/ PWSID/ PERMIT#: SRF T S1-4

REPORTS TO: Kelly Carson E-MAIL: kcarson@briceenvironmental.com

INVOICE TO: Hilcorp AK QUOTE #:

P.O. #: 1952573

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incre-mental Soils	Preservative: VOC - AK petroleum HCl	Preservative: DRO 8270D SIM	Preservative: Ethylene Glycol 8015C	REMARKS/ LOC ID
(1)	A-B SRF14-TS14E-0719	7/6/19	1215	GW	5	G	X	X		
(2)	A-E SRF14-FS14M-0719	7/6/19	1220	GW	5	G	X	X		
(3) MS	A-G SRF14-TS14EE-0719	7/7/19	0825	GW	24	G	X	X	X	extra volume MS/MSD
(6)	A-H SRF14-TS14GR-0719	7/7/19	0930	GW	8	G	X	X	X	
(7)	A-H SRF14-TS14GR2-0719	7/7/19	0930	GW	8	G	X	X	X	
(8)	A-C SRF14-TB01-0719	7/6/19	0800	—	3	—	X			trip blank

AMG 55. 07/10/19

Section 5

	Date	Time	Received By:
Relinquished By: (1)	7/9	1615	
Relinquished By: (2)			
Relinquished By: (3)			
Relinquished By: (4)	07/09/19	16:18	Received For Laboratory By: AMG

Section 4

DOD Project? Yes (No)

Cooler ID: Mary Jane

Data Deliverable Requirements: Level II

Requested Turnaround Time and/or Special Instructions:

Profile: 341882 JKJ

Temp Blank °C: 3.7° D23

or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)

INTACT BROKEN (ABSENT)

(See attached Sample Receipt Form)

29 of 41

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301

[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms-and-conditions

e-Sample Receipt Form

SGS Workorder #: **1193675**

1 1 9 3 6 7 5

1193049	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements	Yes	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	Absent
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
	N/A	**Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: Mary Jane @ 3.7 °C Therm. ID: D23
		Cooler ID: @ °C Therm. ID:
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	No	**Only 21 samples for SRF14-TS14EE-0719 were received instead of the 24 on the CoC. Proceeding per PM with limited volume on the MS/MSD for ethylene glycol.**
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
	N/A	***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	**Sample 2E had a large bubble. Proceeding with limited volume.**
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	No	
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):

Missing samples for SRF14-T514EE-0719 recieved on the 07/15/19
E.M

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1193675001-A	No Preservative Required	OK			
1193675001-B	No Preservative Required	OK			
1193675001-C	HCL to pH < 2	OK			
1193675001-D	HCL to pH < 2	OK			
1193675001-E	HCL to pH < 2	OK			
1193675002-A	No Preservative Required	OK			
1193675002-B	No Preservative Required	OK			
1193675002-C	HCL to pH < 2	OK			
1193675002-D	HCL to pH < 2	OK			
1193675002-E	HCL to pH < 2	BU			
1193675003-A	No Preservative Required	OK			
1193675003-B	No Preservative Required	OK			
1193675003-C	HCL to pH < 2	OK			
1193675003-D	HCL to pH < 2	OK			
1193675003-E	No Preservative Required	OK			
1193675003-F	No Preservative Required	OK			
1193675003-G	No Preservative Required	OK			
1193675003-H	HCL to pH < 2	OK			
1193675004-A	No Preservative Required	OK			
1193675004-B	No Preservative Required	OK			
1193675004-C	HCL to pH < 2	OK			
1193675004-D	HCL to pH < 2	OK			
1193675004-E	No Preservative Required	OK			
1193675004-F	No Preservative Required	OK			
1193675004-G	No Preservative Required	OK			
1193675004-H	HCL to pH < 2	OK			
1193675005-A	No Preservative Required	OK			
1193675005-B	No Preservative Required	OK			
1193675005-C	HCL to pH < 2	OK			
1193675005-D	HCL to pH < 2	OK			
1193675005-E	No Preservative Required	OK			
1193675005-F	No Preservative Required	OK			
1193675005-G	No Preservative Required	OK			
1193675005-H	HCL to pH < 2	OK			
1193675006-A	No Preservative Required	OK			
1193675006-B	No Preservative Required	OK			
1193675006-C	HCL to pH < 2	OK			
1193675006-D	HCL to pH < 2	OK			
1193675006-E	HCL to pH < 2	OK			
1193675006-F	No Preservative Required	OK			
1193675006-G	No Preservative Required	OK			
1193675006-H	No Preservative Required	OK			
1193675007-A	No Preservative Required	OK			
1193675007-B	No Preservative Required	OK			
1193675007-C	HCL to pH < 2	OK			
1193675007-D	HCL to pH < 2	OK			
1193675007-E	HCL to pH < 2	OK			
1193675007-F	No Preservative Required	OK			

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1193675007-G	No Preservative Required	OK			
1193675007-H	No Preservative Required	OK			
1193675008-A	HCL to pH < 2	OK			
1193675008-B	HCL to pH < 2	OK			
1193675008-C	HCL to pH < 2	OK			

Container Condition Glossary

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

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

Bio-Chem LABORATORIES, INC

1049 - 28th Street SE
Grand Rapids, MI 49508
Ph: 616/248-4900
Toll Free: 800/362-LABS
Fax: 616/248-4904

July 19, 2019

Julie Shumway
SGS North America Inc
200 W. Potter Drive
Anchorage, AK 99518

TEL: (907) 562-2343
FAX (907) 561-5301

RE: 1193675

Dear Julie Shumway:

Order No.: 1907046

BIO-CHEM Laboratories, Inc. received 3 samples on 7/12/2019 for the analyses presented in the following report.

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative.

If you have any questions regarding these tests results, please feel free to call.

Please note that unless otherwise instructed, residual samples will be held for sixty (60) days from the original report date. At that time, all non-hazardous samples will be disposed of in accordance with federal, state and local regulations and ordinances, and hazardous samples shall be returned to you. Please contact the laboratory within thirty (30) days if other arrangements for sample retention need to be made.

Sincerely,

Cindy Euwema

Cindy Euwema
Office Manager

Working with you to ensure a better tomorrow.

SGS North America Inc.
CHAIN OF CUSTODY RECORD

Locations Nationwide

Alaska	Florida
New Jersey	Colorado
Texas	North Carolina
Virginia	Louisiana

www.us.sgs.com

CLIENT:	SGS North America Inc. - Alaska Division	SGS Reference:	**Bio-Chem**
CONTACT:	Julie Shumway	PHONE NO:	(907) 562-2343
PROJECT NAME:	1193675	PWSID#:	
		NPDL#:	
REPORTS TO:	Julie Shumway	E-MAIL:	Julie.Shumway@sgs.com; Env.Alaska.RefLabTeam@sgs.com
INVOICE TO:	SGS - Alaska	QUOTE #:	
		P.O. #:	1193675

Additional Comments: All soils report out in dry weight unless

Page 1 of 1

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HHMM	MATRIX/ MATRIX CODE	# CONTAINERS	Preservative Used:	NONE				MS	MSD	SGS lab #	Location ID
						TYPE C = COMP G = GRAB MI = Multi Incremental Soils	Ethylene Glycol 8015M							
01	SRF14-TS14EE-0719	7/7/2019	08:25:00	Water	1		X						1193675003	
	SRF14-TS14EE-0719-MS	7/7/2019	08:25:00	Water	1		X				X		1193675004	
	SRF14-TS14EE-0719-MSD	7/7/2019	08:25:00	Water	1		X					X	1193675005	
02	SRF14-TS14GR-0719	7/7/2019	09:30:00	Water	1		X						1193675006	
03	SRF14-TS14GRZ-0719	7/7/2019	08:30:00	Water	1		X						1193675007	

Relinquished By: (1)	Date	Time	Received By:	DOD Project?	No
				Report to DL (J Flags)? If J- Report as DL/LOD/LOQ.	Yes
Relinquished By: (2)	Date	Time	Received By:	Cooler ID:	
Relinquished By: (3)	Date	Time	Received By:	Temp Blank °C: 2.9°	Chain of Custody Seal: (Circle)
Relinquished By: (4)	Date: 7/11/19	Time: 0940	Received For Laboratory By: UPS/Kathryn Lathrop 7/12/19	or Ambient [ ] 3:00pm	INTACT BROKEN ABSENT

Data Deliverable Requirements: Level II + Dataview

Requested Turnaround Time and-or Special Instructions:

X 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms_and_conditions.htm

BIO-CHEM Laboratories, Inc.

Date: *19-Jul-19*

CLIENT: SGS North America Inc
Project: 1193675
Lab Order: 1907046

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date	Date Received
1907046-01A	SRF14-TS14EE-0719	Water	7/7/2019	7/12/2019
1907046-02A	SRF14-TS14GR-0719	Water	7/7/2019	7/12/2019
1907046-03A	SRF14-TS14GRZ-0719	Water	7/7/2019	7/12/2019

BIO-CHEM Laboratories, Inc.

Date: *19-Jul-19*

CLIENT: SGS North America Inc
Project: 1193675
Lab Order: 1907046

CASE NARRATIVE

Samples are routinely analyzed using methods outlined in the following references:

(SW) Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Ed.
(E) Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020.
(A) Standard Methods for the Examination of Water and Wastewater, APHA, 18th Ed.
(D) Annual Book of ASTM Standards.

Specific methods utilized for this project are provided in the analytical report and are identified by the reference document abbreviation ( ) followed by the method number.

All QA/QC and sample analyses met method, laboratory and/or regulatory data quality objectives unless otherwise specified below.

No data qualifications required and there are no "J" flags to report.

BIO-CHEM Laboratories, Inc.

Date: *7/19/2019*

ANALYTICAL REPORT

CLIENT: SGS North America Inc
Lab Order: 1907046
Project: 1193675
Lab Sample ID: 1907046-01A

Project Number: 1193675
Client Sample ID: SRF14-TS14EE-0719
Collection Date: 7/7/2019
Matrix: WATER

Analyses	Method Ref.	Result	Q	PQL	Units	DF	Analyst	Date
Alcohols by GC/FID								
1. Ethylene Glycol	SW8015B	< 10		10	mg/L	1	LEB	7/17/2019

Definitions: PQL - Practical Quantitation Limit
DF - Dilution Factor

Qualifiers (Q): J - Detected below PQL but above MDL: Estimated
S - Spike Recovery Outside Acceptance Limits
B - Analyte detected in associated Method Blank
N - See case narrative for explanation

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Note: The sample results reported are based on the sample aliquot(s) tested.

CLIENT: SGS North America Inc
Lab Order: 1907046
Project: 1193675
Lab Sample ID: 1907046-02A

Project Number: 1193675
Client Sample ID: SRF14-TS14GR-0719
Collection Date: 7/7/2019
Matrix: WATER

Analyses	Method Ref.	Result	Q	PQL	Units	DF	Analyst	Date
Alcohols by GC/FID								
1. Ethylene Glycol	SW8015B	34,000		10	mg/L	1	LEB	7/17/2019

Definitions: PQL - Practical Quantitation Limit
DF - Dilution Factor

Qualifiers (Q): J - Detected below PQL but above MDL: Estimated
S - Spike Recovery Outside Acceptance Limits
B - Analyte detected in associated Method Blank
N - See case narrative for explanation

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Note: The sample results reported are based on the sample aliquot(s) tested.

BIO-CHEM Laboratories, Inc.

Date: *7/19/2019*

ANALYTICAL REPORT

CLIENT: SGS North America Inc
Lab Order: 1907046
Project: 1193675
Lab Sample ID: 1907046-03A

Project Number: 1193675
Client Sample ID: SRF14-TS14GRZ-0719
Collection Date: 7/7/2019
Matrix: WATER

Analyses	Method Ref.	Result	Q	PQL	Units	DF	Analyst	Date
Alcohols by GC/FID								
1. Ethylene Glycol	SW8015B	27,000		10	mg/L	1	LEB	7/17/2019

Definitions: PQL - Practical Quantitation Limit
DF - Dilution Factor

Qualifiers (Q): J - Detected below PQL but above MDL: Estimated
S - Spike Recovery Outside Acceptance Limits
B - Analyte detected in associated Method Blank
N - See case narrative for explanation

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Note: The sample results reported are based on the sample aliquot(s) tested.

BIO-CHEM Laboratories, Inc.

Lab Order: 1907046
Client: SGS North America Inc
Project: 1193675

ANALYTICAL DETAIL REPORT

Sample ID	Client Sample ID	Matrix	Test Name	Date Sampled	TCLP/SPLP Date	Prep Date	QC Batch	Analysis Date	Analytical Batch
1907046-01A	SRF14-TS14EE-0719	Water	Alcohols by GC/FID	7/7/2019		7/16/2019	43833	7/17/2019	GC_B_FID_190717A
1907046-02A	SRF14-TS14GR-0719	Water	Alcohols by GC/FID	7/7/2019		7/16/2019	43833	7/17/2019	GC_B_FID_190717A
1907046-03A	SRF14-TS14GRZ-0719	Water	Alcohols by GC/FID	7/7/2019		7/16/2019	43833	7/17/2019	GC_B_FID_190717A

CLIENT: SGS North America Inc
Work Order: 1907046
Project: 1193675

ANALYTICAL QC SUMMARY REPORT

TestCode: ALCOHOL_W

Sample ID: **MB-43833**	SampType: **MBLK**	TestCode: **ALCOHOL_W**	Units: **mg/L**	Prep Date: **7/16/2019**	Run ID: **GC_B_FID_190717A**
Client ID: **ZZZZZ**	Batch ID: **43833**	TestNo: **SW8015B**	**(SW8015B)**	Analysis Date: **7/17/2019**	SeqNo: **1099908**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethylene Glycol	< 10	10									

Sample ID: **LCS-43833**	SampType: **LCS**	TestCode: **ALCOHOL_W**	Units: **mg/L**	Prep Date: **7/16/2019**	Run ID: **GC_B_FID_190717A**
Client ID: **ZZZZZ**	Batch ID: **43833**	TestNo: **SW8015B**	**(SW8015B)**	Analysis Date: **7/17/2019**	SeqNo: **1099909**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethylene Glycol	191.1	10	200	0	95.6	73.3	129	0	0		

Sample ID: **1907046-01Ams**	SampType: **MS**	TestCode: **ALCOHOL_W**	Units: **mg/L**	Prep Date: **7/16/2019**	Run ID: **GC_B_FID_190717A**
Client ID: **SRF14-TS14EE-0719**	Batch ID: **43833**	TestNo: **SW8015B**	**(SW8015B)**	Analysis Date: **7/17/2019**	SeqNo: **1099913**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethylene Glycol	389.2	10	400	0	97.3	46	148	0	0		

Sample ID: **1907046-01Amsd**	SampType: **MSD**	TestCode: **ALCOHOL_W**	Units: **mg/L**	Prep Date: **7/16/2019**	Run ID: **GC_B_FID_190717A**
Client ID: **SRF14-TS14EE-0719**	Batch ID: **43833**	TestNo: **SW8015B**	**(SW8015B)**	Analysis Date: **7/17/2019**	SeqNo: **1099914**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethylene Glycol	425.2	10	400	0	106	46	148	389.2	8.83	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

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Laboratory Report of Analysis

To: Hilcorp Alaska, LLC
3800 Centerpoint Dr. Suite 400
Anchorage, AK 99503
(907)277-7297

Report Number: **1193674**

Client Project: **SRF TS1-9 2019 HAK CS GWM Prog**

Dear Kelly Carson,

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 Justin 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.



Justin Nelson
2019.07.18 15:24:39 -08'00'

SGS North America Inc.
Environmental Services – Alaska Division
Project Manager

Justin Nelson Date
Project Manager
Justin.Nelson@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

Member of SGS Group

Case Narrative

SGS Client: **Hilcorp Alaska, LLC**
SGS Project: **1193674**
Project Name/Site: **SRF TS1-9 2019 HAK CS GWM Prog**
Project Contact: **Kelly Carson**

Refer to sample receipt form for information on sample condition.

SRF19-FS19M-0719 MSD (1193674004) BMSD

8270D SIM - PAH BMS/BMSD RPD for Indeno[1,2,3-c,d] pyrene, Dibenzo[a,h]anthracene and Benzo[g,h,i]perylene do not meet QC criteria. Results for this analyte are considered estimated in the parent sample.

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

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

Member of SGS Group

Laboratory Qualifiers

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

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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
SRF19-FS19I-0719	1193674001	07/05/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF19-FS19M-0719	1193674002	07/05/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF19-FS19M-0719 MS	1193674003	07/05/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF19-FS19M-0719 MSD	1193674004	07/05/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF19-FS19D-0719	1193674005	07/05/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF19-FS19NZ-0719	1193674006	07/05/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF19-FS19N-0719	1193674007	07/05/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF19-TS19U-0719	1193674008	07/05/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF19-TS19HH-0719	1193674009	07/05/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF19-TS19C-0719	1193674010	07/06/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF19-TS19D-0719	1193674011	07/06/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF19-TS19DZ-0719	1193674012	07/06/2019	07/09/2019	Water (Surface, Eff., Ground)
SRF19-TB01-0719	1193674013	07/06/2019	07/09/2019	Water (Surface, Eff., Ground)

Method	Method Description
SW8260C	8021B by 8260 (W)
8270D SIM LV (PAH)	8270 PAH SIM GC/MS Liq/Liq ext. LV

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Detectable Results Summary

Client Sample ID: **SRF19-FS19D-0719**
Lab Sample ID: 1193674005

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	0.0586	ug/L
	Naphthalene	0.187	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	0.786J	ug/L
	1,3,5-Trimethylbenzene	0.412J	ug/L
	Benzene	0.442	ug/L
	Ethylbenzene	0.557J	ug/L
	Isopropylbenzene (Cumene)	0.387J	ug/L
	o-Xylene	1.76	ug/L
	P & M -Xylene	0.960J	ug/L
	Toluene	0.391J	ug/L
	Xylenes (total)	2.72J	ug/L

Client Sample ID: **SRF19-FS19NZ-0719**
Lab Sample ID: 1193674006

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	0.328	ug/L
	2-Methylnaphthalene	0.212	ug/L
	Fluorene	0.0357J	ug/L
	Naphthalene	0.875	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	3.41	ug/L
	1,3,5-Trimethylbenzene	0.401J	ug/L
	Benzene	0.510	ug/L
	Isopropylbenzene (Cumene)	1.54	ug/L
	Naphthalene	1.90	ug/L
	P & M -Xylene	2.31	ug/L
	sec-Butylbenzene	0.533J	ug/L
	Xylenes (total)	2.31J	ug/L

Client Sample ID: **SRF19-FS19N-0719**
Lab Sample ID: 1193674007

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	0.316	ug/L
	2-Methylnaphthalene	0.211	ug/L
	Fluorene	0.0358J	ug/L
	Naphthalene	0.837	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	2.37	ug/L
	Benzene	0.550	ug/L
	Isopropylbenzene (Cumene)	1.32	ug/L
	Naphthalene	1.34	ug/L
	P & M -Xylene	1.75J	ug/L
	sec-Butylbenzene	0.447J	ug/L
	Xylenes (total)	1.75J	ug/L

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Detectable Results Summary

Client Sample ID: **SRF19-TS19U-0719**
Lab Sample ID: 1193674008

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	11.5	ug/L
	2-Methylnaphthalene	12.6	ug/L
	Acenaphthene	0.209	ug/L
	Fluorene	0.939	ug/L
	Naphthalene	7.90	ug/L
	Phenanthrene	0.598	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	64.2	ug/L
	1,3,5-Trimethylbenzene	39.8	ug/L
	Benzene	1.48	ug/L
	Ethylbenzene	5.56	ug/L
	Isopropylbenzene (Cumene)	11.3	ug/L
	Naphthalene	11.8	ug/L
	o-Xylene	2.20	ug/L
	P & M -Xylene	8.23	ug/L
	sec-Butylbenzene	4.66	ug/L
	tert-Butylbenzene	1.35	ug/L
	Toluene	0.357J	ug/L
	Xylenes (total)	10.4	ug/L

Client Sample ID: **SRF19-TS19HH-0719**
Lab Sample ID: 1193674009

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	0.249	ug/L
	2-Methylnaphthalene	0.242	ug/L
	Naphthalene	0.179	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	1.63	ug/L
	1,3,5-Trimethylbenzene	4.40	ug/L
	Benzene	0.257J	ug/L
	Isopropylbenzene (Cumene)	3.42	ug/L
	Naphthalene	0.641J	ug/L
	n-Butylbenzene	0.762J	ug/L
	P & M -Xylene	0.628J	ug/L
	sec-Butylbenzene	2.28	ug/L

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Detectable Results Summary

Client Sample ID: **SRF19-TS19C-0719**
Lab Sample ID: 1193674010

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	16.9	ug/L
	2-Methylnaphthalene	19.1	ug/L
	Acenaphthene	0.158	ug/L
	Fluorene	0.420	ug/L
	Naphthalene	16.1	ug/L
	Phenanthrene	0.421	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	417	ug/L
	1,3,5-Trimethylbenzene	320	ug/L
	Benzene	0.247J	ug/L
	Ethylbenzene	22.1	ug/L
	Isopropylbenzene (Cumene)	25.5	ug/L
	Naphthalene	31.0	ug/L
	o-Xylene	2340	ug/L
	P & M -Xylene	191	ug/L
	sec-Butylbenzene	3.96	ug/L
	tert-Butylbenzene	5.02	ug/L
	Toluene	6.16	ug/L
	Xylenes (total)	2530	ug/L

Client Sample ID: **SRF19-TS19D-0719**
Lab Sample ID: 1193674011

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	10.1	ug/L
	2-Methylnaphthalene	12.7	ug/L
	Fluorene	0.475	ug/L
	Naphthalene	28.6	ug/L
	Phenanthrene	0.268	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	534	ug/L
	1,3,5-Trimethylbenzene	301	ug/L
	Benzene	7.86	ug/L
	Ethylbenzene	190	ug/L
	Isopropylbenzene (Cumene)	103	ug/L
	Naphthalene	57.4	ug/L
	o-Xylene	103	ug/L
	P & M -Xylene	625	ug/L
	sec-Butylbenzene	5.51	ug/L
	tert-Butylbenzene	5.36	ug/L
	Toluene	0.359J	ug/L
	Xylenes (total)	728	ug/L

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Detectable Results Summary

Client Sample ID: **SRF19-TS19DZ-0719**
Lab Sample ID: 1193674012

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	11.4	ug/L
	2-Methylnaphthalene	12.1	ug/L
	Acenaphthene	0.224	ug/L
	Fluorene	0.473	ug/L
	Naphthalene	28.5	ug/L
	Phenanthrene	0.222	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	558	ug/L
	1,3,5-Trimethylbenzene	318	ug/L
	Benzene	8.08	ug/L
	Ethylbenzene	197	ug/L
	Isopropylbenzene (Cumene)	104	ug/L
	Naphthalene	59.6	ug/L
	o-Xylene	109	ug/L
	P & M -Xylene	648	ug/L
	sec-Butylbenzene	5.60	ug/L
	tert-Butylbenzene	5.22	ug/L
	Toluene	0.356J	ug/L
	Xylenes (total)	757	ug/L

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Results of **SRF19-FS19I-0719**

Client Sample ID: **SRF19-FS19I-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674001
Lab Project ID: 1193674

Collection Date: 07/05/19 07:50
Received Date: 07/09/19 16:13
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	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
2-Methylnaphthalene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Acenaphthene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Acenaphthylene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Anthracene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Benzo(a)Anthracene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Benzo[a]pyrene	0.00910	U	0.0182	0.00564	ug/L	1		07/15/19 16:09
Benzo[b]Fluoranthene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Benzo[g,h,i]perylene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Benzo[k]fluoranthene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Chrysene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Dibenzo[a,h]anthracene	0.00910	U	0.0182	0.00564	ug/L	1		07/15/19 16:09
Fluoranthene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Fluorene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Indeno[1,2,3-c,d] pyrene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Naphthalene	0.0454	U	0.0909	0.0282	ug/L	1		07/15/19 16:09
Phenanthrene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Pyrene	0.0227	U	0.0455	0.0136	ug/L	1		07/15/19 16:09
Surrogates								
2-Methylnaphthalene-d10 (surr)	67.3		47-106		%	1		07/15/19 16:09
Fluoranthene-d10 (surr)	70.5		24-116		%	1		07/15/19 16:09

Batch Information

Analytical Batch: XMS11522
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/15/19 16:09
Container ID: 1193674001-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 275 mL
Prep Extract Vol: 1 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-FS19I-0719**

Client Sample ID: **SRF19-FS19I-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674001
Lab Project ID: 1193674

Collection Date: 07/05/19 07:50
Received Date: 07/09/19 16:13
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:59
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:59
Benzene	0.200 U		0.400	0.120	ug/L	1		07/14/19 08:59
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:59
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:59
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:59
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:59
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:59
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/14/19 08:59
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:59
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:59
Toluene	0.500 U		1.00	0.310	ug/L	1		07/14/19 08:59
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/14/19 08:59
Surrogates								
1,2-Dichloroethane-D4 (surr)	107		81-118		%	1		07/14/19 08:59
4-Bromofluorobenzene (surr)	110		85-114		%	1		07/14/19 08:59
Toluene-d8 (surr)	96.4		89-112		%	1		07/14/19 08:59

Batch Information

Analytical Batch: VMS19160
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/14/19 08:59
Container ID: 1193674001-C

Prep Batch: VXX34430
Prep Method: SW5030B
Prep Date/Time: 07/14/19 00:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF19-FS19M-0719**

Client Sample ID: **SRF19-FS19M-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674002
Lab Project ID: 1193674

Collection Date: 07/05/19 08:10
Received Date: 07/09/19 16:13
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	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
2-Methylnaphthalene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Acenaphthene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Acenaphthylene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Anthracene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Benzo(a)Anthracene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Benzo[a]pyrene	0.00945	U	0.0189	0.00585	ug/L	1		07/15/19 16:29
Benzo[b]Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Benzo[g,h,i]perylene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Benzo[k]fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Chrysene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Dibenzo[a,h]anthracene	0.00945	U	0.0189	0.00585	ug/L	1		07/15/19 16:29
Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Fluorene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Indeno[1,2,3-c,d] pyrene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Naphthalene	0.0471	U	0.0943	0.0292	ug/L	1		07/15/19 16:29
Phenanthrene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Pyrene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 16:29
Surrogates								
2-Methylnaphthalene-d10 (surr)	60.5		47-106		%	1		07/15/19 16:29
Fluoranthene-d10 (surr)	65.2		24-116		%	1		07/15/19 16:29

Batch Information

Analytical Batch: XMS11522
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/15/19 16:29
Container ID: 1193674002-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-FS19M-0719**

Client Sample ID: **SRF19-FS19M-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674002
Lab Project ID: 1193674

Collection Date: 07/05/19 08:10
Received Date: 07/09/19 16:13
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 09:15
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 09:15
Benzene	0.200 U		0.400	0.120	ug/L	1		07/14/19 09:15
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 09:15
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/14/19 09:15
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/14/19 09:15
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 09:15
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/14/19 09:15
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/14/19 09:15
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 09:15
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/14/19 09:15
Toluene	0.500 U		1.00	0.310	ug/L	1		07/14/19 09:15
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/14/19 09:15
Surrogates								
1,2-Dichloroethane-D4 (surr)	110		81-118		%	1		07/14/19 09:15
4-Bromofluorobenzene (surr)	109		85-114		%	1		07/14/19 09:15
Toluene-d8 (surr)	96.9		89-112		%	1		07/14/19 09:15

Batch Information

Analytical Batch: VMS19160
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/14/19 09:15
Container ID: 1193674002-C

Prep Batch: VXX34430
Prep Method: SW5030B
Prep Date/Time: 07/14/19 00:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-FS19D-0719**

Client Sample ID: **SRF19-FS19D-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674005
Lab Project ID: 1193674

Collection Date: 07/05/19 10:15
Received Date: 07/09/19 16:13
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	0.0586		0.0472	0.0142	ug/L	1		07/15/19 17:31
2-Methylnaphthalene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Acenaphthene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Acenaphthylene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Anthracene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Benzo(a)Anthracene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Benzo[a]pyrene	0.00945	U	0.0189	0.00585	ug/L	1		07/15/19 17:31
Benzo[b]Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Benzo[g,h,i]perylene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Benzo[k]fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Chrysene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Dibenzo[a,h]anthracene	0.00945	U	0.0189	0.00585	ug/L	1		07/15/19 17:31
Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Fluorene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Indeno[1,2,3-c,d] pyrene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Naphthalene	0.187		0.0943	0.0292	ug/L	1		07/15/19 17:31
Phenanthrene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Pyrene	0.0236	U	0.0472	0.0142	ug/L	1		07/15/19 17:31
Surrogates								
2-Methylnaphthalene-d10 (surr)	57.6		47-106		%	1		07/15/19 17:31
Fluoranthene-d10 (surr)	57.5		24-116		%	1		07/15/19 17:31

Batch Information

Analytical Batch: XMS11522
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/15/19 17:31
Container ID: 1193674005-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-FS19D-0719**

Client Sample ID: **SRF19-FS19D-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674005
Lab Project ID: 1193674

Collection Date: 07/05/19 10:15
Received Date: 07/09/19 16:13
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.786	J	1.00	0.310	ug/L	1		07/11/19 20:52
1,3,5-Trimethylbenzene	0.412	J	1.00	0.310	ug/L	1		07/11/19 20:52
Benzene	0.442		0.400	0.120	ug/L	1		07/10/19 19:23
Ethylbenzene	0.557	J	1.00	0.310	ug/L	1		07/11/19 20:52
Isopropylbenzene (Cumene)	0.387	J	1.00	0.310	ug/L	1		07/10/19 19:23
Naphthalene	0.500	U	1.00	0.310	ug/L	1		07/11/19 20:52
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:23
o-Xylene	1.76		1.00	0.310	ug/L	1		07/11/19 20:52
P & M -Xylene	0.960	J	2.00	0.620	ug/L	1		07/11/19 20:52
sec-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:23
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:23
Toluene	0.391	J	1.00	0.310	ug/L	1		07/10/19 19:23
Xylenes (total)	2.72	J	3.00	1.00	ug/L	1		07/11/19 20:52
Surrogates								
1,2-Dichloroethane-D4 (surr)	109		81-118		%	1		07/10/19 19:23
4-Bromofluorobenzene (surr)	106		85-114		%	1		07/10/19 19:23
Toluene-d8 (surr)	95.7		89-112		%	1		07/10/19 19:23

Batch Information

Analytical Batch: VMS19147
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/10/19 19:23
Container ID: 1193674005-C

Prep Batch: VXX34411
Prep Method: SW5030B
Prep Date/Time: 07/10/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19149
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/11/19 20:52
Container ID: 1193674005-D

Prep Batch: VXX34416
Prep Method: SW5030B
Prep Date/Time: 07/11/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-FS19NZ-0719**

Client Sample ID: **SRF19-FS19NZ-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674006
Lab Project ID: 1193674

Collection Date: 07/05/19 09:35
Received Date: 07/09/19 16:13
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	0.328		0.0490	0.0147	ug/L	1		07/15/19 17:52
2-Methylnaphthalene	0.212		0.0490	0.0147	ug/L	1		07/15/19 17:52
Acenaphthene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 17:52
Acenaphthylene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 17:52
Anthracene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 17:52
Benzo(a)Anthracene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 17:52
Benzo[a]pyrene	0.00980 U		0.0196	0.00608	ug/L	1		07/15/19 17:52
Benzo[b]Fluoranthene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 17:52
Benzo[g,h,i]perylene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 17:52
Benzo[k]fluoranthene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 17:52
Chrysene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 17:52
Dibenzo[a,h]anthracene	0.00980 U		0.0196	0.00608	ug/L	1		07/15/19 17:52
Fluoranthene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 17:52
Fluorene	0.0357 J		0.0490	0.0147	ug/L	1		07/15/19 17:52
Indeno[1,2,3-c,d] pyrene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 17:52
Naphthalene	0.875		0.0980	0.0304	ug/L	1		07/15/19 17:52
Phenanthrene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 17:52
Pyrene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 17:52
Surrogates								
2-Methylnaphthalene-d10 (surr)	69		47-106		%	1		07/15/19 17:52
Fluoranthene-d10 (surr)	71.3		24-116		%	1		07/15/19 17:52

Batch Information

Analytical Batch: XMS11522
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/15/19 17:52
Container ID: 1193674006-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-FS19NZ-0719**

Client Sample ID: **SRF19-FS19NZ-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674006
Lab Project ID: 1193674

Collection Date: 07/05/19 09:35
Received Date: 07/09/19 16:13
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	3.41		1.00	0.310	ug/L	1		07/10/19 19:39
1,3,5-Trimethylbenzene	0.401	J	1.00	0.310	ug/L	1		07/10/19 19:39
Benzene	0.510		0.400	0.120	ug/L	1		07/10/19 19:39
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:39
Isopropylbenzene (Cumene)	1.54		1.00	0.310	ug/L	1		07/10/19 19:39
Naphthalene	1.90		1.00	0.310	ug/L	1		07/10/19 19:39
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:39
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:39
P & M -Xylene	2.31		2.00	0.620	ug/L	1		07/10/19 19:39
sec-Butylbenzene	0.533	J	1.00	0.310	ug/L	1		07/10/19 19:39
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:39
Toluene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:39
Xylenes (total)	2.31	J	3.00	1.00	ug/L	1		07/10/19 19:39
Surrogates								
1,2-Dichloroethane-D4 (surr)	108		81-118		%	1		07/10/19 19:39
4-Bromofluorobenzene (surr)	106		85-114		%	1		07/10/19 19:39
Toluene-d8 (surr)	98.6		89-112		%	1		07/10/19 19:39

Batch Information

Analytical Batch: VMS19147
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/10/19 19:39
Container ID: 1193674006-C

Prep Batch: VXX34411
Prep Method: SW5030B
Prep Date/Time: 07/10/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF19-FS19N-0719**

Client Sample ID: **SRF19-FS19N-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674007
Lab Project ID: 1193674

Collection Date: 07/05/19 10:35
Received Date: 07/09/19 16:13
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	0.316		0.0481	0.0144	ug/L	1		07/15/19 18:12
2-Methylnaphthalene	0.211		0.0481	0.0144	ug/L	1		07/15/19 18:12
Acenaphthene	0.0240	U	0.0481	0.0144	ug/L	1		07/15/19 18:12
Acenaphthylene	0.0240	U	0.0481	0.0144	ug/L	1		07/15/19 18:12
Anthracene	0.0240	U	0.0481	0.0144	ug/L	1		07/15/19 18:12
Benzo(a)Anthracene	0.0240	U	0.0481	0.0144	ug/L	1		07/15/19 18:12
Benzo[a]pyrene	0.00960	U	0.0192	0.00596	ug/L	1		07/15/19 18:12
Benzo[b]Fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		07/15/19 18:12
Benzo[g,h,i]perylene	0.0240	U	0.0481	0.0144	ug/L	1		07/15/19 18:12
Benzo[k]fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		07/15/19 18:12
Chrysene	0.0240	U	0.0481	0.0144	ug/L	1		07/15/19 18:12
Dibenzo[a,h]anthracene	0.00960	U	0.0192	0.00596	ug/L	1		07/15/19 18:12
Fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		07/15/19 18:12
Fluorene	0.0358	J	0.0481	0.0144	ug/L	1		07/15/19 18:12
Indeno[1,2,3-c,d] pyrene	0.0240	U	0.0481	0.0144	ug/L	1		07/15/19 18:12
Naphthalene	0.837		0.0962	0.0298	ug/L	1		07/15/19 18:12
Phenanthrene	0.0240	U	0.0481	0.0144	ug/L	1		07/15/19 18:12
Pyrene	0.0240	U	0.0481	0.0144	ug/L	1		07/15/19 18:12
Surrogates								
2-Methylnaphthalene-d10 (surr)	67.5		47-106		%	1		07/15/19 18:12
Fluoranthene-d10 (surr)	69.9		24-116		%	1		07/15/19 18:12

Batch Information

Analytical Batch: XMS11522
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/15/19 18:12
Container ID: 1193674007-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-FS19N-0719**

Client Sample ID: **SRF19-FS19N-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674007
Lab Project ID: 1193674

Collection Date: 07/05/19 10:35
Received Date: 07/09/19 16:13
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	2.37		1.00	0.310	ug/L	1		07/10/19 19:54
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:54
Benzene	0.550		0.400	0.120	ug/L	1		07/10/19 19:54
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:54
Isopropylbenzene (Cumene)	1.32		1.00	0.310	ug/L	1		07/10/19 19:54
Naphthalene	1.34		1.00	0.310	ug/L	1		07/10/19 19:54
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:54
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:54
P & M -Xylene	1.75	J	2.00	0.620	ug/L	1		07/10/19 19:54
sec-Butylbenzene	0.447	J	1.00	0.310	ug/L	1		07/10/19 19:54
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:54
Toluene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:54
Xylenes (total)	1.75	J	3.00	1.00	ug/L	1		07/10/19 19:54
Surrogates								
1,2-Dichloroethane-D4 (surr)	108		81-118		%	1		07/10/19 19:54
4-Bromofluorobenzene (surr)	106		85-114		%	1		07/10/19 19:54
Toluene-d8 (surr)	97.3		89-112		%	1		07/10/19 19:54

Batch Information

Analytical Batch: VMS19147
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/10/19 19:54
Container ID: 1193674007-C

Prep Batch: VXX34411
Prep Method: SW5030B
Prep Date/Time: 07/10/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-TS19U-0719**

Client Sample ID: **SRF19-TS19U-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674008
Lab Project ID: 1193674

Collection Date: 07/05/19 16:30
Received Date: 07/09/19 16:13
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	11.5		0.196	0.0588	ug/L	4		07/16/19 18:59
2-Methylnaphthalene	12.6		0.196	0.0588	ug/L	4		07/16/19 18:59
Acenaphthene	0.209		0.0490	0.0147	ug/L	1		07/15/19 18:33
Acenaphthylene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 18:33
Anthracene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 18:33
Benzo(a)Anthracene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 18:33
Benzo[a]pyrene	0.00980 U		0.0196	0.00608	ug/L	1		07/15/19 18:33
Benzo[b]Fluoranthene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 18:33
Benzo[g,h,i]perylene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 18:33
Benzo[k]fluoranthene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 18:33
Chrysene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 18:33
Dibenzo[a,h]anthracene	0.00980 U		0.0196	0.00608	ug/L	1		07/15/19 18:33
Fluoranthene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 18:33
Fluorene	0.939		0.0490	0.0147	ug/L	1		07/15/19 18:33
Indeno[1,2,3-c,d] pyrene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 18:33
Naphthalene	7.90		0.0980	0.0304	ug/L	1		07/15/19 18:33
Phenanthrene	0.598		0.0490	0.0147	ug/L	1		07/15/19 18:33
Pyrene	0.0245 U		0.0490	0.0147	ug/L	1		07/15/19 18:33
Surrogates								
2-Methylnaphthalene-d10 (surr)	71.1		47-106		%	1		07/15/19 18:33
Fluoranthene-d10 (surr)	70.5		24-116		%	1		07/15/19 18:33

Batch Information

Analytical Batch: XMS11522
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/15/19 18:33
Container ID: 1193674008-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11526
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/16/19 18:59
Container ID: 1193674008-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-TS19U-0719**

Client Sample ID: **SRF19-TS19U-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674008
Lab Project ID: 1193674

Collection Date: 07/05/19 16:30
Received Date: 07/09/19 16:13
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	64.2		1.00	0.310	ug/L	1		07/10/19 20:09
1,3,5-Trimethylbenzene	39.8		1.00	0.310	ug/L	1		07/10/19 20:09
Benzene	1.48		0.400	0.120	ug/L	1		07/10/19 20:09
Ethylbenzene	5.56		1.00	0.310	ug/L	1		07/10/19 20:09
Isopropylbenzene (Cumene)	11.3		1.00	0.310	ug/L	1		07/10/19 20:09
Naphthalene	11.8		1.00	0.310	ug/L	1		07/10/19 20:09
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 20:09
o-Xylene	2.20		1.00	0.310	ug/L	1		07/10/19 20:09
P & M -Xylene	8.23		2.00	0.620	ug/L	1		07/10/19 20:09
sec-Butylbenzene	4.66		1.00	0.310	ug/L	1		07/10/19 20:09
tert-Butylbenzene	1.35		1.00	0.310	ug/L	1		07/10/19 20:09
Toluene	0.357	J	1.00	0.310	ug/L	1		07/10/19 20:09
Xylenes (total)	10.4		3.00	1.00	ug/L	1		07/10/19 20:09
Surrogates								
1,2-Dichloroethane-D4 (surr)	105		81-118		%	1		07/10/19 20:09
4-Bromofluorobenzene (surr)	110		85-114		%	1		07/10/19 20:09
Toluene-d8 (surr)	97.9		89-112		%	1		07/10/19 20:09

Batch Information

Analytical Batch: VMS19147
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/10/19 20:09
Container ID: 1193674008-C

Prep Batch: VXX34411
Prep Method: SW5030B
Prep Date/Time: 07/10/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-TS19HH-0719**

Client Sample ID: **SRF19-TS19HH-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674009
Lab Project ID: 1193674

Collection Date: 07/05/19 17:15
Received Date: 07/09/19 16:13
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	0.249		0.0472	0.0142	ug/L	1		07/15/19 18:53
2-Methylnaphthalene	0.242		0.0472	0.0142	ug/L	1		07/15/19 18:53
Acenaphthene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 18:53
Acenaphthylene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 18:53
Anthracene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 18:53
Benzo(a)Anthracene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 18:53
Benzo[a]pyrene	0.00945 U		0.0189	0.00585	ug/L	1		07/15/19 18:53
Benzo[b]Fluoranthene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 18:53
Benzo[g,h,i]perylene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 18:53
Benzo[k]fluoranthene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 18:53
Chrysene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 18:53
Dibenzo[a,h]anthracene	0.00945 U		0.0189	0.00585	ug/L	1		07/15/19 18:53
Fluoranthene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 18:53
Fluorene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 18:53
Indeno[1,2,3-c,d] pyrene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 18:53
Naphthalene	0.179		0.0943	0.0292	ug/L	1		07/15/19 18:53
Phenanthrene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 18:53
Pyrene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 18:53
Surrogates								
2-Methylnaphthalene-d10 (surr)	72.3		47-106		%	1		07/15/19 18:53
Fluoranthene-d10 (surr)	72.8		24-116		%	1		07/15/19 18:53

Batch Information

Analytical Batch: XMS11522
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/15/19 18:53
Container ID: 1193674009-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-TS19HH-0719**

Client Sample ID: **SRF19-TS19HH-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674009
Lab Project ID: 1193674

Collection Date: 07/05/19 17:15
Received Date: 07/09/19 16:13
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	1.63		1.00	0.310	ug/L	1		07/10/19 20:24
1,3,5-Trimethylbenzene	4.40		1.00	0.310	ug/L	1		07/10/19 20:24
Benzene	0.257	J	0.400	0.120	ug/L	1		07/10/19 20:24
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 20:24
Isopropylbenzene (Cumene)	3.42		1.00	0.310	ug/L	1		07/10/19 20:24
Naphthalene	0.641	J	1.00	0.310	ug/L	1		07/10/19 20:24
n-Butylbenzene	0.762	J	1.00	0.310	ug/L	1		07/10/19 20:24
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/10/19 20:24
P & M -Xylene	0.628	J	2.00	0.620	ug/L	1		07/10/19 20:24
sec-Butylbenzene	2.28		1.00	0.310	ug/L	1		07/10/19 20:24
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 20:24
Toluene	0.500	U	1.00	0.310	ug/L	1		07/10/19 20:24
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/10/19 20:24
Surrogates								
1,2-Dichloroethane-D4 (surr)	98.2		81-118		%	1		07/10/19 20:24
4-Bromofluorobenzene (surr)	109		85-114		%	1		07/10/19 20:24
Toluene-d8 (surr)	96.1		89-112		%	1		07/10/19 20:24

Batch Information

Analytical Batch: VMS19147
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/10/19 20:24
Container ID: 1193674009-C

Prep Batch: VXX34411
Prep Method: SW5030B
Prep Date/Time: 07/10/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-TS19C-0719**

Client Sample ID: **SRF19-TS19C-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674010
Lab Project ID: 1193674

Collection Date: 07/06/19 08:35
Received Date: 07/09/19 16:13
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	16.9		0.189	0.0566	ug/L	4		07/16/19 19:19
2-Methylnaphthalene	19.1		0.189	0.0566	ug/L	4		07/16/19 19:19
Acenaphthene	0.158		0.0472	0.0142	ug/L	1		07/15/19 19:14
Acenaphthylene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 19:14
Anthracene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 19:14
Benzo(a)Anthracene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 19:14
Benzo[a]pyrene	0.00945 U		0.0189	0.00585	ug/L	1		07/15/19 19:14
Benzo[b]Fluoranthene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 19:14
Benzo[g,h,i]perylene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 19:14
Benzo[k]fluoranthene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 19:14
Chrysene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 19:14
Dibenzo[a,h]anthracene	0.00945 U		0.0189	0.00585	ug/L	1		07/15/19 19:14
Fluoranthene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 19:14
Fluorene	0.420		0.0472	0.0142	ug/L	1		07/15/19 19:14
Indeno[1,2,3-c,d] pyrene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 19:14
Naphthalene	16.1		0.377	0.117	ug/L	4		07/16/19 19:19
Phenanthrene	0.421		0.0472	0.0142	ug/L	1		07/15/19 19:14
Pyrene	0.0236 U		0.0472	0.0142	ug/L	1		07/15/19 19:14
Surrogates								
2-Methylnaphthalene-d10 (surr)	63.6		47-106		%	1		07/15/19 19:14
Fluoranthene-d10 (surr)	52.2		24-116		%	1		07/15/19 19:14

Batch Information

Analytical Batch: XMS11522
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/15/19 19:14
Container ID: 1193674010-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11526
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/16/19 19:19
Container ID: 1193674010-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-TS19C-0719**

Client Sample ID: **SRF19-TS19C-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674010
Lab Project ID: 1193674

Collection Date: 07/06/19 08:35
Received Date: 07/09/19 16:13
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	417		20.0	6.20	ug/L	20		07/11/19 22:35
1,3,5-Trimethylbenzene	320		20.0	6.20	ug/L	20		07/11/19 22:35
Benzene	0.247	J	0.400	0.120	ug/L	1		07/10/19 20:39
Ethylbenzene	22.1		1.00	0.310	ug/L	1		07/10/19 20:39
Isopropylbenzene (Cumene)	25.5		1.00	0.310	ug/L	1		07/10/19 20:39
Naphthalene	31.0		1.00	0.310	ug/L	1		07/10/19 20:39
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 20:39
o-Xylene	2340		20.0	6.20	ug/L	20		07/11/19 22:35
P & M -Xylene	191		40.0	12.4	ug/L	20		07/11/19 22:35
sec-Butylbenzene	3.96		1.00	0.310	ug/L	1		07/10/19 20:39
tert-Butylbenzene	5.02		1.00	0.310	ug/L	1		07/10/19 20:39
Toluene	6.16		1.00	0.310	ug/L	1		07/10/19 20:39
Xylenes (total)	2530		60.0	20.0	ug/L	20		07/11/19 22:35
Surrogates								
1,2-Dichloroethane-D4 (surr)	108		81-118		%	1		07/10/19 20:39
4-Bromofluorobenzene (surr)	106		85-114		%	1		07/10/19 20:39
Toluene-d8 (surr)	97.9		89-112		%	1		07/10/19 20:39

Batch Information

Analytical Batch: VMS19147
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/10/19 20:39
Container ID: 1193674010-C

Prep Batch: VXX34411
Prep Method: SW5030B
Prep Date/Time: 07/10/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19149
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/11/19 22:35
Container ID: 1193674010-D

Prep Batch: VXX34416
Prep Method: SW5030B
Prep Date/Time: 07/11/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-TS19D-0719**

Client Sample ID: **SRF19-TS19D-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674011
Lab Project ID: 1193674

Collection Date: 07/06/19 08:35
Received Date: 07/09/19 16:13
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	10.1		0.0525	0.0158	ug/L	1		07/15/19 19:35
2-Methylnaphthalene	12.7		0.263	0.0788	ug/L	5		07/16/19 19:40
Acenaphthene	0.0262 U		0.0525	0.0158	ug/L	1		07/15/19 19:35
Acenaphthylene	0.0262 U		0.0525	0.0158	ug/L	1		07/15/19 19:35
Anthracene	0.0262 U		0.0525	0.0158	ug/L	1		07/15/19 19:35
Benzo(a)Anthracene	0.0262 U		0.0525	0.0158	ug/L	1		07/15/19 19:35
Benzo[a]pyrene	0.0105 U		0.0210	0.00651	ug/L	1		07/15/19 19:35
Benzo[b]Fluoranthene	0.0262 U		0.0525	0.0158	ug/L	1		07/15/19 19:35
Benzo[g,h,i]perylene	0.0262 U		0.0525	0.0158	ug/L	1		07/15/19 19:35
Benzo[k]fluoranthene	0.0262 U		0.0525	0.0158	ug/L	1		07/15/19 19:35
Chrysene	0.0262 U		0.0525	0.0158	ug/L	1		07/15/19 19:35
Dibenzo[a,h]anthracene	0.0105 U		0.0210	0.00651	ug/L	1		07/15/19 19:35
Fluoranthene	0.0262 U		0.0525	0.0158	ug/L	1		07/15/19 19:35
Fluorene	0.475		0.0525	0.0158	ug/L	1		07/15/19 19:35
Indeno[1,2,3-c,d] pyrene	0.0262 U		0.0525	0.0158	ug/L	1		07/15/19 19:35
Naphthalene	28.6		0.525	0.163	ug/L	5		07/16/19 19:40
Phenanthrene	0.268		0.0525	0.0158	ug/L	1		07/15/19 19:35
Pyrene	0.0262 U		0.0525	0.0158	ug/L	1		07/15/19 19:35
Surrogates								
2-Methylnaphthalene-d10 (surr)	54.5		47-106		%	1		07/15/19 19:35
Fluoranthene-d10 (surr)	57.2		24-116		%	1		07/15/19 19:35

Batch Information

Analytical Batch: XMS11522
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/15/19 19:35
Container ID: 1193674011-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 238 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11526
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/16/19 19:40
Container ID: 1193674011-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 238 mL
Prep Extract Vol: 1 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-TS19D-0719**

Client Sample ID: **SRF19-TS19D-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674011
Lab Project ID: 1193674

Collection Date: 07/06/19 08:35
Received Date: 07/09/19 16:13
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	534		20.0	6.20	ug/L	20		07/11/19 22:50
1,3,5-Trimethylbenzene	301		20.0	6.20	ug/L	20		07/11/19 22:50
Benzene	7.86		0.400	0.120	ug/L	1		07/10/19 18:53
Ethylbenzene	190		20.0	6.20	ug/L	20		07/11/19 22:50
Isopropylbenzene (Cumene)	103		1.00	0.310	ug/L	1		07/10/19 18:53
Naphthalene	57.4		1.00	0.310	ug/L	1		07/10/19 18:53
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 18:53
o-Xylene	103		20.0	6.20	ug/L	20		07/11/19 22:50
P & M -Xylene	625		40.0	12.4	ug/L	20		07/11/19 22:50
sec-Butylbenzene	5.51		1.00	0.310	ug/L	1		07/10/19 18:53
tert-Butylbenzene	5.36		1.00	0.310	ug/L	1		07/10/19 18:53
Toluene	0.359	J	1.00	0.310	ug/L	1		07/10/19 18:53
Xylenes (total)	728		60.0	20.0	ug/L	20		07/11/19 22:50
Surrogates								
1,2-Dichloroethane-D4 (surr)	98.4		81-118		%	1		07/10/19 18:53
4-Bromofluorobenzene (surr)	105		85-114		%	1		07/10/19 18:53
Toluene-d8 (surr)	98.3		89-112		%	1		07/10/19 18:53

Batch Information

Analytical Batch: VMS19147
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/10/19 18:53
Container ID: 1193674011-C

Prep Batch: VXX34411
Prep Method: SW5030B
Prep Date/Time: 07/10/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19149
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/11/19 22:50
Container ID: 1193674011-D

Prep Batch: VXX34416
Prep Method: SW5030B
Prep Date/Time: 07/11/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF19-TS19DZ-0719**

Client Sample ID: **SRF19-TS19DZ-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674012
Lab Project ID: 1193674

Collection Date: 07/06/19 07:35
Received Date: 07/09/19 16:13
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	11.4		0.227	0.0682	ug/L	5		07/16/19 20:00
2-Methylnaphthalene	12.1		0.227	0.0682	ug/L	5		07/16/19 20:00
Acenaphthene	0.224		0.0455	0.0136	ug/L	1		07/15/19 19:55
Acenaphthylene	0.0227 U		0.0455	0.0136	ug/L	1		07/15/19 19:55
Anthracene	0.0227 U		0.0455	0.0136	ug/L	1		07/15/19 19:55
Benzo(a)Anthracene	0.0227 U		0.0455	0.0136	ug/L	1		07/15/19 19:55
Benzo[a]pyrene	0.00910 U		0.0182	0.00564	ug/L	1		07/15/19 19:55
Benzo[b]Fluoranthene	0.0227 U		0.0455	0.0136	ug/L	1		07/15/19 19:55
Benzo[g,h,i]perylene	0.0227 U		0.0455	0.0136	ug/L	1		07/15/19 19:55
Benzo[k]fluoranthene	0.0227 U		0.0455	0.0136	ug/L	1		07/15/19 19:55
Chrysene	0.0227 U		0.0455	0.0136	ug/L	1		07/15/19 19:55
Dibenzo[a,h]anthracene	0.00910 U		0.0182	0.00564	ug/L	1		07/15/19 19:55
Fluoranthene	0.0227 U		0.0455	0.0136	ug/L	1		07/15/19 19:55
Fluorene	0.473		0.0455	0.0136	ug/L	1		07/15/19 19:55
Indeno[1,2,3-c,d] pyrene	0.0227 U		0.0455	0.0136	ug/L	1		07/15/19 19:55
Naphthalene	28.5		0.455	0.141	ug/L	5		07/16/19 20:00
Phenanthrene	0.222		0.0455	0.0136	ug/L	1		07/15/19 19:55
Pyrene	0.0227 U		0.0455	0.0136	ug/L	1		07/15/19 19:55
Surrogates								
2-Methylnaphthalene-d10 (surr)	51.7		47-106		%	1		07/15/19 19:55
Fluoranthene-d10 (surr)	54.6		24-116		%	1		07/15/19 19:55

Batch Information

Analytical Batch: XMS11522
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/15/19 19:55
Container ID: 1193674012-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 275 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11526
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/16/19 20:00
Container ID: 1193674012-A

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 07/10/19 09:25
Prep Initial Wt./Vol.: 275 mL
Prep Extract Vol: 1 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Results of **SRF19-TS19DZ-0719**

Client Sample ID: **SRF19-TS19DZ-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674012
Lab Project ID: 1193674

Collection Date: 07/06/19 07:35
Received Date: 07/09/19 16:13
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	558		20.0	6.20	ug/L	20		07/11/19 23:05
1,3,5-Trimethylbenzene	318		20.0	6.20	ug/L	20		07/11/19 23:05
Benzene	8.08		0.400	0.120	ug/L	1		07/10/19 19:08
Ethylbenzene	197		20.0	6.20	ug/L	20		07/11/19 23:05
Isopropylbenzene (Cumene)	104		1.00	0.310	ug/L	1		07/10/19 19:08
Naphthalene	59.6		1.00	0.310	ug/L	1		07/10/19 19:08
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/10/19 19:08
o-Xylene	109		20.0	6.20	ug/L	20		07/11/19 23:05
P & M -Xylene	648		40.0	12.4	ug/L	20		07/11/19 23:05
sec-Butylbenzene	5.60		1.00	0.310	ug/L	1		07/10/19 19:08
tert-Butylbenzene	5.22		1.00	0.310	ug/L	1		07/10/19 19:08
Toluene	0.356	J	1.00	0.310	ug/L	1		07/10/19 19:08
Xylenes (total)	757		60.0	20.0	ug/L	20		07/11/19 23:05
Surrogates								
1,2-Dichloroethane-D4 (surr)	99.3		81-118		%	1		07/10/19 19:08
4-Bromofluorobenzene (surr)	106		85-114		%	1		07/10/19 19:08
Toluene-d8 (surr)	98.2		89-112		%	1		07/10/19 19:08

Batch Information

Analytical Batch: VMS19147
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/10/19 19:08
Container ID: 1193674012-C

Prep Batch: VXX34411
Prep Method: SW5030B
Prep Date/Time: 07/10/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19149
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/11/19 23:05
Container ID: 1193674012-E

Prep Batch: VXX34416
Prep Method: SW5030B
Prep Date/Time: 07/11/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF19-TB01-0719**

Client Sample ID: **SRF19-TB01-0719**
Client Project ID: **SRF TS1-9 2019 HAK CS GWM Prog**
Lab Sample ID: 1193674013
Lab Project ID: 1193674

Collection Date: 07/06/19 06:00
Received Date: 07/09/19 16:13
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/10/19 17:53
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/10/19 17:53
Benzene	0.200 U		0.400	0.120	ug/L	1		07/10/19 17:53
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/10/19 17:53
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/10/19 17:53
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/10/19 17:53
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/10/19 17:53
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/10/19 17:53
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/10/19 17:53
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/10/19 17:53
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/10/19 17:53
Toluene	0.500 U		1.00	0.310	ug/L	1		07/10/19 17:53
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/10/19 17:53
Surrogates								
1,2-Dichloroethane-D4 (surr)	109		81-118		%	1		07/10/19 17:53
4-Bromofluorobenzene (surr)	106		85-114		%	1		07/10/19 17:53
Toluene-d8 (surr)	96.9		89-112		%	1		07/10/19 17:53

Batch Information

Analytical Batch: VMS19147
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/10/19 17:53
Container ID: 1193674013-A

Prep Batch: VXX34411
Prep Method: SW5030B
Prep Date/Time: 07/10/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/17/2019 12:23:03PM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1796165 [VXX/34411]
Blank Lab ID: 1518065

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193674005, 1193674006, 1193674007, 1193674008, 1193674009, 1193674010, 1193674011, 1193674012, 1193674013

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	108	81-118		%
4-Bromofluorobenzene (surr)	107	85-114		%
Toluene-d8 (surr)	97.2	89-112		%

Batch Information

Analytical Batch: VMS19147
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: NRB
Analytical Date/Time: 7/10/2019 3:33:00PM

Prep Batch: VXX34411
Prep Method: SW5030B
Prep Date/Time: 7/10/2019 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1193674 [VXX34411]
Blank Spike Lab ID: 1518066
Date Analyzed: 07/10/2019 15:48

Spike Duplicate ID: LCSD for HBN 1193674 [VXX34411]
Spike Duplicate Lab ID: 1518067
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193674005, 1193674006, 1193674007, 1193674008, 1193674009, 1193674010, 1193674011, 1193674012, 1193674013

Results by **SW8260C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	30.1	100	30	29.6	99	(79-124)	1.60	(< 20)
1,3,5-Trimethylbenzene	30	29.4	98	30	29.1	97	(75-124)	1.00	(< 20)
Benzene	30	27.0	90	30	26.7	89	(79-120)	1.10	(< 20)
Ethylbenzene	30	26.7	89	30	26.6	89	(79-121)	0.50	(< 20)
Isopropylbenzene (Cumene)	30	27.2	91	30	26.5	89	(72-131)	2.60	(< 20)
Naphthalene	30	26.8	89	30	27.8	93	(61-128)	3.70	(< 20)
n-Butylbenzene	30	29.2	97	30	28.6	95	(75-128)	2.20	(< 20)
o-Xylene	30	27.4	92	30	26.8	90	(78-122)	2.20	(< 20)
P & M -Xylene	60	53.7	89	60	52.4	87	(80-121)	2.50	(< 20)
sec-Butylbenzene	30	28.8	96	30	27.7	92	(77-126)	3.90	(< 20)
tert-Butylbenzene	30	28.8	96	30	28.5	95	(78-124)	1.00	(< 20)
Toluene	30	25.1	84	30	24.3	81	(80-121)	3.40	(< 20)
Xylenes (total)	90	81.1	90	90	79.2	88	(79-121)	2.40	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	100	100	30	102	102	(81-118)	2.20	
4-Bromofluorobenzene (surr)	30	107	107	30	108	108	(85-114)	0.40	
Toluene-d8 (surr)	30	97.4	97	30	95.8	96	(89-112)	1.60	

Batch Information

Analytical Batch: **VMS19147**
Analytical Method: **SW8260C**
Instrument: **Agilent 7890-75MS**
Analyst: **NRB**

Prep Batch: **VXX34411**
Prep Method: **SW5030B**
Prep Date/Time: **07/10/2019 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
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Member of SGS Group

Method Blank

Blank ID: MB for HBN 1796559 [VXX/34416]
Blank Lab ID: 1810337

Matrix: Water (Surface2Eff.2Ground)

QC for Samples:
1193674, , 821193674, 1, 21193674, 1121193674, 15

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,2,4-Trimethylbenzene	, .8, , U	1., ,	, .31,	ug/L
1,3,5-Trimethylbenzene	, .8, , U	1., ,	, .31,	ug/L
Ethylbenzene	, .8, , U	1., ,	, .31,	ug/L
Naphthalene	, .8, , U	1., ,	, .31,	ug/L
o-Xylene	, .8, , U	1., ,	, .31,	ug/L
P & M -Xylene	1., , U	5., ,	, .65,	ug/L
Xylenes (total)	1.8, U	3., ,	1., ,	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	1, 1	01-110		%
4-Bromofluorobenzene (surr)	1, 5	08-114		%
Toluene-d0 (surr)	98.6	09-115		%

Batch Information

Analytical Batch: VMS19149
Analytical Method: SW056, C
Instrument: VPA 70, /8978 GC/MS
Analyst: NRB
Analytical Date/Time: 7/11/5, 19 3:40:, , PM

Prep Batch: VXX34416
Prep Method: SW8, 3, B
Prep Date/Time: 7/11/5, 19 6:, , :, , AM
Prep Initial Wt./Vol.: 8 mL
Prep Extract Vol: 8 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1193674 [VXX34416]
Blank Spike Lab ID: 1518338
Date t nalAyez: d7/11/2d19 16:18

Spike Duplicate ID: LCSD for HBN 1193674 [VXX34416]
Spike Duplicate Lab ID: 1518339
Matrix: Water (Surface, Eff., Grounz)

QC for Samples: 1193674dd5, 1193674d1d, 1193674d11, 1193674d12

Results by SW8260C

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenyene	3d	27.6	92	3d	26.4	88	(79-124)	4.2d	(< 2d)
1,3,5-Trimethylbenyene	3d	27.7	92	3d	26.5	88	(75-124)	4.4d	(< 2d)
Ethylbenyene	3d	27.2	91	3d	25.4	85	(79-121)	6.6d	(< 2d)
Naphthalene	3d	28.4	95	3d	28.1	94	(61-128)	d.96	(< 2d)
o-Xylene	3d	27.1	9d	3d	25.3	84	(78-122)	6.7d	(< 2d)
P & M -Xylene	6d	54.4	91	6d	51.4	86	(8d-121)	5.6d	(< 2d)
Xylenes (total)	9d	81.4	91	9d	76.7	85	(79-121)	6.dd	(< 2d)
Surrogates									
1,2-Dichloroethane-D4 (surr)	3d	95.7	96	3d	95.1	95	(81-118)	d.67	
4-Bromofluorobenyene (surr)	3d	1dd	1dd	3d	1dd	1dd	(85-114)	d.d5	
Toluene-z8 (surr)	3d	97.8	98	3d	97.3	97	(89-112)	d.44	

Batch Information

Analytical Batch: **VMS19149**
Analytical Method: **SW8260C**
Instrument: **VPA 780/5975 GC/MS**
Analyst: **NRB**

Prep Batch: **VXX34416**
Prep Method: **SW5030B**
Prep Date/Time: **07/11/2019 06:00**
Spike Init Wt./Vol.: 3d ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 3d ug/L Extract Vol: 5 mL

Print Date: d7/17/2d19 12:23:1dPM

Method Blank

Blank ID: MB for HBN 17965[1 VX/ / 35445] L
Blank ba8 ID: 101Q741

Matrix: Watsr (murfacs2Eff.2Ground)

CS for map els, :
1195674]] 121195674]] [

Rs, ult, 8y **SW8260C**

Parap stsr	Rs, ult,	bOC3Sb	Db	Unit,
12[24-Trip sthyl8snzsns	] .0]] U	1.]]	] .51]	ug3b
1252Q-Trip sthyl8snzsns	] .0]] U	1.]]	] .51]	ug3b
Bsnzsns	] .[ ]] U	] .4]]	] .1[ ]	ug3b
Ethyl8snzsns	] .0]] U	1.]]	] .51]	ug3b
I, oeroeyl8snzsns (Sup sns)	] .0]] U	1.]]	] .51]	ug3b
Naehthalsns	] .0]] U	1.]]	] .51]	ug3b
n-Butyl8snzsns	] .0]] U	1.]]	] .51]	ug3b
o-/ ylsns	] .0]] U	1.]]	] .51]	ug3b
P & M -/ ylsns	1.]] U	[.]]	] .6[ ]	ug3b
, sc-Butyl8snzsns	] .0]] U	1.]]	] .51]	ug3b
tsrt-Butyl8snzsns	] .0]] U	1.]]	] .51]	ug3b
Tolusns	] .0]] U	1.]]	] .51]	ug3b
/ ylsns, (total)	1.0] U	5.]]	1.]]	ug3b
Surrogates				
12[-Dichlorosthans-D4 (, urr)	1] Q	Q1-11Q		%
4-Brop ofluoro8snzsns (, urr)	11]	Q0-114		%
Tolusns-dQ(, urr)	97.6	Q9-11[		%

Batch Information

Analytical Batch: XMm1916]
Analytical Msthod: mWQ[6] S
In, trup snt: Agilsnt 7Q9] -70Mm
Analy, t: NRB
Analytical Dats3Tip s: 73143[ ] 19 0:45:]] AM

Prse Batch: X/ / 5445]
Prse Msthod: mW0] 5] B
Prse Dats3Tip s: 73143[ ] 19 1[:5] :]] AM
Prse Initial Wt.3Xol.: 0 p b
Prse Extract Xol: 0 p b

Print Dats:] 73173[ ] 19 1[:[5:1[PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1193674 [VXX3443] b
Blank Spike La5 ID: 181074t
DaAe y nalzde/ :] 72l142] 19] 8:80

Spike DuplicaAe ID: LCSD for HBN 1193674 [VXX3443] b
Spike DuplicaAe La5 ID: 1810743
MaAix: WaAer (Surface, Eff., Groun/)

QC for Samples: 1193674]] 1, 1193674]] t

ResulAs 5z **SW8260C**

	Blank Spike (ug2L)			Spike DuplicaAe (ug2L)					
ParameAer	Spike	ResulA	Rec (%)	Spike	ResulA	Rec (%)	CL	RPD (%)	RPD CL
1,t ,4-TrimeAnzl5endene	3]	3t .]	1] 7	3]	3t .4	1] 0	(79-1t 4)	1.3]	(< t])
1,3,8-TrimeAnzl5endene	3]	3t .3	1] 0	3]	3t .1	1] 7	(78-1t 4)	] .88	(< t])
Bendene	3]	t 0.0	96	3]	t 0.4	98	(79-1t])	1.3]	(< t])
EAnzl5endene	3]	t 0.4	98	3]	t 0.t	94	(79-1t 1)	] .80	(< t])
Isopropzl5endene (Cumene)	3]	t 9.6	99	3]	t 0.9	96	(7t -131)	t .3]	(< t])
NaphAnalene	3]	t 7.3	91	3]	t 9.t	97	(61-1t 0)	6.9]	(< t])
n-BuAzl5endene	3]	3t .8	1] 0	3]	3t .9	11]	(78-1t 0)	1.1]	(< t])
o-Xzlene	3]	t 0.7	96	3]	t 0.t	94	(70-1tt)	t .]]	(< t])
P & M -Xzlene	6]	86.8	94	6]	86.1	93	(0] -1t 1)	] .78	(< t])
sec-BuAzl5endene	3]	31.9	1] 6	3]	3t .8	1] 0	(77-1t 6)	1.7]	(< t])
AerABuAzl5endene	3]	31.7	1] 6	3]	3t .4	1] 0	(70-1t 4)	t .3]	(< t])
Toluene	3]	t 6.6	09	3]	t 6.4	00	(0] -1t 1)	] .04	(< t])
Xzlenes (AoAal)	9]	08.t	98	9]	04.t	94	(79-1t 1)	1.t]	(< t])
Surrogates									
1,t -DichloroeAnane-D4 (surr)	3]	1] 1	1] 1	3]	1]]	1]]	(01-110)	] .t 6	
4-Bromofluoro5endene (surr)	3]	111	111	3]	11t	11t	(08-114)	1.t]	
Toluene-/ 0 (surr)	3]	98.6	96	3]	96.8	97	(09-11t)	] .09	

Batch Information

y nalzAcal BaAch: **VMS19160**
y nalzAcal MeAno/ : **SW8260C**
InsAumenA **4 gilent 7890A7- MS**
y nalzsA **5 NB**

Prep BaAch: **VRRX33X0**
Prep MeAno/ : **SW- 0X0B**
Prep DaAe2Time: **07/13/2019 00:X0**
Spike IniAWA2Vol.: 3] ug2L ExAracAVol: 8 mL
Dupe IniAWA2Vol.: 3] ug2L ExAracAVol: 8 mL

Billable Matrix Spike Summary

Original Sample ID: 1193674002
MS Sample ID: 1193674003 BMS
MSD Sample ID: 1193674004 BMSD

Analysis Date: 07/14/2019 9:15
Analysis Date: 07/14/2019 6:58
Analysis Date: 07/14/2019 7:14
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by **SW8260C**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	0.500U	30.0	34.1	114	30.0	33.0	110	79-124	3.20	(< 20)
1,3,5-Trimethylbenzene	0.500U	30.0	34.5	115	30.0	33.1	110	75-124	4.10	(< 20)
Benzene	0.200U	30.0	30.7	102	30.0	30.7	102	79-120	0.24	(< 20)
Ethylbenzene	0.500U	30.0	29.9	100	30.0	29.4	98	79-121	1.90	(< 20)
Isopropylbenzene (Cumene)	0.500U	30.0	30.7	102	30.0	30.6	102	72-131	0.43	(< 20)
Naphthalene	0.500U	30.0	32	107	30.0	30.3	101	61-128	5.50	(< 20)
n-Butylbenzene	0.500U	30.0	35.1	117	30.0	33.9	113	75-128	3.30	(< 20)
o-Xylene	0.500U	30.0	29.7	99	30.0	28.9	96	78-122	3.00	(< 20)
P & M -Xylene	1.00U	60.0	58.7	98	60.0	56.6	94	80-121	3.70	(< 20)
sec-Butylbenzene	0.500U	30.0	34.1	114	30.0	32.9	110	77-126	3.50	(< 20)
tert-Butylbenzene	0.500U	30.0	34.4	115	30.0	32.7	109	78-124	5.10	(< 20)
Toluene	0.500U	30.0	27.8	93	30.0	27.4	92	80-121	1.30	(< 20)
Xylenes (total)	1.50U	90.0	88.5	98	90.0	85.5	95	79-121	3.40	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		30.0	29.8	99	30.0	30.2	101	81-118	1.50	
4-Bromofluorobenzene (surr)		30.0	34.2	114	30.0	32.9	110	85-114	4.00	
Toluene-d8 (surr)		30.0	29.3	98	30.0	28.7	96	89-112	2.20	

Batch Information

Analytical Batch: VMS19160
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: NRB
Analytical Date/Time: 7/14/2019 6:58:00AM

Prep Batch: VXX34430
Prep Method: Volatiles Extraction 8240/8260 FULL
Prep Date/Time: 7/14/2019 12:30:00AM
Prep Initial Wt./Vol.: 5.00mL
Prep Extract Vol: 5.00mL

Print Date: 07/17/2019 12:23:14PM

Method Blank

Blank ID: MB for HBN 1796039 [XXX/41732]
Blank Lab ID: 1517541

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193674001, 1193674002, 1193674005, 1193674006, 1193674007, 1193674008, 1193674009, 1193674010, 1193674011, 1193674012

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)	54.8	47-106		%
Fluoranthene-d10 (surr)	59.5	24-116		%

Batch Information

Analytical Batch: XMS11522
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/15/2019 11:41:00AM

Prep Batch: XXX41732
Prep Method: SW3520C
Prep Date/Time: 7/10/2019 9:25:35AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193674 [XXX41732]
Blank Spike Lab ID: 1517542
Date Analyzed: 07/15/2019 12:01

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193674001, 1193674002, 1193674005, 1193674006, 1193674007, 1193674008, 1193674009, 1193674010, 1193674011, 1193674012

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

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	2	1.62	81	(41-115)
2-Methylnaphthalene	2	1.57	78	(39-114)
Acenaphthene	2	1.66	83	(48-114)
Acenaphthylene	2	1.76	88	(35-121)
Anthracene	2	1.82	91	(53-119)
Benzo(a)Anthracene	2	1.68	84	(59-120)
Benzo[a]pyrene	2	1.68	84	(53-120)
Benzo[b]Fluoranthene	2	1.73	87	(53-126)
Benzo[g,h,i]perylene	2	1.57	79	(44-128)
Benzo[k]fluoranthene	2	1.70	85	(54-125)
Chrysene	2	1.71	86	(57-120)
Dibenzo[a,h]anthracene	2	1.44	72	(44-131)
Fluoranthene	2	1.75	88	(58-120)
Fluorene	2	1.77	88	(50-118)
Indeno[1,2,3-c,d] pyrene	2	1.73	86	(48-130)
Naphthalene	2	1.64	82	(43-114)
Phenanthrene	2	1.75	88	(53-115)
Pyrene	2	1.82	91	(53-121)
Surrogates				
2-Methylnaphthalene-d10 (surr)	2	69.4	69	(47-106)
Fluoranthene-d10 (surr)	2	76	76	(24-116)

Batch Information

Analytical Batch: **XMS11522**
Analytical Method: **8270D SIM LV (PAH)**
Instrument: **Agilent GC 7890B/5977A SWA**
Analyst: **DSD**

Prep Batch: **XXX41732**
Prep Method: **SW3520C**
Prep Date/Time: **07/10/2019 09:25**
Spike Init Wt./Vol.: 2 ug/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: Extract Vol:

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Billable Matrix Spike Summary

Original Sample ID: 1193674002
MS Sample ID: 1193674003 BMS
MSD Sample ID: 1193674004 BMSD

Analysis Date: 07/15/2019 16:29
Analysis Date: 07/15/2019 16:50
Analysis Date: 07/15/2019 17:10
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

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	0.0236U	1.96	1.43	73	2.08	1.61	77	41-115	12.00	(< 20)
2-Methylnaphthalene	0.0236U	1.96	1.4	72	2.08	1.57	75	39-114	11.00	(< 20)
Acenaphthene	0.0236U	1.96	1.44	73	2.08	1.67	80	48-114	14.80	(< 20)
Acenaphthylene	0.0236U	1.96	1.54	79	2.08	1.76	85	35-121	13.20	(< 20)
Anthracene	0.0236U	1.96	1.6	82	2.08	1.79	86	53-119	11.50	(< 20)
Benzo(a)Anthracene	0.0236U	1.96	1.4	71	2.08	1.60	77	59-120	13.50	(< 20)
Benzo[a]pyrene	0.00945U	1.96	1.28	65	2.08	1.52	73	53-120	17.60	(< 20)
Benzo[b]Fluoranthene	0.0236U	1.96	1.32	68	2.08	1.56	75	53-126	16.10	(< 20)
Benzo[g,h,i]perylene	0.0236U	1.96	.999	51	2.08	1.27	61	44-128	24.10	* (< 20)
Benzo[k]fluoranthene	0.0236U	1.96	1.26	64	2.08	1.52	73	54-125	18.50	(< 20)
Chrysene	0.0236U	1.96	1.41	72	2.08	1.63	78	57-120	14.60	(< 20)
Dibenzo[a,h]anthracene	0.00945U	1.96	.885	45	2.08	1.17	56	44-131	27.50	* (< 20)
Fluoranthene	0.0236U	1.96	1.56	80	2.08	1.72	83	58-120	9.80	(< 20)
Fluorene	0.0236U	1.96	1.55	79	2.08	1.77	85	50-118	13.20	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0236U	1.96	1.14	58	2.08	1.41	68	48-130	21.10	* (< 20)
Naphthalene	0.0471U	1.96	1.46	75	2.08	1.64	79	43-114	11.30	(< 20)
Phenanthrene	0.0236U	1.96	1.52	78	2.08	1.72	83	53-115	12.20	(< 20)
Pyrene	0.0236U	1.96	1.61	82	2.08	1.79	86	53-121	10.60	(< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		1.96	1.34	69	2.08	1.51	73	47-106	12.00	
Fluoranthene-d10 (surr)		1.96	1.4	71	2.08	1.58	76	24-116	12.30	

Batch Information

Analytical Batch: XMS11522
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/15/2019 4:50:00PM

Prep Batch: XXX41732
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/10/2019 9:25:35AM
Prep Initial Wt./Vol.: 255.00mL
Prep Extract Vol: 1.00mL

Print Date: 07/17/2019 12:23:18PM

SGS

CH 1193674

Locations Nationwide
Alaska Maryland
New Jersey New York
North Carolina Indiana
West Virginia Kentucky
www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Section 1

CLIENT: Brice Environmental
CONTACT: Kmi Lloyd PHONE NO: 907-317-7999
PROJECT NAME: 2019 HAKCS GWM Program PROJECT/ PWSID/ PERMIT#: SRF FS19
REPORTS TO: Kelly Carson E-MAIL: kcarson@briceenvironmental.com
INVOICE TO: Milcorp AK QUOTE #: P.O. #: 1952573

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: HCl	Preservative: –	REMARKS/ LOC ID
1 AE	SRF19-FS19I-0719	7/5/19	0750	GW	5	G	VOC-AKpetrolist SW8260C	PAH SW8270D SIM	
2-6 AE	SRF19-FS19M-0719	7/5/19	0810	GW	15	G			MS/MSD
5 AE	SRF19-FS19D-0719	7/5/19	1015	GW	5	G			
6 AE	SRF19-FS19NZ-0719	7/5/19	0935	GW	5	G			
7 AE	SRF19-FS19N-0719	7/5/19	1035	GW	5	G			
8 AE	SRF19-FS19U-0719	7/5/19	1630	GW	5	G			closed w/o headspace, bubbles develop
9 AE	SRF19-TS19MH-0719	7/5/19	1715	GW	5	G			
10 AE	SRF19-TS19C-0719	7/6/19	0835	GW	5	G			
11 AE	SRF19-TS19D-0719	7/6/19	0835	GW	5	G			Hot
12 AE	SRF19-TS19DZ-0719	7/6/19	0835	GW	5	G			Hot

Section 5

	Date	Time	
Relinquished By: (1)	7/9	1613	Received By:
Relinquished By: (2)			Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	07/09/19	16:13	Received For Laboratory By: AMG

Section 4

DOD Project? Yes (No)
Cooler ID: Mars

Data Deliverable Requirements: Level II

Requested Turnaround Time and/or Special Instructions:

Profile: 341882 JKJ 7/9/19

Temp Blank °C: 5.9° D23
or Ambient [ ]
(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)
INTACT BROKEN (ABSENT)
(See attached Sample Receipt Form)

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms-and-conditions

SGS

CH 1193674

Locations Nationwide
Alaska Maryland
New Jersey New York
North Carolina Indiana
West Virgina Kentucky
www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out.
Omissions may delay the onset of analysis.

Section 1

CLIENT: Brice Environmental

CONTACT: Kimi Lloyd PHONE NO: 907-317-7999

PROJECT NAME: 2019 HAKCS CwM Program PROJECT/ PWSID/ PERMIT#: SRF ~~Electric~~ AS TS 1-9

REPORTS TO: Kelly Carson E-MAIL: kcarson@briceenvironmental.com

INVOICE TO: Hilcorp Alaska QUOTE #: P.O. #: 1952573

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	Section 3 # CONTAINERS	Section 3 Type C = COMP G = GRAB MI = Multi Incre-mental Soils	Preservative: VOC-AK Petroleum 5W826	Preservative: HCl	REMARKS/ LOC ID
(13) AC	SRF19-TB01-0719	7/5/19	~~0600~~ 0800 AK	-	3	-	X		

Section 4

DOD Project? Yes (No)

Cooler ID: Mars

Data Deliverable Requirements: Level II

Requested Turnaround Time and/or Special Instructions:

Section 5

Relinquished By:	Date	Time	Received By:
(1)	7/9	1613	
(2)			
(3)			
(4)	07/09/19	16:13	Alexander Gyr AMG

Temp Blank °C: 5.9°C 0.1?

or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) AMD

INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms-and-conditions

F083-Kit_Request_and_COC_Templates-Blank
Revised 2013-03-24

e-Sample Receipt Form

SGS Workorder #: **1193674**

1 1 9 3 6 7 4

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements	Yes	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	HD
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?		
**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: Mars @ 5.9 °C Therm. ID: D23
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
		***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	Container Id	Preservative	Container Condition
1193674001-A	No Preservative Required	OK			
1193674001-B	No Preservative Required	OK			
1193674001-C	HCL to pH < 2	OK			
1193674001-D	HCL to pH < 2	OK			
1193674001-E	HCL to pH < 2	OK			
1193674002-A	No Preservative Required	OK			
1193674002-B	No Preservative Required	OK			
1193674002-C	HCL to pH < 2	OK			
1193674002-D	HCL to pH < 2	OK			
1193674002-E	HCL to pH < 2	OK			
1193674003-A	No Preservative Required	OK			
1193674003-B	No Preservative Required	OK			
1193674003-C	HCL to pH < 2	OK			
1193674003-D	HCL to pH < 2	OK			
1193674003-E	HCL to pH < 2	OK			
1193674004-A	No Preservative Required	OK			
1193674004-B	No Preservative Required	OK			
1193674004-C	HCL to pH < 2	OK			
1193674004-D	HCL to pH < 2	OK			
1193674004-E	HCL to pH < 2	OK			
1193674005-A	No Preservative Required	OK			
1193674005-B	No Preservative Required	OK			
1193674005-C	HCL to pH < 2	OK			
1193674005-D	HCL to pH < 2	OK			
1193674005-E	HCL to pH < 2	OK			
1193674006-A	No Preservative Required	OK			
1193674006-B	No Preservative Required	OK			
1193674006-C	HCL to pH < 2	OK			
1193674006-D	HCL to pH < 2	OK			
1193674006-E	HCL to pH < 2	OK			
1193674007-A	No Preservative Required	OK			
1193674007-B	No Preservative Required	OK			
1193674007-C	HCL to pH < 2	OK			
1193674007-D	HCL to pH < 2	OK			
1193674007-E	HCL to pH < 2	OK			
1193674008-A	No Preservative Required	OK			
1193674008-B	No Preservative Required	OK			
1193674008-C	HCL to pH < 2	OK			
1193674008-D	HCL to pH < 2	OK			
1193674008-E	HCL to pH < 2	OK			
1193674009-A	No Preservative Required	OK			
1193674009-B	No Preservative Required	OK			
1193674009-C	HCL to pH < 2	OK			
1193674009-D	HCL to pH < 2	OK			
1193674009-E	HCL to pH < 2	OK			
1193674010-A	No Preservative Required	OK			
1193674010-B	No Preservative Required	OK			
1193674010-C	HCL to pH < 2	OK			

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1193674010-D	HCL to pH < 2	OK			
1193674010-E	HCL to pH < 2	OK			
1193674011-A	No Preservative Required	OK			
1193674011-B	No Preservative Required	OK			
1193674011-C	HCL to pH < 2	OK			
1193674011-D	HCL to pH < 2	OK			
1193674011-E	HCL to pH < 2	OK			
1193674012-A	No Preservative Required	OK			
1193674012-B	No Preservative Required	OK			
1193674012-C	HCL to pH < 2	OK			
1193674012-D	HCL to pH < 2	OK			
1193674012-E	HCL to pH < 2	OK			
1193674013-A	HCL to pH < 2	OK			
1193674013-B	HCL to pH < 2	OK			
1193674013-C	HCL to pH < 2	OK			

Container Condition Glossary

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

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

Laboratory Report of Analysis

To: Hilcorp Alaska, LLC
3800 Centerpoint Dr. Suite 400
Anchorage, AK 99503
(907)277-7297

Report Number: **1193793**

Client Project: **SRF TS1-27 2019 HAKCS GWM Prog**

Dear Kelly Carson,

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 Justin 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.

Justin Nelson
2019.10.25
10:01:01 -08'00'

Justin Nelson Date
Project Manager
Justin.Nelson@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

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Case Narrative

SGS Client: **Hilcorp Alaska, LLC**
SGS Project: **1193793**
Project Name/Site: **SRF TS1-27 2019 HAKCS GWM Prog**
Project Contact: **Kelly Carson**

Refer to sample receipt form for information on sample condition.

SRF127-TS127G-0719 MS (1193793003) BMS

8260C - BMS recovery for several analytes does not meet QC criteria. See LCS for accuracy requirements.
8270D SIM - PAH BMS recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

SRF127-TS127G-0719 MSD (1193793004) BMSD

8260C - BMSD recovery for several analytes does not meet QC criteria. See LCS for accuracy requirements.
8270D SIM - PAH BMSD recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

LCSD for HBN 1796517 [VXX/3445 (1519627) LCSD

8260C - Surrogate recovery for 4-bromofluorobenzene does not meet QC criteria.

1193788001MS (1518727) MS

8270D SIM - PAH MS recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

1193792004MS (1518948) MS

8270D SIM - PAH MS recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

1193788001MSD (1518728) MSD

8270D SIM - PAH MSD recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.
8270D SIM - PAH MS/MSD RPD for several analytes do not meet QC criteria. Results for this analyte are considered estimated in the parent sample.

1193792004MSD (1518949) MSD

8270D SIM - PAH MSD recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

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

SGS North America Inc.
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t 907.562.2343 f 907.561.5301 www.us.sgs.com

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Report of Manual Integrations

Laboratory ID	Client Sample ID	Analytical Batch	Analyte	Reason
SW8260C				
1193793006	SRF127-TS127KZ-0719	VMS19171	n-Butylbenzene	SP
1193793008	SRF127-TS127M-0719	VMS19171	n-Butylbenzene	SP

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Print Date: 10/25/2019 9:09:17AM

Laboratory Qualifiers

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

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

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

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

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
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
SRF127-FS127C-0719	1193793001	07/10/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF127-TS127G-0719	1193793002	07/10/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF127-TS127G-0719 MS	1193793003	07/10/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF127-TS127G-0719 MSD	1193793004	07/10/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF127-TS127K-0719	1193793005	07/10/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF127-TS127KZ-0719	1193793006	07/10/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF127-TS127L-0719	1193793007	07/10/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF127-TS127M-0719	1193793008	07/10/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF127-TB01-0719	1193793009	07/10/2019	07/15/2019	Water (Surface, Eff., Ground)

Method	Method Description
SW8260C	8021B by 8260 (W)
8270D SIM LV (PAH)	8270 PAH SIM GC/MS Liq/Liq ext. LV

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Detectable Results Summary

Client Sample ID: **SRF127-TS127G-0719**
Lab Sample ID: 1193793002

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	0.457	ug/L
	2-Methylnaphthalene	0.181	ug/L
	Naphthalene	7.29	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	60.6	ug/L
	1,3,5-Trimethylbenzene	19.6	ug/L
	Benzene	9.24	ug/L
	Ethylbenzene	23.2	ug/L
	Isopropylbenzene (Cumene)	21.9	ug/L
	Naphthalene	9.94	ug/L
	o-Xylene	0.336J	ug/L
	P & M -Xylene	264	ug/L
	sec-Butylbenzene	2.64	ug/L
	tert-Butylbenzene	0.714J	ug/L
	Xylenes (total)	265	ug/L

Client Sample ID: **SRF127-TS127K-0719**
Lab Sample ID: 1193793005

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	58.0	ug/L
	2-Methylnaphthalene	60.9	ug/L
	Acenaphthene	0.106	ug/L
	Fluorene	0.120	ug/L
	Naphthalene	170	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	1190	ug/L
	1,3,5-Trimethylbenzene	362	ug/L
	Benzene	36.6	ug/L
	Ethylbenzene	664	ug/L
	Isopropylbenzene (Cumene)	290	ug/L
	Naphthalene	272	ug/L
	n-Butylbenzene	41.5	ug/L
	o-Xylene	1.29	ug/L
	P & M -Xylene	2420	ug/L
	sec-Butylbenzene	90.1	ug/L
	tert-Butylbenzene	15.1	ug/L
	Xylenes (total)	2420	ug/L

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Detectable Results Summary

Client Sample ID: **SRF127-TS127KZ-0719**
Lab Sample ID: 1193793006

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	56.5	ug/L
	2-Methylnaphthalene	60.0	ug/L
	Acenaphthene	0.109	ug/L
	Acenaphthylene	0.105	ug/L
	Fluorene	0.123	ug/L
	Naphthalene	172	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	1320	ug/L
	1,3,5-Trimethylbenzene	394	ug/L
	Benzene	35.7	ug/L
	Ethylbenzene	704	ug/L
	Isopropylbenzene (Cumene)	311	ug/L
	Naphthalene	301	ug/L
	n-Butylbenzene	38.8	ug/L
	o-Xylene	1.24	ug/L
	P & M -Xylene	2590	ug/L
	sec-Butylbenzene	90.7	ug/L
	tert-Butylbenzene	14.8	ug/L
	Xylenes (total)	2590	ug/L

Client Sample ID: **SRF127-TS127L-0719**
Lab Sample ID: 1193793007

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	0.358	ug/L
	2-Methylnaphthalene	0.248	ug/L
	Naphthalene	1.64	ug/L
Volatile GC/MS	Ethylbenzene	0.670J	ug/L
	Isopropylbenzene (Cumene)	2.27	ug/L
	Naphthalene	2.47	ug/L
	sec-Butylbenzene	1.70	ug/L
	tert-Butylbenzene	0.390J	ug/L

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Detectable Results Summary

Client Sample ID: **SRF127-TS127M-0719**
Lab Sample ID: 1193793008

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	15.4	ug/L
	2-Methylnaphthalene	15.3	ug/L
	Acenaphthene	0.169	ug/L
	Anthracene	0.0265J	ug/L
	Fluorene	0.424	ug/L
	Naphthalene	26.1	ug/L
	Phenanthrene	0.429	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	343	ug/L
	1,3,5-Trimethylbenzene	99.4	ug/L
	Benzene	3.85	ug/L
	Ethylbenzene	41.4	ug/L
	Isopropylbenzene (Cumene)	53.6	ug/L
	Naphthalene	64.9	ug/L
	n-Butylbenzene	1.24	ug/L
	P & M -Xylene	180	ug/L
	sec-Butylbenzene	4.60	ug/L
	tert-Butylbenzene	1.31	ug/L
	Toluene	0.330J	ug/L
	Xylenes (total)	180	ug/L

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Results of **SRF127-FS127C-0719**

Client Sample ID: **SRF127-FS127C-0719**
Client Project ID: **SRF TS1-27 2019 HAKCS GWM Prog**
Lab Sample ID: 1193793001

Collection Date: 07/10/19 16:10
Received Date: 07/15/19 16:39
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	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
2-Methylnaphthalene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Acenaphthene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Acenaphthylene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Anthracene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Benzo(a)Anthracene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Benzo[a]pyrene	0.0105	U	0.0210	0.00651	ug/L	1		07/19/19 14:49
Benzo[b]Fluoranthene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Benzo[g,h,i]perylene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Benzo[k]fluoranthene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Chrysene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Dibenzo[a,h]anthracene	0.0105	U	0.0210	0.00651	ug/L	1		07/19/19 14:49
Fluoranthene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Fluorene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Indeno[1,2,3-c,d] pyrene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Naphthalene	0.0525	U	0.105	0.0326	ug/L	1		07/19/19 14:49
Phenanthrene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Pyrene	0.0262	U	0.0525	0.0158	ug/L	1		07/19/19 14:49
Surrogates								
2-Methylnaphthalene-d10 (surr)	66.1		47-106		%	1		07/19/19 14:49
Fluoranthene-d10 (surr)	78.7		24-116		%	1		07/19/19 14:49

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/19/19 14:49
Container ID: 1193793001-A

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 07/16/19 11:03
Prep Initial Wt./Vol.: 238 mL
Prep Extract Vol: 1 mL

Print Date: 10/25/2019 9:09:23AM

J flagging is activated

Results of **SRF127-FS127C-0719**

Client Sample ID: **SRF127-FS127C-0719**
Client Project ID: **SRF TS1-27 2019 HAKCS GWM Prog**
Lab Sample ID: 1193793001

Collection Date: 07/10/19 16:10
Received Date: 07/15/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 19:06
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 19:06
Benzene	0.200 U		0.400	0.120	ug/L	1		07/16/19 19:34
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 19:06
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/15/19 19:06
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:34
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 19:06
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/15/19 19:06
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/15/19 19:06
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 19:06
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 19:06
Toluene	0.500 U		1.00	0.310	ug/L	1		07/15/19 19:06
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/15/19 19:06
Surrogates								
1,2-Dichloroethane-D4 (surr)	104		81-118		%	1		07/15/19 19:06
4-Bromofluorobenzene (surr)	110		85-114		%	1		07/15/19 19:06
Toluene-d8 (surr)	96.1		89-112		%	1		07/15/19 19:06

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 19:06
Container ID: 1193793001-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19175
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/16/19 19:34
Container ID: 1193793001-E

Prep Batch: VXX34455
Prep Method: SW5030B
Prep Date/Time: 07/16/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/25/2019 9:09:23AM

J flagging is activated

Results of **SRF127-TS127G-0719**

Client Sample ID: **SRF127-TS127G-0719**
Client Project ID: **SRF TS1-27 2019 HAKCS GWM Prog**
Lab Sample ID: 1193793002

Collection Date: 07/10/19 12:10
Received Date: 07/15/19 16:39
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	0.457		0.0534	0.0160	ug/L	1		07/19/19 15:09
2-Methylnaphthalene	0.181		0.0534	0.0160	ug/L	1		07/19/19 15:09
Acenaphthene	0.0267 U		0.0534	0.0160	ug/L	1		07/19/19 15:09
Acenaphthylene	0.0267 U		0.0534	0.0160	ug/L	1		07/19/19 15:09
Anthracene	0.0267 U		0.0534	0.0160	ug/L	1		07/19/19 15:09
Benzo(a)Anthracene	0.0267 U		0.0534	0.0160	ug/L	1		07/19/19 15:09
Benzo[a]pyrene	0.0107 U		0.0214	0.00662	ug/L	1		07/19/19 15:09
Benzo[b]Fluoranthene	0.0267 U		0.0534	0.0160	ug/L	1		07/19/19 15:09
Benzo[g,h,i]perylene	0.0267 U		0.0534	0.0160	ug/L	1		07/19/19 15:09
Benzo[k]fluoranthene	0.0267 U		0.0534	0.0160	ug/L	1		07/19/19 15:09
Chrysene	0.0267 U		0.0534	0.0160	ug/L	1		07/19/19 15:09
Dibenzo[a,h]anthracene	0.0107 U		0.0214	0.00662	ug/L	1		07/19/19 15:09
Fluoranthene	0.0267 U		0.0534	0.0160	ug/L	1		07/19/19 15:09
Fluorene	0.0267 U		0.0534	0.0160	ug/L	1		07/19/19 15:09
Indeno[1,2,3-c,d] pyrene	0.0267 U		0.0534	0.0160	ug/L	1		07/19/19 15:09
Naphthalene	7.29		0.107	0.0331	ug/L	1		07/19/19 15:09
Phenanthrene	0.0267 U		0.0534	0.0160	ug/L	1		07/19/19 15:09
Pyrene	0.0267 U		0.0534	0.0160	ug/L	1		07/19/19 15:09
Surrogates								
2-Methylnaphthalene-d10 (surr)	64.5		47-106		%	1		07/19/19 15:09
Fluoranthene-d10 (surr)	75.1		24-116		%	1		07/19/19 15:09

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/19/19 15:09
Container ID: 1193793002-A

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 07/16/19 11:03
Prep Initial Wt./Vol.: 234 mL
Prep Extract Vol: 1 mL

Print Date: 10/25/2019 9:09:23AM

J flagging is activated

Results of **SRF127-TS127G-0719**

Client Sample ID: **SRF127-TS127G-0719**
Client Project ID: **SRF TS1-27 2019 HAKCS GWM Prog**
Lab Sample ID: 1193793002

Collection Date: 07/10/19 12:10
Received Date: 07/15/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	60.6		1.00	0.310	ug/L	1		07/16/19 19:50
1,3,5-Trimethylbenzene	19.6		1.00	0.310	ug/L	1		07/16/19 19:50
Benzene	9.24		0.400	0.120	ug/L	1		07/16/19 19:50
Ethylbenzene	23.2		1.00	0.310	ug/L	1		07/16/19 19:50
Isopropylbenzene (Cumene)	21.9		1.00	0.310	ug/L	1		07/16/19 19:50
Naphthalene	9.94		1.00	0.310	ug/L	1		07/16/19 19:50
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/16/19 19:50
o-Xylene	0.336	J	1.00	0.310	ug/L	1		07/16/19 19:50
P & M -Xylene	264		2.00	0.620	ug/L	1		07/16/19 19:50
sec-Butylbenzene	2.64		1.00	0.310	ug/L	1		07/16/19 19:50
tert-Butylbenzene	0.714	J	1.00	0.310	ug/L	1		07/16/19 19:50
Toluene	0.500	U	1.00	0.310	ug/L	1		07/16/19 19:50
Xylenes (total)	265		3.00	1.00	ug/L	1		07/16/19 19:50
Surrogates								
1,2-Dichloroethane-D4 (surr)	105		81-118		%	1		07/16/19 19:50
4-Bromofluorobenzene (surr)	111		85-114		%	1		07/16/19 19:50
Toluene-d8 (surr)	94.8		89-112		%	1		07/16/19 19:50

Batch Information

Analytical Batch: VMS19175
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/16/19 19:50
Container ID: 1193793002-C

Prep Batch: VXX34455
Prep Method: SW5030B
Prep Date/Time: 07/16/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/25/2019 9:09:23AM

J flagging is activated

Results of **SRF127-TS127K-0719**

Client Sample ID: **SRF127-TS127K-0719**
Client Project ID: **SRF TS1-27 2019 HAKCS GWM Prog**
Lab Sample ID: 1193793005

Collection Date: 07/10/19 12:10
Received Date: 07/15/19 16:39
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	58.0		1.89	0.566	ug/L	40		07/21/19 05:07
2-Methylnaphthalene	60.9		1.89	0.566	ug/L	40		07/21/19 05:07
Acenaphthene	0.106		0.0472	0.0142	ug/L	1		07/19/19 16:11
Acenaphthylene	0.0236	U	0.0472	0.0142	ug/L	1		07/19/19 16:11
Anthracene	0.0236	U	0.0472	0.0142	ug/L	1		07/19/19 16:11
Benzo(a)Anthracene	0.0236	U	0.0472	0.0142	ug/L	1		07/19/19 16:11
Benzo[a]pyrene	0.00945	U	0.0189	0.00585	ug/L	1		07/19/19 16:11
Benzo[b]Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/19/19 16:11
Benzo[g,h,i]perylene	0.0236	U	0.0472	0.0142	ug/L	1		07/19/19 16:11
Benzo[k]fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/19/19 16:11
Chrysene	0.0236	U	0.0472	0.0142	ug/L	1		07/19/19 16:11
Dibenzo[a,h]anthracene	0.00945	U	0.0189	0.00585	ug/L	1		07/19/19 16:11
Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/19/19 16:11
Fluorene	0.120		0.0472	0.0142	ug/L	1		07/19/19 16:11
Indeno[1,2,3-c,d] pyrene	0.0236	U	0.0472	0.0142	ug/L	1		07/19/19 16:11
Naphthalene	170		3.77	1.17	ug/L	40		07/21/19 05:07
Phenanthrene	0.0236	U	0.0472	0.0142	ug/L	1		07/19/19 16:11
Pyrene	0.0236	U	0.0472	0.0142	ug/L	1		07/19/19 16:11
Surrogates								
2-Methylnaphthalene-d10 (surr)	59.2		47-106		%	1		07/19/19 16:11
Fluoranthene-d10 (surr)	66.9		24-116		%	1		07/19/19 16:11

Batch Information

Analytical Batch: XMS11542
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/21/19 05:07
Container ID: 1193793005-A

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 07/16/19 11:03
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/19/19 16:11
Container ID: 1193793005-A

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 07/16/19 11:03
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Print Date: 10/25/2019 9:09:23AM

J flagging is activated

Results of **SRF127-TS127K-0719**

Client Sample ID: **SRF127-TS127K-0719**
Client Project ID: **SRF TS1-27 2019 HAKCS GWM Prog**
Lab Sample ID: 1193793005

Collection Date: 07/10/19 12:10
Received Date: 07/15/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	1190		20.0	6.20	ug/L	20		07/17/19 20:36
1,3,5-Trimethylbenzene	362		20.0	6.20	ug/L	20		07/17/19 20:36
Benzene	36.6		0.400	0.120	ug/L	1		07/16/19 20:05
Ethylbenzene	664		20.0	6.20	ug/L	20		07/17/19 20:36
Isopropylbenzene (Cumene)	290		20.0	6.20	ug/L	20		07/17/19 20:36
Naphthalene	272		20.0	6.20	ug/L	20		07/17/19 20:36
n-Butylbenzene	41.5		1.00	0.310	ug/L	1		07/16/19 20:05
o-Xylene	1.29		1.00	0.310	ug/L	1		07/16/19 20:05
P & M -Xylene	2420		40.0	12.4	ug/L	20		07/17/19 20:36
sec-Butylbenzene	90.1		1.00	0.310	ug/L	1		07/16/19 20:05
tert-Butylbenzene	15.1		1.00	0.310	ug/L	1		07/16/19 20:05
Toluene	0.500	U	1.00	0.310	ug/L	1		07/16/19 20:05
Xylenes (total)	2420		60.0	20.0	ug/L	20		07/17/19 20:36
Surrogates								
1,2-Dichloroethane-D4 (surr)	95.3		81-118		%	1		07/16/19 20:05
4-Bromofluorobenzene (surr)	110		85-114		%	20		07/17/19 20:36
Toluene-d8 (surr)	94.5		89-112		%	1		07/16/19 20:05

Batch Information

Analytical Batch: VMS19175
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/16/19 20:05
Container ID: 1193793005-D

Prep Batch: VXX34455
Prep Method: SW5030B
Prep Date/Time: 07/16/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 20:36
Container ID: 1193793005-E

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/25/2019 9:09:23AM

J flagging is activated

Results of **SRF127-TS127KZ-0719**

Client Sample ID: **SRF127-TS127KZ-0719**
Client Project ID: **SRF TS1-27 2019 HAKCS GWM Prog**
Lab Sample ID: 1193793006

Collection Date: 07/10/19 11:10
Received Date: 07/15/19 16:39
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	56.5		1.92	0.577	ug/L	40		07/21/19 05:27
2-Methylnaphthalene	60.0		1.92	0.577	ug/L	40		07/21/19 05:27
Acenaphthene	0.109		0.0481	0.0144	ug/L	1		07/19/19 16:32
Acenaphthylene	0.105		0.0481	0.0144	ug/L	1		07/19/19 16:32
Anthracene	0.0240 U		0.0481	0.0144	ug/L	1		07/19/19 16:32
Benzo(a)Anthracene	0.0240 U		0.0481	0.0144	ug/L	1		07/19/19 16:32
Benzo[a]pyrene	0.00960 U		0.0192	0.00596	ug/L	1		07/19/19 16:32
Benzo[b]Fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		07/19/19 16:32
Benzo[g,h,i]perylene	0.0240 U		0.0481	0.0144	ug/L	1		07/19/19 16:32
Benzo[k]fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		07/19/19 16:32
Chrysene	0.0240 U		0.0481	0.0144	ug/L	1		07/19/19 16:32
Dibenzo[a,h]anthracene	0.00960 U		0.0192	0.00596	ug/L	1		07/19/19 16:32
Fluoranthene	0.0240 U		0.0481	0.0144	ug/L	1		07/19/19 16:32
Fluorene	0.123		0.0481	0.0144	ug/L	1		07/19/19 16:32
Indeno[1,2,3-c,d] pyrene	0.0240 U		0.0481	0.0144	ug/L	1		07/19/19 16:32
Naphthalene	172		3.85	1.19	ug/L	40		07/21/19 05:27
Phenanthrene	0.0240 U		0.0481	0.0144	ug/L	1		07/19/19 16:32
Pyrene	0.0240 U		0.0481	0.0144	ug/L	1		07/19/19 16:32
Surrogates								
2-Methylnaphthalene-d10 (surr)	64.2		47-106		%	1		07/19/19 16:32
Fluoranthene-d10 (surr)	67.1		24-116		%	1		07/19/19 16:32

Batch Information

Analytical Batch: XMS11542
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/21/19 05:27
Container ID: 1193793006-A

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 07/16/19 11:03
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/19/19 16:32
Container ID: 1193793006-A

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 07/16/19 11:03
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Results of **SRF127-TS127KZ-0719**

Client Sample ID: **SRF127-TS127KZ-0719**
Client Project ID: **SRF TS1-27 2019 HAKCS GWM Prog**
Lab Sample ID: 1193793006

Collection Date: 07/10/19 11:10
Received Date: 07/15/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	1320		20.0	6.20	ug/L	20		07/16/19 21:51
1,3,5-Trimethylbenzene	394		20.0	6.20	ug/L	20		07/16/19 21:51
Benzene	35.7		0.400	0.120	ug/L	1		07/15/19 19:21
Ethylbenzene	704		20.0	6.20	ug/L	20		07/16/19 21:51
Isopropylbenzene (Cumene)	311		20.0	6.20	ug/L	20		07/16/19 21:51
Naphthalene	301		20.0	6.20	ug/L	20		07/16/19 21:51
n-Butylbenzene	38.8		1.00	0.310	ug/L	1		07/15/19 19:21
o-Xylene	1.24		1.00	0.310	ug/L	1		07/15/19 19:21
P & M -Xylene	2590		40.0	12.4	ug/L	20		07/16/19 21:51
sec-Butylbenzene	90.7		1.00	0.310	ug/L	1		07/15/19 19:21
tert-Butylbenzene	14.8		1.00	0.310	ug/L	1		07/15/19 19:21
Toluene	0.500	U	1.00	0.310	ug/L	1		07/15/19 19:21
Xylenes (total)	2590		60.0	20.0	ug/L	20		07/16/19 21:51
Surrogates								
1,2-Dichloroethane-D4 (surr)	95.6		81-118		%	1		07/15/19 19:21
4-Bromofluorobenzene (surr)	111		85-114		%	20		07/16/19 21:51
Toluene-d8 (surr)	95.2		89-112		%	1		07/15/19 19:21

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 19:21
Container ID: 1193793006-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19175
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/16/19 21:51
Container ID: 1193793006-D

Prep Batch: VXX34455
Prep Method: SW5030B
Prep Date/Time: 07/16/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF127-TS127L-0719**

Client Sample ID: **SRF127-TS127L-0719**
Client Project ID: **SRF TS1-27 2019 HAKCS GWM Prog**
Lab Sample ID: 1193793007

Collection Date: 07/10/19 18:30
Received Date: 07/15/19 16:39
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	0.358		0.0521	0.0156	ug/L	1		07/18/19 04:34
2-Methylnaphthalene	0.248		0.0521	0.0156	ug/L	1		07/18/19 04:34
Acenaphthene	0.0261 U		0.0521	0.0156	ug/L	1		07/18/19 04:34
Acenaphthylene	0.0261 U		0.0521	0.0156	ug/L	1		07/18/19 04:34
Anthracene	0.0261 U		0.0521	0.0156	ug/L	1		07/18/19 04:34
Benzo(a)Anthracene	0.0261 U		0.0521	0.0156	ug/L	1		07/18/19 04:34
Benzo[a]pyrene	0.0104 U		0.0208	0.00646	ug/L	1		07/18/19 04:34
Benzo[b]Fluoranthene	0.0261 U		0.0521	0.0156	ug/L	1		07/18/19 04:34
Benzo[g,h,i]perylene	0.0261 U		0.0521	0.0156	ug/L	1		07/18/19 04:34
Benzo[k]fluoranthene	0.0261 U		0.0521	0.0156	ug/L	1		07/18/19 04:34
Chrysene	0.0261 U		0.0521	0.0156	ug/L	1		07/18/19 04:34
Dibenzo[a,h]anthracene	0.0104 U		0.0208	0.00646	ug/L	1		07/18/19 04:34
Fluoranthene	0.0261 U		0.0521	0.0156	ug/L	1		07/18/19 04:34
Fluorene	0.0261 U		0.0521	0.0156	ug/L	1		07/18/19 04:34
Indeno[1,2,3-c,d] pyrene	0.0261 U		0.0521	0.0156	ug/L	1		07/18/19 04:34
Naphthalene	1.64		0.104	0.0323	ug/L	1		07/18/19 04:34
Phenanthrene	0.0261 U		0.0521	0.0156	ug/L	1		07/18/19 04:34
Pyrene	0.0261 U		0.0521	0.0156	ug/L	1		07/18/19 04:34
Surrogates								
2-Methylnaphthalene-d10 (surr)	51.5		47-106		%	1		07/18/19 04:34
Fluoranthene-d10 (surr)	51.4		24-116		%	1		07/18/19 04:34

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 04:34
Container ID: 1193793007-A

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 07/15/19 11:28
Prep Initial Wt./Vol.: 240 mL
Prep Extract Vol: 1 mL

Print Date: 10/25/2019 9:09:23AM

J flagging is activated

Results of **SRF127-TS127L-0719**

Client Sample ID: **SRF127-TS127L-0719**
Client Project ID: **SRF TS1-27 2019 HAKCS GWM Prog**
Lab Sample ID: 1193793007

Collection Date: 07/10/19 18:30
Received Date: 07/15/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 20:06
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 20:06
Benzene	0.200 U		0.400	0.120	ug/L	1		07/15/19 19:36
Ethylbenzene	0.670 J		1.00	0.310	ug/L	1		07/17/19 20:06
Isopropylbenzene (Cumene)	2.27		1.00	0.310	ug/L	1		07/17/19 20:06
Naphthalene	2.47		1.00	0.310	ug/L	1		07/17/19 20:06
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 19:36
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/17/19 20:06
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/17/19 20:06
sec-Butylbenzene	1.70		1.00	0.310	ug/L	1		07/17/19 20:06
tert-Butylbenzene	0.390 J		1.00	0.310	ug/L	1		07/17/19 20:06
Toluene	0.500 U		1.00	0.310	ug/L	1		07/15/19 19:36
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/17/19 20:06
Surrogates								
1,2-Dichloroethane-D4 (surr)	106		81-118		%	1		07/15/19 19:36
4-Bromofluorobenzene (surr)	110		85-114		%	1		07/15/19 19:36
Toluene-d8 (surr)	95.1		89-112		%	1		07/15/19 19:36

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 19:36
Container ID: 1193793007-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 20:06
Container ID: 1193793007-E

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/25/2019 9:09:23AM

J flagging is activated

Results of **SRF127-TS127M-0719**

Client Sample ID: **SRF127-TS127M-0719**
Client Project ID: **SRF TS1-27 2019 HAKCS GWM Prog**
Lab Sample ID: 1193793008

Collection Date: 07/10/19 18:00
Received Date: 07/15/19 16:39
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	15.4		0.248	0.0744	ug/L	5		07/18/19 13:36
2-Methylnaphthalene	15.3		0.248	0.0744	ug/L	5		07/18/19 13:36
Acenaphthene	0.169		0.0496	0.0149	ug/L	1		07/18/19 04:55
Acenaphthylene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 04:55
Anthracene	0.0265	J	0.0496	0.0149	ug/L	1		07/18/19 04:55
Benzo(a)Anthracene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 04:55
Benzo[a]pyrene	0.00990	U	0.0198	0.00615	ug/L	1		07/18/19 04:55
Benzo[b]Fluoranthene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 04:55
Benzo[g,h,i]perylene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 04:55
Benzo[k]fluoranthene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 04:55
Chrysene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 04:55
Dibenzo[a,h]anthracene	0.00990	U	0.0198	0.00615	ug/L	1		07/18/19 04:55
Fluoranthene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 04:55
Fluorene	0.424		0.0496	0.0149	ug/L	1		07/18/19 04:55
Indeno[1,2,3-c,d] pyrene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 04:55
Naphthalene	26.1		0.496	0.154	ug/L	5		07/18/19 13:36
Phenanthrene	0.429		0.0496	0.0149	ug/L	1		07/18/19 04:55
Pyrene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 04:55
Surrogates								
2-Methylnaphthalene-d10 (surr)	50.1		47-106		%	1		07/18/19 04:55
Fluoranthene-d10 (surr)	41.8		24-116		%	1		07/18/19 04:55

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 04:55
Container ID: 1193793008-A

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 07/15/19 11:28
Prep Initial Wt./Vol.: 252 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11535
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 13:36
Container ID: 1193793008-A

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 07/15/19 11:28
Prep Initial Wt./Vol.: 252 mL
Prep Extract Vol: 1 mL

Print Date: 10/25/2019 9:09:23AM

J flagging is activated

Results of **SRF127-TS127M-0719**

Client Sample ID: **SRF127-TS127M-0719**
Client Project ID: **SRF TS1-27 2019 HAKCS GWM Prog**
Lab Sample ID: 1193793008

Collection Date: 07/10/19 18:00
Received Date: 07/15/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	343		20.0	6.20	ug/L	20		07/16/19 22:06
1,3,5-Trimethylbenzene	99.4		1.00	0.310	ug/L	1		07/15/19 19:51
Benzene	3.85		0.400	0.120	ug/L	1		07/15/19 19:51
Ethylbenzene	41.4		1.00	0.310	ug/L	1		07/15/19 19:51
Isopropylbenzene (Cumene)	53.6		1.00	0.310	ug/L	1		07/15/19 19:51
Naphthalene	64.9		1.00	0.310	ug/L	1		07/15/19 19:51
n-Butylbenzene	1.24		1.00	0.310	ug/L	1		07/15/19 19:51
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/15/19 19:51
P & M -Xylene	180		2.00	0.620	ug/L	1		07/15/19 19:51
sec-Butylbenzene	4.60		1.00	0.310	ug/L	1		07/15/19 19:51
tert-Butylbenzene	1.31		1.00	0.310	ug/L	1		07/15/19 19:51
Toluene	0.330	J	1.00	0.310	ug/L	1		07/15/19 19:51
Xylenes (total)	180		3.00	1.00	ug/L	1		07/15/19 19:51
Surrogates								
1,2-Dichloroethane-D4 (surr)	99.6		81-118		%	1		07/15/19 19:51
4-Bromofluorobenzene (surr)	112		85-114		%	1		07/15/19 19:51
Toluene-d8 (surr)	96.3		89-112		%	1		07/15/19 19:51

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 19:51
Container ID: 1193793008-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19175
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/16/19 22:06
Container ID: 1193793008-D

Prep Batch: VXX34455
Prep Method: SW5030B
Prep Date/Time: 07/16/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/25/2019 9:09:23AM

J flagging is activated

Results of **SRF127-TB01-0719**

Client Sample ID: **SRF127-TB01-0719**
Client Project ID: **SRF TS1-27 2019 HAKCS GWM Prog**
Lab Sample ID: 1193793009

Collection Date: 07/10/19 08:00
Received Date: 07/15/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 20:21
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 20:06
Benzene	0.200 U		0.400	0.120	ug/L	1		07/15/19 20:06
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 20:06
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/15/19 20:06
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/17/19 20:21
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 20:06
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/15/19 20:06
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/15/19 20:06
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 20:06
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 20:06
Toluene	0.500 U		1.00	0.310	ug/L	1		07/15/19 20:06
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/15/19 20:06
Surrogates								
1,2-Dichloroethane-D4 (surr)	105		81-118		%	1		07/15/19 20:06
4-Bromofluorobenzene (surr)	112		85-114		%	1		07/15/19 20:06
Toluene-d8 (surr)	96.2		89-112		%	1		07/15/19 20:06

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 20:06
Container ID: 1193793009-A

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 20:21
Container ID: 1193793009-B

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/25/2019 9:09:23AM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1796460 [VXX/34446]
Blank Lab ID: 1519362

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193793001, 1193793006, 1193793007, 1193793008, 1193793009

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	107	81-118		%
4-Bromofluorobenzene (surr)	113	85-114		%
Toluene-d8 (surr)	96	89-112		%

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: CMC
Analytical Date/Time: 7/15/2019 2:48:00PM

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 7/15/2019 6:30:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193793 [VXX34446]
Blank Spike Lab ID: 1519363
Date Analyzed: 07/15/2019 15:03

Spike Duplicate ID: LCSD for HBN 1193793 [VXX34446]
Spike Duplicate Lab ID: 1519364
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193793001, 1193793006, 1193793007, 1193793008, 1193793009

Results by **SW8260C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	32.2	107	30	31.2	104	(79-124)	3.10	(< 20)
1,3,5-Trimethylbenzene	30	31.7	106	30	30.8	103	(75-124)	2.70	(< 20)
Benzene	30	27.9	93	30	26.8	90	(79-120)	3.90	(< 20)
Ethylbenzene	30	27.9	93	30	27.0	90	(79-121)	3.10	(< 20)
Isopropylbenzene (Cumene)	30	27.7	92	30	27.4	91	(72-131)	1.40	(< 20)
Naphthalene	30	27.3	91	30	28.3	95	(61-128)	3.70	(< 20)
n-Butylbenzene	30	32.5	108	30	31.5	105	(75-128)	3.10	(< 20)
o-Xylene	30	27.5	92	30	27.0	90	(78-122)	2.00	(< 20)
P & M -Xylene	60	54.2	90	60	53.0	88	(80-121)	2.30	(< 20)
sec-Butylbenzene	30	31.7	106	30	30.5	102	(77-126)	3.80	(< 20)
tert-Butylbenzene	30	31.2	104	30	30.8	103	(78-124)	1.30	(< 20)
Toluene	30	26.5	88	30	25.8	86	(80-121)	2.50	(< 20)
Xylenes (total)	90	81.8	91	90	80.0	89	(79-121)	2.20	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	97.7	98	30	98.2	98	(81-118)	0.59	
4-Bromofluorobenzene (surr)	30	113	113	30	112	112	(85-114)	0.59	
Toluene-d8 (surr)	30	96.1	96	30	95.6	96	(89-112)	0.52	

Batch Information

Analytical Batch: **VMS19171**
Analytical Method: **SW8260C**
Instrument: **Agilent 7890-75MS**
Analyst: **CMC**

Prep Batch: **VXX34446**
Prep Method: **SW5030B**
Prep Date/Time: **07/15/2019 06:30**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

Print Date: 10/25/2019 9:09:26AM

Method Blank

Blank ID: MB for HBN 1796410 [VXX/03344]
Blank Lab ID: 1419450

Matrix: Watpr (Curfacp, Eff., Ground)

2 Q for CaS mpe:
1190790ss1, 1190790ss8, 1190790ss4, 1190790ss6, 1190790ss5

Rpeulte by **SW8260C**

ParaS ptpr	Rpeulte	LO2 /QL	DL	Unite
1,8,3-TriS pthylbpnzpnp	s.4ssU	1.ss	s.01s	ug/L
1,0,4-TriS pthylbpnzpnp	s.4ssU	1.ss	s.01s	ug/L
Bpnzpnp	s.8ssU	s.3ss	s.18s	ug/L
Ethylbpnzpnp	s.4ssU	1.ss	s.01s	ug/L
Ieomromylbpnzpnp (QuS pnp)	s.4ssU	1.ss	s.01s	ug/L
Nam hthalpnp	s.4ssU	1.ss	s.01s	ug/L
n-Butylbpnzpnp	s.4ssU	1.ss	s.01s	ug/L
o-Xylpnp	s.4ssU	1.ss	s.01s	ug/L
P & M -Xylpnp	1.ssU	8.ss	s.68s	ug/L
epc-Butylbpnzpnp	s.4ssU	1.ss	s.01s	ug/L
tprt-Butylbpnzpnp	s.4ssU	1.ss	s.01s	ug/L
Tolupnp	s.4ssU	1.ss	s.01s	ug/L
Xylpnpe (total)	1.4sU	0.ss	1.ss	ug/L
Surrogates				
1,8-Dichloropthanp-D3 (eurr)	1s9	51-115		%
3-BroS ofluorobpnzpnp (eurr)	118	54-113		%
Tolupnp-d5 (eurr)	96.8	59-118		%

Batch Information

Analytical Batch: VMC19174
Analytical Mpthod: CW586sQ
InetruS pnt: Agilpnt 759s-74MC
Analyet: NRB
Analytical Datp/TiS p: 7/16/8s19 0:ss:ssPM

PrpmBatch: VXX03344
PrpmMpthod: CW4s0sB
PrpmDatp/TiS p: 7/16/8s19 6:ss:ssAM
PrpmInitial Wt./Vol.: 4 S L
PrpmExtract Vol: 4 S L

Print Datp: 1s/84/8s19 9:s9:89AM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1193793 [VXX34466]
Blank Spike Lab ID: 1619654
Date Analyzed: 07/12/u019 16:16

Spike DcpliRate ID: LCSD for HBN 1193793 [VXX34466]
Spike DcpliRate Lab ID: 1619656
x atriW (ater ,ScrfaReE. ffGE) rocndP

8 C for Sa%pleM 1193793001E119379300uE1193793006E1193793002E1193793005

s eMcltMby **SW8260C**

	Blank Spike ,cQLP			Spike DcpliRate ,cQLP					
mara%eter	Spike	s eMclt	s eR,g P	Spike	s eMclt	s eR,g P	CL	s mD ,g P	s mD CL
1E,E4-Tri%ethylbenzene	30	31G5	102	30	31G	104	, 79-1u4 P	uG0	,< u0 P
1E3E6-Tri%ethylbenzene	30	31G7	102	30	u9G9	100	, 76-1u4 P	2G0	,< u0 P
Benzene	30	u5G2	92	30	u5G4	96	, 79-1u0 P	0G7	,< u0 P
. thylbenzene	30	u5G3	94	30	u7G4	91	, 79-1u1 P	uG7	,< u0 P
IMopropylbenzene ,Cc%eneP	30	u5G5	92	30	u7G	91	, 7u-131 P	6G7	,< u0 P
Naphthalene	30	u7G5	93	30	30G4	101	, 21-1u5 P	5G5	,< u0 P
n-Bctylbenzene	30	31G6	106	30	30G3	100	, 76-1u5 P	4G6	,< u0 P
o-Xylene	30	u5G	94	30	u7G3	90	, 75-1uu P	4G3	,< u0 P
m & x -Xylene	20	66G2	93	20	63G9	90	, 50-1u1 P	3G	,< u0 P
MeR-Bctylbenzene	30	30G6	10u	30	u9G7	99	, 77-1u2 P	uG6	,< u0 P
tert-Bctylbenzene	30	30G	101	30	30G	101	, 75-1u4 P	0G5	,< u0 P
Tolcene	30	u7G4	91	30	u6G5	52	, 50-1u1 P	2G	,< u0 P
XyleneM,totalP	90	53G9	93	90	51G	90	, 79-1u1 P	3G6	,< u0 P
Surrogates									
1E,-DiRhloroethane-D4 ,MtrrP	30	95G5	99	30	95G6	99	, 51-115 P	0G3u	
4-Bro%oflcorobenzene ,MtrrP	30	111	111	30	111	111	, 56-114 P	0G2	
Tolcene-d5 ,MtrrP	30	97G6	95	30	96G4	96	, 59-11u P	uG	,< u0 P

Batch Information

AnalytiRal BatRh: **VMS19175**
AnalytiRal x ethod: **SW8260C**
InMrc%ent: **Agilent 7890-75MS**
AnalyM: **NRB**

mrep BatRh: **VXX34455**
mrep x ethod: **SW5030B**
mrep Date/Ti%e: **07/16/2019 06:00**
Spike Init (tGVolG 30 cQL . WtraRt Vol: 6 %L
Dcpe Init (tGVolG 30 cQL . WtraRt Vol: 6 %L

mrint Date: 10/u6/u019 9:09:31Ax

Billable Matrix Spike Summary

Original Sample ID: 1193793002
MS Sample ID: 1193793003 BMS
MSD Sample ID: 1193793004 BMSD

Analysis Date: 07/16/2019 19:50
Analysis Date: 07/16/2019 15:46
Analysis Date: 07/16/2019 16:01
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by **SW8260C**

		Matrix Spike (ug/L)				Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)		Spike	Result	Rec (%)		CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	60.6	30.0	72.8	41	*	30.0	71.1	35	*	79-124	2.30	(< 20)
1,3,5-Trimethylbenzene	19.6	30.0	45.2	86		30.0	44.3	83		75-124	2.00	(< 20)
Benzene	9.24	30.0	35.7	88		30.0	33.5	81		79-120	6.20	(< 20)
Ethylbenzene	23.2	30.0	42.7	65	*	30.0	42.1	63	*	79-121	1.40	(< 20)
Isopropylbenzene (Cumene)	21.9	30.0	44.5	75		30.0	43.0	70	*	72-131	3.30	(< 20)
Naphthalene	9.94	30.0	37.6	92		30.0	37.7	92		61-128	0.11	(< 20)
n-Butylbenzene	0.500U	30.0	34.6	115		30.0	33.9	113		75-128	2.00	(< 20)
o-Xylene	0.336J	30.0	29	96		30.0	27.8	92		78-122	4.00	(< 20)
P & M -Xylene	264	60.0	221	-72	*	60.0	214	-84	*	80-121	3.50	(< 20)
sec-Butylbenzene	2.64	30.0	35.3	109		30.0	34.1	105		77-126	3.40	(< 20)
tert-Butylbenzene	0.714J	30.0	33.9	111		30.0	32.9	107		78-124	3.00	(< 20)
Toluene	0.500U	30.0	26.9	90		30.0	26.3	88		80-121	2.40	(< 20)
Xylenes (total)	265	90.0	250	-16	*	90.0	242	-26	*	79-121	3.60	(< 20)
Surrogates												
1,2-Dichloroethane-D4 (surr)		30.0	29.4	98		30.0	29.0	97		81-118	1.30	
4-Bromofluorobenzene (surr)		30.0	33.5	112		30.0	34.3	114		85-114	2.50	
Toluene-d8 (surr)		30.0	29	97		30.0	29.0	97		89-112	0.09	

Batch Information

Analytical Batch: VMS19175
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: NRB
Analytical Date/Time: 7/16/2019 3:46:00PM

Prep Batch: VXX34455
Prep Method: Volatiles Extraction 8240/8260 FULL
Prep Date/Time: 7/16/2019 6:00:00AM
Prep Initial Wt./Vol.: 5.00mL
Prep Extract Vol: 5.00mL

Print Date: 10/25/2019 9:09:33AM

Method Blank

Blank ID: MB for HBN 1796417 [VVX 3346]
Blank Lab ID: 1419654

2 Q for CaS mpe:
119/ 79/ ss4, 119/ 79/ ss7, 119/ 79/ ss9

Ma8ti : x a8pr W(rfaup, c ffE . ro(nGd

) pe(l8e bR **SW8260C**

OaraS p8pr	) pe(l8e	LU2 XQL	DL	y nt8e
1,5,3P rtS p8TRbpnhpnp	s4ssy	1Fss	sE 1s	(zXL
1,/ ,4P rtS p8TRbpnhpnp	s4ssy	1Fss	sE 1s	(zXL
c 8TRbpnhpnp	s4ssy	1Fss	sE 1s	(zXL
leomromRbpnhpnp W(S pnpd	s4ssy	1Fss	sE 1s	(zXL
NamT8Talpnp	s4ssy	1Fss	sE 1s	(zXL
oPVRpnp	s4ssy	1Fss	sE 1s	(zXL
O g M PVRpnp	1Fssy	5Fss	sF65s	(zXL
epuPB(8Rbpnhpnp	s4ssy	1Fss	sE 1s	(zXL
8pr8PB(8Rbpnhpnp	s4ssy	1Fss	sE 1s	(zXL
VRpnpe W68ald	1F4sy	/ Fss	1Fss	(zXL
Surrogates				
1,5PDtuTloropBTanpPD3 W(rrd	1s4	&1P11&		%
3PBroS ofl(orobpnhpnp W(rrd	111	&4P113		%
- ol(pnpPG& W(rrd	96E5	&9P115		%

Batch Information

AnalR8ual Ba8uT: [MC19179
AnalR8ual Mp8ToG: Cx &56sQ
Ine8(S pn8 AztIpn87&9sP74MC
AnalRe8 QMQ
AnalR8ual Da8pX tS p: 7X17X6s19 5:33:ssOM

OrpmBa8uT: [VV/ 3346
OrpmMp8ToG: Cx 4s/ sB
OrpmDa8pX tS p: 7X17X6s19 6:ss:ssAM
OrpmInt8al x 8EX olE 4 S L
Orpmc i 8rau8[ol: 4 S L

Blank Spike Summary

Blank Spike ID: LCS for HBN 1193793 [VXX34456]
Blank Spike Lab ID: 1519626
Date Analyzed: 07/17/2019 14:59

Spike Duplicate ID: LCSD for HBN 1193793 [VXX34456]
Spike Duplicate Lab ID: 1519627
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193793005, 1193793007, 1193793009

Results by **SW8260C**

	Blank Spike (ug/L)				Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)		Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	30.8	103		30	30.0	100	(79-124)	2.60	(< 20)
1,3,5-Trimethylbenzene	30	30.1	100		30	29.8	99	(75-124)	1.00	(< 20)
Ethylbenzene	30	26.7	89		30	25.9	87	(79-121)	2.90	(< 20)
Isopropylbenzene (Cumene)	30	26.8	89		30	26.2	87	(72-131)	2.30	(< 20)
Naphthalene	30	27.4	91		30	28.7	96	(61-128)	4.90	(< 20)
o-Xylene	30	27.2	91		30	26.5	88	(78-122)	2.70	(< 20)
P & M -Xylene	60	52.8	88		60	51.1	85	(80-121)	3.20	(< 20)
sec-Butylbenzene	30	29.2	97		30	28.1	94	(77-126)	3.60	(< 20)
tert-Butylbenzene	30	29.7	99		30	28.6	96	(78-124)	3.50	(< 20)
Xylenes (total)	90	80.1	89		90	77.6	86	(79-121)	3.10	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)	30	97.3	97		30	98.4	98	(81-118)	1.10	
4-Bromofluorobenzene (surr)	30	115	115	*	30	114	114	(85-114)	0.66	
Toluene-d8 (surr)	30	95.8	96		30	96.1	96	(89-112)	0.24	

Batch Information

Analytical Batch: **VMS19179**
Analytical Method: **SW8260C**
Instrument: **Agilent 7890-75MS**
Analyst: **CMC**

Prep Batch: **VXX34456**
Prep Method: **SW5030B**
Prep Date/Time: **07/17/2019 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1796314 [XXX/41758]
Blank Lab ID: 1518724

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193793007, 1193793008

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)	63	47-106		%
Fluoranthene-d10 (surr)	63.4	24-116		%

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 7/17/2019 10:44:00PM

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 7/15/2019 11:28:11AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193793 [XXX41758]
Blank Spike Lab ID: 1518725
Date Analyzed: 07/17/2019 23:05

Spike Duplicate ID: LCSD for HBN 1193793 [XXX41758]
Spike Duplicate Lab ID: 1518726
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193793007, 1193793008

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

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1-Methylnaphthalene	2	1.50	75	2	1.41	70	(41-115)	6.20	(< 20)
2-Methylnaphthalene	2	1.46	73	2	1.37	69	(39-114)	5.80	(< 20)
Acenaphthene	2	1.48	74	2	1.37	69	(48-114)	7.60	(< 20)
Acenaphthylene	2	1.57	79	2	1.45	72	(35-121)	8.20	(< 20)
Anthracene	2	1.54	77	2	1.41	71	(53-119)	9.00	(< 20)
Benzo(a)Anthracene	2	1.50	75	2	1.37	68	(59-120)	9.10	(< 20)
Benzo[a]pyrene	2	1.52	76	2	1.40	70	(53-120)	7.90	(< 20)
Benzo[b]Fluoranthene	2	1.61	81	2	1.50	75	(53-126)	7.00	(< 20)
Benzo[g,h,i]perylene	2	1.45	73	2	1.32	66	(44-128)	9.50	(< 20)
Benzo[k]fluoranthene	2	1.51	76	2	1.40	70	(54-125)	8.10	(< 20)
Chrysene	2	1.50	75	2	1.39	69	(57-120)	7.90	(< 20)
Dibenzo[a,h]anthracene	2	1.37	69	2	1.24	62	(44-131)	10.50	(< 20)
Fluoranthene	2	1.58	79	2	1.42	71	(58-120)	10.80	(< 20)
Fluorene	2	1.53	77	2	1.42	71	(50-118)	7.60	(< 20)
Indeno[1,2,3-c,d] pyrene	2	1.58	79	2	1.46	73	(48-130)	7.50	(< 20)
Naphthalene	2	1.53	76	2	1.42	71	(43-114)	6.90	(< 20)
Phenanthrene	2	1.50	75	2	1.37	68	(53-115)	9.40	(< 20)
Pyrene	2	1.62	81	2	1.48	74	(53-121)	9.20	(< 20)
Surrogates									
2-Methylnaphthalene-d10 (surr)	2	69.1	69	2	64	64	(47-106)	7.60	
Fluoranthene-d10 (surr)	2	69.9	70	2	64.3	64	(24-116)	8.30	

Batch Information

Analytical Batch: **XMS11531**
Analytical Method: **8270D SIM LV (PAH)**
Instrument: **SVA Agilent 780/5975 GC/MS**
Analyst: **BMZ**

Prep Batch: **XXX41758**
Prep Method: **SW3520C**
Prep Date/Time: **07/15/2019 11:28**
Spike Init Wt./Vol.: 2 ug/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 2 ug/L Extract Vol: 1 mL

Print Date: 10/25/2019 9:09:41AM

Matrix Spike Summary

Original Sample ID: 1193788001
MS Sample ID: 1518727 MS
MSD Sample ID: 1518728 MSD

Analysis Date: 07/18/2019 1:08
Analysis Date: 07/18/2019 1:29
Analysis Date: 07/18/2019 1:50
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193793007, 1193793008

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	0.0194J	2.05	1.13	54		1.92	1.38	71		41-115	20.10	*	(< 20)
2-Methylnaphthalene	0.0269J	2.05	1.1	52		1.92	1.35	69		39-114	20.80	*	(< 20)
Acenaphthene	0.0236U	2.05	1.09	53		1.92	1.35	70		48-114	21.60	*	(< 20)
Acenaphthylene	0.0236U	2.05	1.16	57		1.92	1.45	76		35-121	22.30	*	(< 20)
Anthracene	0.0236U	2.05	1.1	54		1.92	1.38	72		53-119	22.20	*	(< 20)
Benzo(a)Anthracene	0.0236U	2.05	.958	47	*	1.92	1.09	57	*	59-120	12.60		(< 20)
Benzo[a]pyrene	0.00945U	2.05	.903	44	*	1.92	0.985	51	*	53-120	8.60		(< 20)
Benzo[b]Fluoranthene	0.0236U	2.05	.945	46	*	1.92	1.02	53		53-126	7.60		(< 20)
Benzo[g,h,i]perylene	0.0236U	2.05	.691	34	*	1.92	0.778	41	*	44-128	11.80		(< 20)
Benzo[k]fluoranthene	0.0236U	2.05	.897	44	*	1.92	0.976	51	*	54-125	8.40		(< 20)
Chrysene	0.0236U	2.05	.979	48	*	1.92	1.12	58		57-120	13.70		(< 20)
Dibenzo[a,h]anthracene	0.00945U	2.05	.554	27	*	1.92	0.664	35	*	44-131	18.00		(< 20)
Fluoranthene	0.0236U	2.05	1.1	54	*	1.92	1.33	69		58-120	19.30		(< 20)
Fluorene	0.0236U	2.05	1.12	55		1.92	1.38	72		50-118	21.30	*	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0236U	2.05	.787	38	*	1.92	0.859	45	*	48-130	8.80		(< 20)
Naphthalene	0.0471U	2.05	1.15	56		1.92	1.40	73		43-114	19.30		(< 20)
Phenanthrene	0.0236U	2.05	1.08	53	*	1.92	1.33	69		53-115	21.00	*	(< 20)
Pyrene	0.0236U	2.05	1.15	56		1.92	1.38	72		53-121	18.20		(< 20)
Surrogates													
2-Methylnaphthalene-d10 (surr)		2.05	1.02	50		1.92	1.21	63		47-106	17.60		
Fluoranthene-d10 (surr)		2.05	.985	48		1.92	1.20	62		24-116	19.60		

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 7/18/2019 1:29:00AM

Prep Batch: XXX41758
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/15/2019 11:28:11AM
Prep Initial Wt./Vol.: 244.00mL
Prep Extract Vol: 1.00mL

Print Date: 10/25/2019 9:09:42AM

Method Blank

Blank ID: MB for HBN 1796372 [XXX/41767]
Blank Lab ID: 1518946

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193793001, 1193793002, 1193793005, 1193793006

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)	64.6	47-106		%
Fluoranthene-d10 (surr)	89.2	24-116		%

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/19/2019 11:44:00AM

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 7/16/2019 11:03:21AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Member of SGS Group

Blank Spike Summary

Blank Spike ID: LCS for HBN 1193793 [XXX41767]
Blank Spike Lab ID: 1518947
Date Analyzed: 07/19/2019 12:04

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193793001, 1193793002, 1193793005, 1193793006

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

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	2	1.43	72	(41-115)
2-Methylnaphthalene	2	1.40	70	(39-114)
Acenaphthene	2	1.47	74	(48-114)
Acenaphthylene	2	1.61	80	(35-121)
Anthracene	2	1.62	81	(53-119)
Benzo(a)Anthracene	2	1.78	89	(59-120)
Benzo[a]pyrene	2	1.73	87	(53-120)
Benzo[b]Fluoranthene	2	1.80	90	(53-126)
Benzo[g,h,i]perylene	2	1.60	80	(44-128)
Benzo[k]fluoranthene	2	1.76	88	(54-125)
Chrysene	2	1.80	90	(57-120)
Dibenzo[a,h]anthracene	2	1.52	76	(44-131)
Fluoranthene	2	1.88	94	(58-120)
Fluorene	2	1.60	80	(50-118)
Indeno[1,2,3-c,d] pyrene	2	1.74	87	(48-130)
Naphthalene	2	1.46	73	(43-114)
Phenanthrene	2	1.54	77	(53-115)
Pyrene	2	1.95	98	(53-121)
Surrogates				
2-Methylnaphthalene-d10 (surr)	2	67.3	67	(47-106)
Fluoranthene-d10 (surr)	2	93.1	93	(24-116)

Batch Information

Analytical Batch: **XMS11539**
Analytical Method: **8270D SIM LV (PAH)**
Instrument: **Agilent GC 7890B/5977A SWA**
Analyst: **DSD**

Prep Batch: **XXX41767**
Prep Method: **SW3520C**
Prep Date/Time: **07/16/2019 11:03**
Spike Init Wt./Vol.: 2 ug/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: Extract Vol:

Print Date: 10/25/2019 9:09:46AM

Matrix Spike Summary

Original Sample ID: 1193792004
MS Sample ID: 1518948 MS
MSD Sample ID: 1518949 MSD

Analysis Date: 07/19/2019 13:27
Analysis Date: 07/19/2019 13:47
Analysis Date: 07/19/2019 14:08
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193793001, 1193793002, 1193793005, 1193793006

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	0.0227U	1.92	1.25	65		1.92	1.25	65		41-115	0.55	(< 20)
2-Methylnaphthalene	0.0227U	1.92	1.25	65		1.92	1.24	65		39-114	0.52	(< 20)
Acenaphthene	0.0227U	1.92	1.27	66		1.92	1.26	65		48-114	0.89	(< 20)
Acenaphthylene	0.0227U	1.92	1.35	70		1.92	1.34	70		35-121	0.88	(< 20)
Anthracene	0.0227U	1.92	1.32	69		1.92	1.30	68		53-119	1.80	(< 20)
Benzo(a)Anthracene	0.0227U	1.92	1.09	57	*	1.92	1.07	56	*	59-120	2.30	(< 20)
Benzo[a]pyrene	0.00910U	1.92	.782	41	*	1.92	0.802	42	*	53-120	2.50	(< 20)
Benzo[b]Fluoranthene	0.0227U	1.92	.924	48	*	1.92	0.913	48	*	53-126	1.20	(< 20)
Benzo[g,h,i]perylene	0.0227U	1.92	.478	25	*	1.92	0.492	26	*	44-128	3.00	(< 20)
Benzo[k]fluoranthene	0.0227U	1.92	.78	41	*	1.92	0.807	42	*	54-125	3.40	(< 20)
Chrysene	0.0227U	1.92	1.05	55	*	1.92	1.05	55	*	57-120	0.51	(< 20)
Dibenzo[a,h]anthracene	0.00910U	1.92	.42	22	*	1.92	0.440	23	*	44-131	4.60	(< 20)
Fluoranthene	0.0227U	1.92	1.4	73		1.92	1.39	72		58-120	0.92	(< 20)
Fluorene	0.0227U	1.92	1.31	68		1.92	1.30	68		50-118	0.62	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0227U	1.92	.616	32	*	1.92	0.631	33	*	48-130	2.50	(< 20)
Naphthalene	0.0454U	1.92	1.3	67		1.92	1.28	67		43-114	0.90	(< 20)
Phenanthrene	0.0227U	1.92	1.29	67		1.92	1.26	66		53-115	2.20	(< 20)
Pyrene	0.0227U	1.92	1.47	77		1.92	1.46	76		53-121	0.80	(< 20)
Surrogates												
2-Methylnaphthalene-d10 (surr)		1.92	1.26	66		1.92	1.24	64		47-106	1.90	
Fluoranthene-d10 (surr)		1.92	1.37	71		1.92	1.35	70		24-116	2.00	

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/19/2019 1:47:00PM

Prep Batch: XXX41767
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/16/2019 11:03:21AM
Prep Initial Wt./Vol.: 260.00mL
Prep Extract Vol: 1.00mL

Print Date: 10/25/2019 9:09:48AM

Billable Matrix Spike Summary

Original Sample ID: 1193793002
MS Sample ID: 1193793003 BMS
MSD Sample ID: 1193793004 BMSD

Analysis Date: 07/19/2019 15:09
Analysis Date: 07/19/2019 15:30
Analysis Date: 07/19/2019 15:51
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

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	0.457	2.14	1.71	59		2.17	1.65	55		41-115	3.80	(< 20)
2-Methylnaphthalene	0.181	2.14	1.44	59		2.17	1.38	55		39-114	4.40	(< 20)
Acenaphthene	0.0267U	2.14	1.36	64		2.17	1.29	59		48-114	6.00	(< 20)
Acenaphthylene	0.0267U	2.14	1.47	69		2.17	1.38	63		35-121	6.30	(< 20)
Anthracene	0.0267U	2.14	1.44	68		2.17	1.38	64		53-119	4.40	(< 20)
Benzo(a)Anthracene	0.0267U	2.14	1.3	61		2.17	1.24	57	*	59-120	4.60	(< 20)
Benzo[a]pyrene	0.0107U	2.14	.989	46	*	2.17	0.924	43	*	53-120	6.80	(< 20)
Benzo[b]Fluoranthene	0.0267U	2.14	1.14	54		2.17	1.08	50	*	53-126	5.50	(< 20)
Benzo[g,h,i]perylene	0.0267U	2.14	.668	31	*	2.17	0.629	29	*	44-128	6.10	(< 20)
Benzo[k]fluoranthene	0.0267U	2.14	.956	45	*	2.17	0.945	44	*	54-125	1.10	(< 20)
Chrysene	0.0267U	2.14	1.23	57		2.17	1.19	55	*	57-120	2.90	(< 20)
Dibenzo[a,h]anthracene	0.0107U	2.14	.582	27	*	2.17	0.544	25	*	44-131	6.70	(< 20)
Fluoranthene	0.0267U	2.14	1.55	72		2.17	1.47	68		58-120	4.80	(< 20)
Fluorene	0.0267U	2.14	1.41	66		2.17	1.40	64		50-118	0.94	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0267U	2.14	.793	37	*	2.17	0.755	35	*	48-130	5.00	(< 20)
Naphthalene	7.29	2.14	7.62	15	*	2.17	7.18	-5	*	43-114	5.90	(< 20)
Phenanthrene	0.0267U	2.14	1.4	66		2.17	1.32	61		53-115	6.00	(< 20)
Pyrene	0.0267U	2.14	1.63	77		2.17	1.56	72		53-121	4.60	(< 20)
Surrogates												
2-Methylnaphthalene-d10 (surr)		2.14	1.33	62		2.17	1.28	59		47-106	4.40	
Fluoranthene-d10 (surr)		2.14	1.51	71		2.17	1.47	67		24-116	3.20	

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/19/2019 3:30:00PM

Prep Batch: XXX41767
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/16/2019 11:03:21AM
Prep Initial Wt./Vol.: 234.00mL
Prep Extract Vol: 1.00mL

Print Date: 10/25/2019 9:09:48AM

SGS 1193793

SGS North America Inc.
CHAIN OF CUSTODY RECORD

Locations Nationwide
Alaska Maryland
New Jersey New York
North Carolina Indiana
West Virgina Kentucky
www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Page 1 of 1

Section 1

CLIENT: BRICE ENVIRONMENTAL

CONTACT: KIMI LLOYD PHONE NO: 907-317-7999

PROJECT NAME: 2019 HAK CS GWM PROGRAM PROJECT/ PWSID/ PERMIT#: SRF TS 1-27

REPORTS TO: KELLY CARSON E-MAIL: KCARSON@BRICEENVIRONMENTAL.COM

INVOICE TO: HILCORP AK QUOTE #: P.O. #: 1952573

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: HCL	HCL	HCL	HCL	HCL					REMARKS/ LOC ID
							AK101 (GRO)	AK102 (DRO)	AK103 (RRO)	SW8260C (AK PETRO LIST VOC)	SW8260C (BTEX ONLY)	SW8270D SIM (PAH)	SW8015C (ETHYLENE GLYCOL)			
(1)	AE	SRF127-FS127C-0719	7/10/19	1610	GW	5	1	1	1	3	1	2	1			
(2-4)	AE	SRF127-TS127G-0719	7/10/19	1210	GW	15	1	1	1	9	1	6	1			Added Volume for MS/MSD
(5)	AE	SRF127-TS127K-0719	7/10/19	1210	GW	5	-	-	-	3	-	2	1			
(6)	AE	SRF127-TS127KZ-0719	7/10/19	1110	GW	5	-	-	-	3	-	2	1			
(7)	AE	SRF127-TS127L-0719	7/10/19	1830	GW	5	-	-	-	3	-	2	-			
(8)	AE	SRF127-TS127M-0719	7/10/19	1800	GW	5	-	-	-	3	-	2	-			
(9)	AC	SRF127-TB01-0719	7/10/19	0800	GW	3	-	-	-	3	-	-	-			

Section 5

	Date	Time	
Relinquished By: (1) KIMI LLOYD	7/12/19	0930	Received By: [RAVN]
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date 07/12/19	Time 16:39	Received For Laboratory By: Alex G Alp6

Section 4

DOD Project? Yes (No)

Cooler ID: DUSTY RHODES

Data Deliverable Requirements: LEVEL II

Requested Turnaround Time and/or Special Instructions:

Profile: 341882 JK

Temp Blank °C: 0-1° DAJ or Ambient [ ]
(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) 1PAB Commercial
INTACT BROKEN ABSENT
(See attached Sample Receipt Form)

Revised Report - Revision 1

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms-and-conditions

F083-Kit_Request_and_COC_Templates-Blank
Revised 2013.03.24

Revised Report - Revision 1

Shipper's Name and Address
SGS ENVIRONMENTAL 50012
200 W POTTER DR
ANCHORAGE, AK 99518
562, 2343

Consignee:
BRICE ENVIRONMENTAL SERVICES CORP 40272
5015 BUSINESS PARK BLVD.
ANCHORAGE , AK 99503
907, 3609261

Ravn ALASKA

RAVN AIR
4700 OLD INTERNATIONAL AIRPORT ROAD
ANCHORAGE AK. 99502

It is agreed that the goods described herein are accepted in good order and undamaged condition (except as noted) for carriage SUBJECT TO THE "TERMS OF CONTRACT". The Shippers attention is drawn to the "TERMS OF CONTRACT LIMIT OF LIABILITY". The maximum liability by declaring a value of the goods and paying a supplemental charge of $0.75 per $100.00 up to a maximum of $5,000.00 declared value.

Accounting Information
GEN - GENERAL FREIGHT

Origin	ENA	Currency	USD
Destination	ANC	Charge Code	CX
Handling Information		Declared Value for Carriage	0

Pieces	Gross Weight	Nature of Goods	Chargeable Weight	Rate/Charge	Total	Length	Width	Height	Dim Weight
4		GEN//WATER SAMPLES				5	5	5	3
4	190		190						3

Fee	Prepaid	Collect
Weight Charge		70.30
Valuation Charge		0.00
Tax		4.39
Total Other Charges Due Agent		0.00
Total Other Charges Due Carrier		0.00
Total		74.69
Signature of Issuing Carrier or its Agent	WB Date	WB Time
BRAHUNSON KAAI	12-JUL-19	1133

Other Charges			
FSC Fee	0.00	SSC Fee	0.00
DOC Fees	0.00	DG Fee	0.00
OTH Fees	0.00	P/U Fee	0.00
DEL Fees	0.00	TSC Fees	0.00

The shipper certifies that the particulars on the face hereof are correct, and that the shipment does not contain dangerous goods, and that all ITEMS ARE ACCEPTED AT SHIPPER'S RISK.

KIMBERLY LLOYD
(Shipper's printed name and signature)

The consignee certifies that the shipment is received in good order except where noted below.

(Consignee's printed name and signature)

CARRIAGE SUBJECT TO "TERMS OF CONTRACT" found at https://www.flyravn.com/cargo-services/cargo-contract-carriage

Alert Expeditors Inc. #394319

Citywide Delivery • 440-3351
8421 Flamingo Drive • Anchorage, Alaska 99502

Date 7/12/14

From Brice Environmental

To SGS

Collect ☐	Prepay ☐ Account ☐	Advance Charges ☐
Job # ENA	PO# TH 1050 0154	

Water Samples

Shipped Signature

Total Charge

Received By: Ant Nec for Y La

Revised Report - Revision 1

e-Sample Receipt Form

Revised Report - Revision 1

SGS Workorder #: **1193793**

1193793

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		N/A Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Yes	1F 1B
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?		
		**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: Dusty Rhodes @ 0.1 °C Therm. ID: D45
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
		***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	Container Id	Preservative	Container Condition
1193793001-A	No Preservative Required	OK			
1193793001-B	No Preservative Required	OK			
1193793001-C	HCL to pH < 2	OK			
1193793001-D	HCL to pH < 2	OK			
1193793001-E	HCL to pH < 2	OK			
1193793002-A	No Preservative Required	OK			
1193793002-B	No Preservative Required	OK			
1193793002-C	HCL to pH < 2	OK			
1193793002-D	HCL to pH < 2	OK			
1193793002-E	HCL to pH < 2	OK			
1193793003-A	No Preservative Required	OK			
1193793003-B	No Preservative Required	OK			
1193793003-C	HCL to pH < 2	OK			
1193793003-D	HCL to pH < 2	OK			
1193793003-E	HCL to pH < 2	OK			
1193793004-A	No Preservative Required	OK			
1193793004-B	No Preservative Required	OK			
1193793004-C	HCL to pH < 2	OK			
1193793004-D	HCL to pH < 2	OK			
1193793004-E	HCL to pH < 2	OK			
1193793005-A	No Preservative Required	OK			
1193793005-B	No Preservative Required	OK			
1193793005-C	HCL to pH < 2	OK			
1193793005-D	HCL to pH < 2	OK			
1193793005-E	HCL to pH < 2	OK			
1193793006-A	No Preservative Required	OK			
1193793006-B	No Preservative Required	OK			
1193793006-C	HCL to pH < 2	OK			
1193793006-D	HCL to pH < 2	OK			
1193793006-E	HCL to pH < 2	OK			
1193793007-A	No Preservative Required	OK			
1193793007-B	No Preservative Required	OK			
1193793007-C	HCL to pH < 2	OK			
1193793007-D	HCL to pH < 2	OK			
1193793007-E	HCL to pH < 2	OK			
1193793008-A	No Preservative Required	OK			
1193793008-B	No Preservative Required	OK			
1193793008-C	HCL to pH < 2	OK			
1193793008-D	HCL to pH < 2	OK			
1193793008-E	HCL to pH < 2	OK			
1193793009-A	HCL to pH < 2	OK			
1193793009-B	HCL to pH < 2	OK			
1193793009-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.
NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

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Laboratory Report of Analysis

To: Hilcorp Alaska, LLC
3800 Centerpoint Dr. Suite 400
Anchorage, AK 99503
(907)277-7297

Report Number: **1193786**

Client Project: **SRF TS-1-33 HAK CS GWM Program**

Dear Kelly Carson,

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 Justin 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.

_____

Justin Nelson Date
Project Manager
Justin.Nelson@sgs.com

SGS North America Inc. 200 West Potter Drive, Anchorage, AK 99518
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Case Narrative

SGS Client: **Hilcorp Alaska, LLC**
SGS Project: **1193786**
Project Name/Site: **SRF TS-1-33 HAK CS GWM Program**
Project Contact: **Kelly Carson**

Refer to sample receipt form for information on sample condition.

SRF133-TS133UR-0719 (1193786002) PS

Revised Report - Revision 1 - This report has been reissued to correct the sample ID.

SRF133-TS133JJ-0719 (1193786005) PS

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

SRF133-TS133W-0719 (1193786007) PS

8270 SIM - Upon initial sample login, the sample was recorded as having been sampled on 7/11/2019. As a result, the sample was extracted outside of holding time.

SRF133-FS133F-0719 (1193786011) PS

8270 SIM - Upon initial sample login, the sample was recorded as having been sampled on 7/11/2019. As a result, the sample was extracted outside of holding time.

SRF133-TS133Q-0719 MS (1193786009) BMS

8270D SIM - PAH BMS recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.
8260C - BMS recovery for benzene and n-butylbenzene does not meet QC criteria. See LCS for accuracy requirements.

SRF133-TS133Q-0719 MSD (1193786010) BMSD

8270D SIM - PAH BMSD recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.
8260C - BMSD recovery for benzene does not meet QC criteria. See LCS for accuracy requirements.

LCSD for HBN 1796517 [VXX/3445 (1519627) LCSD

8260C - Surrogate recovery for 4-bromofluorobenzene does not meet QC criteria.

LCSD for HBN 1796601 [VXX/3446 (1519959) LCSD

8260C - Surrogate recovery for 4-bromofluorobenzene does not meet QC criteria.
8260C - LCSD recovery for 1,1-dichloroethene does not meet QC criteria.

1193792004MS (1518948) MS

8270D SIM - PAH MS recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

1193799014MS (1519644) MS

8270D SIM - PAH MS recovery for Indeno[1,2,3-c,d]pyrene, Dibenzo[a,h]anthracene and Benzo[g,h,i]perylene do not meet QC criteria. Refer to the LCS for accuracy requirements.

1193792004MSD (1518949) MSD

8270D SIM - PAH MSD recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

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Case Narrative

SGS Client: **Hilcorp Alaska, LLC**
SGS Project: **1193786**
Project Name/Site: **SRF TS-1-33 HAK CS GWM Program**
Project Contact: **Kelly Carson**

1193799014MSD (1519645) MSD

8270D SIM - PAH MSD recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.
8270D SIM - PAH MS/MSD RPD for Indeno[1,2,3-c,d] pyrene, Dibenzo[a,h]anthracene and Benzo[g,h,i]perylene do not meet QC criteria. Results for this analyte are considered estimated in the parent sample.

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

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Report of Manual Integrations

Laboratory ID	Client Sample ID	Analytical Batch	Analyte	Reason
SW8260C				
1193786001	SRF133-FS133H-0719	VMS19179	n-Butylbenzene	SP

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Print Date: 12/16/2019 4:43:49PM

Laboratory Qualifiers

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

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

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

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

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
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
SRF133-FS133H-0719	1193786001	07/11/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF133-TS133UR-0719	1193786002	07/11/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF133-TS13302-0719	1193786003	07/11/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF133-FS133S-0719	1193786004	07/11/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF133-TS133JJ-0719	1193786005	07/11/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF133-TS13302Z-0719	1193786006	07/11/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF133-TS133W-0719	1193786007	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF133-TS133Q-0719	1193786008	07/11/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF133-TS133Q-0719 MS	1193786009	07/11/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF133-TS133Q-0719 MSD	1193786010	07/11/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF133-FS133F-0719	1193786011	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF133-FS133FZ-0719	1193786012	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF133-TB01-0719	1193786013	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)

Method	Method Description
SW8260C	8021B by 8260 (W)
8270D SIM LV (PAH)	8270 PAH SIM GC/MS Liq/Liq ext. LV

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Detectable Results Summary

Client Sample ID: **SRF133-FS133H-0719**
Lab Sample ID: 1193786001

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	1.72	ug/L
	2-Methylnaphthalene	1.82	ug/L
	Fluorene	0.197	ug/L
	Naphthalene	3.77	ug/L
	Phenanthrene	0.286	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	4.75	ug/L
	1,3,5-Trimethylbenzene	12.5	ug/L
	Benzene	9.33	ug/L
	Ethylbenzene	35.1	ug/L
	Isopropylbenzene (Cumene)	11.7	ug/L
	Naphthalene	4.41	ug/L
	n-Butylbenzene	2.00	ug/L
	o-Xylene	0.550J	ug/L
	P & M -Xylene	11.6	ug/L
	sec-Butylbenzene	4.89	ug/L
	tert-Butylbenzene	0.760J	ug/L
	Toluene	0.470J	ug/L
	Xylenes (total)	12.1	ug/L

Client Sample ID: **SRF133-TS133UR-0719**
Lab Sample ID: 1193786002

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	Naphthalene	1.04	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	0.750J	ug/L
	Benzene	22.4	ug/L
	Ethylbenzene	23.6	ug/L
	Isopropylbenzene (Cumene)	5.54	ug/L
	Naphthalene	15.8	ug/L
	o-Xylene	0.870J	ug/L
	P & M -Xylene	0.900J	ug/L
	sec-Butylbenzene	0.660J	ug/L
	tert-Butylbenzene	0.920J	ug/L
	Toluene	0.340J	ug/L
	Xylenes (total)	1.77J	ug/L

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Detectable Results Summary

Client Sample ID: **SRF133-TS13302-0719**
Lab Sample ID: 1193786003

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	23.7	ug/L
	2-Methylnaphthalene	20.1	ug/L
	Acenaphthene	0.556	ug/L
	Fluorene	0.649	ug/L
	Naphthalene	27.0	ug/L
	Phenanthrene	0.188	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	1.42	ug/L
	Benzene	192	ug/L
	Ethylbenzene	164	ug/L
	Isopropylbenzene (Cumene)	44.3	ug/L
	Naphthalene	47.3	ug/L
	n-Butylbenzene	2.78	ug/L
	o-Xylene	2.07	ug/L
	P & M -Xylene	26.8	ug/L
	sec-Butylbenzene	10.2	ug/L
	tert-Butylbenzene	2.55	ug/L
	Toluene	0.570J	ug/L
	Xylenes (total)	28.9	ug/L

Client Sample ID: **SRF133-FS133S-0719**
Lab Sample ID: 1193786004

	Parameter	Result	Units
Volatile GC/MS	1,3,5-Trimethylbenzene	5.29	ug/L
	Benzene	0.980	ug/L
	Isopropylbenzene (Cumene)	2.68	ug/L
	sec-Butylbenzene	1.68	ug/L
	tert-Butylbenzene	0.550J	ug/L

Client Sample ID: **SRF133-TS133JJ-0719**
Lab Sample ID: 1193786005

	Parameter	Result	Units
Volatile GC/MS	Benzene	0.580	ug/L
	Isopropylbenzene (Cumene)	0.730J	ug/L
	Naphthalene	0.310J	ug/L
	sec-Butylbenzene	0.760J	ug/L
	tert-Butylbenzene	0.530J	ug/L

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Detectable Results Summary

Client Sample ID: **SRF133-TS13302Z-0719**
Lab Sample ID: 1193786006

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	24.4	ug/L
	2-Methylnaphthalene	20.3	ug/L
	Acenaphthene	0.589	ug/L
	Fluorene	0.696	ug/L
	Naphthalene	27.7	ug/L
	Phenanthrene	0.201	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	1.44	ug/L
	Benzene	190	ug/L
	Ethylbenzene	179	ug/L
	Isopropylbenzene (Cumene)	48.1	ug/L
	Naphthalene	48.4	ug/L
	n-Butylbenzene	3.10	ug/L
	o-Xylene	2.15	ug/L
	P & M -Xylene	28.1	ug/L
	sec-Butylbenzene	11.1	ug/L
	tert-Butylbenzene	2.71	ug/L
	Toluene	0.610J	ug/L
	Xylenes (total)	30.3	ug/L

Client Sample ID: **SRF133-TS133Q-0719**
Lab Sample ID: 1193786008

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	3.43	ug/L
	2-Methylnaphthalene	2.12	ug/L
	Naphthalene	17.0	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	542	ug/L
	1,3,5-Trimethylbenzene	345	ug/L
	Benzene	45.3	ug/L
	Ethylbenzene	1050	ug/L
	Isopropylbenzene (Cumene)	308	ug/L
	Naphthalene	41.3	ug/L
	o-Xylene	2.28	ug/L
	P & M -Xylene	1760	ug/L
	sec-Butylbenzene	13.6	ug/L
	tert-Butylbenzene	280	ug/L
	Toluene	0.660J	ug/L
	Xylenes (total)	1760	ug/L

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Detectable Results Summary

Client Sample ID: **SRF133-FS133F-0719**
Lab Sample ID: 1193786011

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	0.146	ug/L
	2-Methylnaphthalene	0.132	ug/L
	Naphthalene	0.300	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	0.490J	ug/L
	Benzene	123	ug/L
	Ethylbenzene	0.680J	ug/L
	P & M -Xylene	3.22	ug/L
	Xylenes (total)	3.22	ug/L

Client Sample ID: **SRF133-FS133FZ-0719**
Lab Sample ID: 1193786012

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	0.170	ug/L
	2-Methylnaphthalene	0.148	ug/L
	Naphthalene	0.333	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	0.350J	ug/L
	Benzene	73.2	ug/L
	Ethylbenzene	0.420J	ug/L
	P & M -Xylene	2.17	ug/L
	Xylenes (total)	2.17J	ug/L

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Results of **SRF133-FS133H-0719**

Client Sample ID: **SRF133-FS133H-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786001
Lab Project ID: 1193786

Collection Date: 07/11/19 16:55
Received Date: 07/12/19 16:39
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	1.72		0.0525	0.0158	ug/L	1		07/21/19 20:19
2-Methylnaphthalene	1.82		0.0525	0.0158	ug/L	1		07/21/19 20:19
Acenaphthene	0.0262	U	0.0525	0.0158	ug/L	1		07/21/19 20:19
Acenaphthylene	0.0262	U	0.0525	0.0158	ug/L	1		07/21/19 20:19
Anthracene	0.0262	U	0.0525	0.0158	ug/L	1		07/21/19 20:19
Benzo(a)Anthracene	0.0262	U	0.0525	0.0158	ug/L	1		07/21/19 20:19
Benzo[a]pyrene	0.0105	U	0.0210	0.00651	ug/L	1		07/21/19 20:19
Benzo[b]Fluoranthene	0.0262	U	0.0525	0.0158	ug/L	1		07/21/19 20:19
Benzo[g,h,i]perylene	0.0262	U	0.0525	0.0158	ug/L	1		07/21/19 20:19
Benzo[k]fluoranthene	0.0262	U	0.0525	0.0158	ug/L	1		07/21/19 20:19
Chrysene	0.0262	U	0.0525	0.0158	ug/L	1		07/21/19 20:19
Dibenzo[a,h]anthracene	0.0105	U	0.0210	0.00651	ug/L	1		07/21/19 20:19
Fluoranthene	0.0262	U	0.0525	0.0158	ug/L	1		07/21/19 20:19
Fluorene	0.197		0.0525	0.0158	ug/L	1		07/21/19 20:19
Indeno[1,2,3-c,d] pyrene	0.0262	U	0.0525	0.0158	ug/L	1		07/21/19 20:19
Naphthalene	3.77		0.105	0.0326	ug/L	1		07/21/19 20:19
Phenanthrene	0.286		0.0525	0.0158	ug/L	1		07/21/19 20:19
Pyrene	0.0262	U	0.0525	0.0158	ug/L	1		07/21/19 20:19
Surrogates								
2-Methylnaphthalene-d10 (surr)	70.1		47-106		%	1		07/21/19 20:19
Fluoranthene-d10 (surr)	87.9		24-116		%	1		07/21/19 20:19

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/21/19 20:19
Container ID: 1193786001-A

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 07/18/19 11:43
Prep Initial Wt./Vol.: 238 mL
Prep Extract Vol: 1 mL

Results of **SRF133-FS133H-0719**

Client Sample ID: **SRF133-FS133H-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786001
Lab Project ID: 1193786

Collection Date: 07/11/19 16:55
Received Date: 07/12/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	4.75		1.00	0.310	ug/L	1		07/17/19 21:07
1,3,5-Trimethylbenzene	12.5		1.00	0.310	ug/L	1		07/17/19 21:07
Benzene	9.33		0.400	0.120	ug/L	1		07/17/19 21:07
Ethylbenzene	35.1		1.00	0.310	ug/L	1		07/17/19 21:07
Isopropylbenzene (Cumene)	11.7		1.00	0.310	ug/L	1		07/17/19 21:07
Naphthalene	4.41		1.00	0.310	ug/L	1		07/17/19 21:07
n-Butylbenzene	2.00		1.00	0.310	ug/L	1		07/17/19 21:07
o-Xylene	0.550	J	1.00	0.310	ug/L	1		07/17/19 21:07
P & M -Xylene	11.6		2.00	0.620	ug/L	1		07/17/19 21:07
sec-Butylbenzene	4.89		1.00	0.310	ug/L	1		07/17/19 21:07
tert-Butylbenzene	0.760	J	1.00	0.310	ug/L	1		07/17/19 21:07
Toluene	0.470	J	1.00	0.310	ug/L	1		07/17/19 21:07
Xylenes (total)	12.1		3.00	1.00	ug/L	1		07/17/19 21:07
Surrogates								
1,2-Dichloroethane-D4 (surr)	94.8		81-118		%	1		07/17/19 21:07
4-Bromofluorobenzene (surr)	109		85-114		%	1		07/17/19 21:07
Toluene-d8 (surr)	96.8		89-112		%	1		07/17/19 21:07

Batch Information

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 21:07
Container ID: 1193786001-C

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-TS133UR-0719**

Client Sample ID: **SRF133-TS133UR-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786002
Lab Project ID: 1193786

Collection Date: 07/11/19 15:20
Received Date: 07/12/19 16:39
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	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
2-Methylnaphthalene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Acenaphthene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Acenaphthylene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Anthracene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Benzo(a)Anthracene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Benzo[a]pyrene	0.0101	U	0.0203	0.00630	ug/L	1		07/21/19 20:39
Benzo[b]Fluoranthene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Benzo[g,h,i]perylene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Benzo[k]fluoranthene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Chrysene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Dibenzo[a,h]anthracene	0.0101	U	0.0203	0.00630	ug/L	1		07/21/19 20:39
Fluoranthene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Fluorene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Indeno[1,2,3-c,d] pyrene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Naphthalene	1.04		0.102	0.0315	ug/L	1		07/21/19 20:39
Phenanthrene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Pyrene	0.0254	U	0.0508	0.0152	ug/L	1		07/21/19 20:39
Surrogates								
2-Methylnaphthalene-d10 (surr)	57.6		47-106		%	1		07/21/19 20:39
Fluoranthene-d10 (surr)	66.9		24-116		%	1		07/21/19 20:39

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/21/19 20:39
Container ID: 1193786002-A

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 07/18/19 11:43
Prep Initial Wt./Vol.: 246 mL
Prep Extract Vol: 1 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-TS133UR-0719**

Client Sample ID: **SRF133-TS133UR-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786002
Lab Project ID: 1193786

Collection Date: 07/11/19 15:20
Received Date: 07/12/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.750	J	1.00	0.310	ug/L	1		07/17/19 21:22
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 21:22
Benzene	22.4		0.400	0.120	ug/L	1		07/17/19 21:22
Ethylbenzene	23.6		1.00	0.310	ug/L	1		07/17/19 21:22
Isopropylbenzene (Cumene)	5.54		1.00	0.310	ug/L	1		07/17/19 21:22
Naphthalene	15.8		1.00	0.310	ug/L	1		07/17/19 21:22
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 21:22
o-Xylene	0.870	J	1.00	0.310	ug/L	1		07/17/19 21:22
P & M -Xylene	0.900	J	2.00	0.620	ug/L	1		07/17/19 21:22
sec-Butylbenzene	0.660	J	1.00	0.310	ug/L	1		07/17/19 21:22
tert-Butylbenzene	0.920	J	1.00	0.310	ug/L	1		07/17/19 21:22
Toluene	0.340	J	1.00	0.310	ug/L	1		07/17/19 21:22
Xylenes (total)	1.77	J	3.00	1.00	ug/L	1		07/17/19 21:22
Surrogates								
1,2-Dichloroethane-D4 (surr)	97.6		81-118		%	1		07/17/19 21:22
4-Bromofluorobenzene (surr)	111		85-114		%	1		07/17/19 21:22
Toluene-d8 (surr)	95.7		89-112		%	1		07/17/19 21:22

Batch Information

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 21:22
Container ID: 1193786002-C

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-TS13302-0719**

Client Sample ID: **SRF133-TS13302-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786003
Lab Project ID: 1193786

Collection Date: 07/11/19 15:00
Received Date: 07/12/19 16:39
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	23.7		0.252	0.0756	ug/L	5		07/22/19 17:58
2-Methylnaphthalene	20.1		0.252	0.0756	ug/L	5		07/22/19 17:58
Acenaphthene	0.556		0.0504	0.0151	ug/L	1		07/21/19 17:04
Acenaphthylene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:04
Anthracene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:04
Benzo(a)Anthracene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:04
Benzo[a]pyrene	0.0101	U	0.0202	0.00625	ug/L	1		07/21/19 17:04
Benzo[b]Fluoranthene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:04
Benzo[g,h,i]perylene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:04
Benzo[k]fluoranthene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:04
Chrysene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:04
Dibenzo[a,h]anthracene	0.0101	U	0.0202	0.00625	ug/L	1		07/21/19 17:04
Fluoranthene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:04
Fluorene	0.649		0.0504	0.0151	ug/L	1		07/21/19 17:04
Indeno[1,2,3-c,d] pyrene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:04
Naphthalene	27.0		0.504	0.156	ug/L	5		07/22/19 17:58
Phenanthrene	0.188		0.0504	0.0151	ug/L	1		07/21/19 17:04
Pyrene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:04
Surrogates								
2-Methylnaphthalene-d10 (surr)	75.6		47-106		%	1		07/21/19 17:04
Fluoranthene-d10 (surr)	65.6		24-116		%	1		07/21/19 17:04

Batch Information

Analytical Batch: XMS11550
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/21/19 17:04
Container ID: 1193786003-A

Prep Batch: XXX41777
Prep Method: SW3520C
Prep Date/Time: 07/17/19 10:53
Prep Initial Wt./Vol.: 248 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11554
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/22/19 17:58
Container ID: 1193786003-A

Prep Batch: XXX41777
Prep Method: SW3520C
Prep Date/Time: 07/17/19 10:53
Prep Initial Wt./Vol.: 248 mL
Prep Extract Vol: 1 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-TS13302-0719**

Client Sample ID: **SRF133-TS13302-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786003
Lab Project ID: 1193786

Collection Date: 07/11/19 15:00
Received Date: 07/12/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	1.42		1.00	0.310	ug/L	1		07/17/19 21:37
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 21:37
Benzene	192		0.400	0.120	ug/L	1		07/17/19 21:37
Ethylbenzene	164		1.00	0.310	ug/L	1		07/17/19 21:37
Isopropylbenzene (Cumene)	44.3		1.00	0.310	ug/L	1		07/17/19 21:37
Naphthalene	47.3		1.00	0.310	ug/L	1		07/17/19 21:37
n-Butylbenzene	2.78		1.00	0.310	ug/L	1		07/17/19 21:37
o-Xylene	2.07		1.00	0.310	ug/L	1		07/17/19 21:37
P & M -Xylene	26.8		2.00	0.620	ug/L	1		07/17/19 21:37
sec-Butylbenzene	10.2		1.00	0.310	ug/L	1		07/17/19 21:37
tert-Butylbenzene	2.55		1.00	0.310	ug/L	1		07/17/19 21:37
Toluene	0.570	J	1.00	0.310	ug/L	1		07/17/19 21:37
Xylenes (total)	28.9		3.00	1.00	ug/L	1		07/17/19 21:37
Surrogates								
1,2-Dichloroethane-D4 (surr)	92.5		81-118		%	1		07/17/19 21:37
4-Bromofluorobenzene (surr)	113		85-114		%	1		07/17/19 21:37
Toluene-d8 (surr)	95.5		89-112		%	1		07/17/19 21:37

Batch Information

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 21:37
Container ID: 1193786003-C

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-FS133S-0719**

Client Sample ID: **SRF133-FS133S-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786004
Lab Project ID: 1193786

Collection Date: 07/11/19 10:15
Received Date: 07/12/19 16:39
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	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
2-Methylnaphthalene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Acenaphthene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Acenaphthylene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Anthracene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Benzo(a)Anthracene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Benzo[a]pyrene	0.0111	U	0.0221	0.00686	ug/L	1		07/21/19 17:25
Benzo[b]Fluoranthene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Benzo[g,h,i]perylene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Benzo[k]fluoranthene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Chrysene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Dibenzo[a,h]anthracene	0.0111	U	0.0221	0.00686	ug/L	1		07/21/19 17:25
Fluoranthene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Fluorene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Indeno[1,2,3-c,d] pyrene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Naphthalene	0.0555	U	0.111	0.0343	ug/L	1		07/21/19 17:25
Phenanthrene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Pyrene	0.0277	U	0.0553	0.0166	ug/L	1		07/21/19 17:25
Surrogates								
2-Methylnaphthalene-d10 (surr)	61.7		47-106		%	1		07/21/19 17:25
Fluoranthene-d10 (surr)	70.4		24-116		%	1		07/21/19 17:25

Batch Information

Analytical Batch: XMS11550
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/21/19 17:25
Container ID: 1193786004-A

Prep Batch: XXX41777
Prep Method: SW3520C
Prep Date/Time: 07/17/19 10:53
Prep Initial Wt./Vol.: 226 mL
Prep Extract Vol: 1 mL

Results of **SRF133-FS133S-0719**

Client Sample ID: **SRF133-FS133S-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786004
Lab Project ID: 1193786

Collection Date: 07/11/19 10:15
Received Date: 07/12/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 21:53
1,3,5-Trimethylbenzene	5.29		1.00	0.310	ug/L	1		07/17/19 21:53
Benzene	0.980		0.400	0.120	ug/L	1		07/18/19 17:42
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/18/19 17:42
Isopropylbenzene (Cumene)	2.68		1.00	0.310	ug/L	1		07/17/19 21:53
Naphthalene	0.500	U	1.00	0.310	ug/L	1		07/18/19 17:42
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 21:53
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/17/19 21:53
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		07/17/19 21:53
sec-Butylbenzene	1.68		1.00	0.310	ug/L	1		07/17/19 21:53
tert-Butylbenzene	0.550	J	1.00	0.310	ug/L	1		07/17/19 21:53
Toluene	0.500	U	1.00	0.310	ug/L	1		07/17/19 21:53
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/17/19 21:53
Surrogates								
1,2-Dichloroethane-D4 (surr)	97.2		81-118		%	1		07/17/19 21:53
4-Bromofluorobenzene (surr)	110		85-114		%	1		07/17/19 21:53
Toluene-d8 (surr)	95.3		89-112		%	1		07/17/19 21:53

Batch Information

Analytical Batch: VMS19183
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/18/19 17:42
Container ID: 1193786004-E

Prep Batch: VXX34466
Prep Method: SW5030B
Prep Date/Time: 07/18/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 21:53
Container ID: 1193786004-C

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-TS133JJ-0719**

Client Sample ID: **SRF133-TS133JJ-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786005
Lab Project ID: 1193786

Collection Date: 07/11/19 12:10
Received Date: 07/12/19 16:39
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	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
2-Methylnaphthalene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Acenaphthene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Acenaphthylene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Anthracene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Benzo(a)Anthracene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Benzo[a]pyrene	0.0112 U		0.0223	0.00692	ug/L	1		07/21/19 17:46
Benzo[b]Fluoranthene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Benzo[g,h,i]perylene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Benzo[k]fluoranthene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Chrysene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Dibenzo[a,h]anthracene	0.0112 U		0.0223	0.00692	ug/L	1		07/21/19 17:46
Fluoranthene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Fluorene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Indeno[1,2,3-c,d] pyrene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Naphthalene	0.0560 U		0.112	0.0346	ug/L	1		07/21/19 17:46
Phenanthrene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Pyrene	0.0279 U		0.0558	0.0167	ug/L	1		07/21/19 17:46
Surrogates								
2-Methylnaphthalene-d10 (surr)	42.6	*	47-106		%	1		07/21/19 17:46
Fluoranthene-d10 (surr)	48.7		24-116		%	1		07/21/19 17:46

Batch Information

Analytical Batch: XMS11550
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/21/19 17:46
Container ID: 1193786005-A

Prep Batch: XXX41777
Prep Method: SW3520C
Prep Date/Time: 07/17/19 10:53
Prep Initial Wt./Vol.: 224 mL
Prep Extract Vol: 1 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-TS133JJ-0719**

Client Sample ID: **SRF133-TS133JJ-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786005
Lab Project ID: 1193786

Collection Date: 07/11/19 12:10
Received Date: 07/12/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 22:08
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 22:08
Benzene	0.580		0.400	0.120	ug/L	1		07/17/19 22:08
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 22:08
Isopropylbenzene (Cumene)	0.730	J	1.00	0.310	ug/L	1		07/17/19 22:08
Naphthalene	0.310	J	1.00	0.310	ug/L	1		07/17/19 22:08
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 22:08
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/17/19 22:08
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		07/17/19 22:08
sec-Butylbenzene	0.760	J	1.00	0.310	ug/L	1		07/17/19 22:08
tert-Butylbenzene	0.530	J	1.00	0.310	ug/L	1		07/17/19 22:08
Toluene	0.500	U	1.00	0.310	ug/L	1		07/17/19 22:08
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/17/19 22:08
Surrogates								
1,2-Dichloroethane-D4 (surr)	105		81-118		%	1		07/17/19 22:08
4-Bromofluorobenzene (surr)	110		85-114		%	1		07/17/19 22:08
Toluene-d8 (surr)	95.8		89-112		%	1		07/17/19 22:08

Batch Information

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 22:08
Container ID: 1193786005-C

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-TS13302Z-0719**

Client Sample ID: **SRF133-TS13302Z-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786006
Lab Project ID: 1193786

Collection Date: 07/11/19 14:00
Received Date: 07/12/19 16:39
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	24.4		0.258	0.0775	ug/L	5		07/22/19 18:19
2-Methylnaphthalene	20.3		0.258	0.0775	ug/L	5		07/22/19 18:19
Acenaphthene	0.589		0.0517	0.0155	ug/L	1		07/21/19 18:06
Acenaphthylene	0.0259	U	0.0517	0.0155	ug/L	1		07/21/19 18:06
Anthracene	0.0259	U	0.0517	0.0155	ug/L	1		07/21/19 18:06
Benzo(a)Anthracene	0.0259	U	0.0517	0.0155	ug/L	1		07/21/19 18:06
Benzo[a]pyrene	0.0104	U	0.0207	0.00640	ug/L	1		07/21/19 18:06
Benzo[b]Fluoranthene	0.0259	U	0.0517	0.0155	ug/L	1		07/21/19 18:06
Benzo[g,h,i]perylene	0.0259	U	0.0517	0.0155	ug/L	1		07/21/19 18:06
Benzo[k]fluoranthene	0.0259	U	0.0517	0.0155	ug/L	1		07/21/19 18:06
Chrysene	0.0259	U	0.0517	0.0155	ug/L	1		07/21/19 18:06
Dibenzo[a,h]anthracene	0.0104	U	0.0207	0.00640	ug/L	1		07/21/19 18:06
Fluoranthene	0.0259	U	0.0517	0.0155	ug/L	1		07/21/19 18:06
Fluorene	0.696		0.0517	0.0155	ug/L	1		07/21/19 18:06
Indeno[1,2,3-c,d] pyrene	0.0259	U	0.0517	0.0155	ug/L	1		07/21/19 18:06
Naphthalene	27.7		0.517	0.160	ug/L	5		07/22/19 18:19
Phenanthrene	0.201		0.0517	0.0155	ug/L	1		07/21/19 18:06
Pyrene	0.0259	U	0.0517	0.0155	ug/L	1		07/21/19 18:06
Surrogates								
2-Methylnaphthalene-d10 (surr)	81.3		47-106		%	1		07/21/19 18:06
Fluoranthene-d10 (surr)	66.9		24-116		%	1		07/21/19 18:06

Batch Information

Analytical Batch: XMS11550
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/21/19 18:06
Container ID: 1193786006-A

Prep Batch: XXX41777
Prep Method: SW3520C
Prep Date/Time: 07/17/19 10:53
Prep Initial Wt./Vol.: 242 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11554
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/22/19 18:19
Container ID: 1193786006-A

Prep Batch: XXX41777
Prep Method: SW3520C
Prep Date/Time: 07/17/19 10:53
Prep Initial Wt./Vol.: 242 mL
Prep Extract Vol: 1 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-TS13302Z-0719**

Client Sample ID: **SRF133-TS13302Z-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786006
Lab Project ID: 1193786

Collection Date: 07/11/19 14:00
Received Date: 07/12/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Naphthalene	48.4		1.00	0.310	ug/L	1		07/17/19 22:23
1,2,4-Trimethylbenzene	1.44		1.00	0.310	ug/L	1		07/17/19 22:23
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 22:23
Benzene	190		8.00	2.40	ug/L	20		07/18/19 21:48
Ethylbenzene	179		1.00	0.310	ug/L	1		07/17/19 22:23
Isopropylbenzene (Cumene)	48.1		1.00	0.310	ug/L	1		07/17/19 22:23
n-Butylbenzene	3.10		1.00	0.310	ug/L	1		07/17/19 22:23
o-Xylene	2.15		1.00	0.310	ug/L	1		07/17/19 22:23
P & M -Xylene	28.1		2.00	0.620	ug/L	1		07/17/19 22:23
sec-Butylbenzene	11.1		1.00	0.310	ug/L	1		07/17/19 22:23
tert-Butylbenzene	2.71		1.00	0.310	ug/L	1		07/17/19 22:23
Toluene	0.610 J		1.00	0.310	ug/L	1		07/17/19 22:23
Xylenes (total)	30.3		3.00	1.00	ug/L	1		07/17/19 22:23
Surrogates								
1,2-Dichloroethane-D4 (surr)	91.3		81-118		%	1		07/17/19 22:23
4-Bromofluorobenzene (surr)	112		85-114		%	1		07/17/19 22:23
Toluene-d8 (surr)	95.5		89-112		%	1		07/17/19 22:23

Batch Information

Analytical Batch: VMS19183
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/18/19 21:48
Container ID: 1193786006-E

Prep Batch: VXX34466
Prep Method: SW5030B
Prep Date/Time: 07/18/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 22:23
Container ID: 1193786006-C

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-TS133W-0719**

Client Sample ID: **SRF133-TS133W-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786007
Lab Project ID: 1193786

Collection Date: 07/09/19 17:20
Received Date: 07/12/19 16:39
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		07/21/19 21:00
2-Methylnaphthalene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Acenaphthene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Acenaphthylene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Anthracene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Benzo(a)Anthracene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Benzo[a]pyrene	0.00960	U	0.0192	0.00596	ug/L	1		07/21/19 21:00
Benzo[b]Fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Benzo[g,h,i]perylene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Benzo[k]fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Chrysene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Dibenzo[a,h]anthracene	0.00960	U	0.0192	0.00596	ug/L	1		07/21/19 21:00
Fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Fluorene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Indeno[1,2,3-c,d] pyrene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Naphthalene	0.0481	U	0.0962	0.0298	ug/L	1		07/21/19 21:00
Phenanthrene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Pyrene	0.0240	U	0.0481	0.0144	ug/L	1		07/21/19 21:00
Surrogates								
2-Methylnaphthalene-d10 (surr)	63.3		47-106		%	1		07/21/19 21:00
Fluoranthene-d10 (surr)	81.8		24-116		%	1		07/21/19 21:00

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/21/19 21:00
Container ID: 1193786007-A

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 07/18/19 11:43
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-TS133W-0719**

Client Sample ID: **SRF133-TS133W-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786007
Lab Project ID: 1193786

Collection Date: 07/09/19 17:20
Received Date: 07/12/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 22:38
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 22:38
Benzene	0.200 U		0.400	0.120	ug/L	1		07/17/19 22:38
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 22:38
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/17/19 22:38
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/18/19 17:58
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 22:38
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/17/19 22:38
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/17/19 22:38
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 22:38
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 22:38
Toluene	0.500 U		1.00	0.310	ug/L	1		07/17/19 22:38
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/17/19 22:38
Surrogates								
1,2-Dichloroethane-D4 (surr)	104		81-118		%	1		07/17/19 22:38
4-Bromofluorobenzene (surr)	112		85-114		%	1		07/17/19 22:38
Toluene-d8 (surr)	95.5		89-112		%	1		07/17/19 22:38

Batch Information

Analytical Batch: VMS19183
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/18/19 17:58
Container ID: 1193786007-E

Prep Batch: VXX34466
Prep Method: SW5030B
Prep Date/Time: 07/18/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 22:38
Container ID: 1193786007-C

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-TS133Q-0719**

Client Sample ID: **SRF133-TS133Q-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786008
Lab Project ID: 1193786

Collection Date: 07/11/19 11:15
Received Date: 07/12/19 16:39
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	3.43		0.0521	0.0156	ug/L	1		07/21/19 18:27
2-Methylnaphthalene	2.12		0.0521	0.0156	ug/L	1		07/21/19 18:27
Acenaphthene	0.0261 U		0.0521	0.0156	ug/L	1		07/21/19 18:27
Acenaphthylene	0.0261 U		0.0521	0.0156	ug/L	1		07/21/19 18:27
Anthracene	0.0261 U		0.0521	0.0156	ug/L	1		07/21/19 18:27
Benzo(a)Anthracene	0.0261 U		0.0521	0.0156	ug/L	1		07/21/19 18:27
Benzo[a]pyrene	0.0104 U		0.0208	0.00646	ug/L	1		07/21/19 18:27
Benzo[b]Fluoranthene	0.0261 U		0.0521	0.0156	ug/L	1		07/21/19 18:27
Benzo[g,h,i]perylene	0.0261 U		0.0521	0.0156	ug/L	1		07/21/19 18:27
Benzo[k]fluoranthene	0.0261 U		0.0521	0.0156	ug/L	1		07/21/19 18:27
Chrysene	0.0261 U		0.0521	0.0156	ug/L	1		07/21/19 18:27
Dibenzo[a,h]anthracene	0.0104 U		0.0208	0.00646	ug/L	1		07/21/19 18:27
Fluoranthene	0.0261 U		0.0521	0.0156	ug/L	1		07/21/19 18:27
Fluorene	0.0261 U		0.0521	0.0156	ug/L	1		07/21/19 18:27
Indeno[1,2,3-c,d] pyrene	0.0261 U		0.0521	0.0156	ug/L	1		07/21/19 18:27
Naphthalene	17.0		0.521	0.161	ug/L	5		07/22/19 18:39
Phenanthrene	0.0261 U		0.0521	0.0156	ug/L	1		07/21/19 18:27
Pyrene	0.0261 U		0.0521	0.0156	ug/L	1		07/21/19 18:27
Surrogates								
2-Methylnaphthalene-d10 (surr)	50.2		47-106		%	1		07/21/19 18:27
Fluoranthene-d10 (surr)	52.3		24-116		%	1		07/21/19 18:27

Batch Information

Analytical Batch: XMS11550
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/21/19 18:27
Container ID: 1193786008-A

Prep Batch: XXX41777
Prep Method: SW3520C
Prep Date/Time: 07/17/19 10:53
Prep Initial Wt./Vol.: 240 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11554
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/22/19 18:39
Container ID: 1193786008-A

Prep Batch: XXX41777
Prep Method: SW3520C
Prep Date/Time: 07/17/19 10:53
Prep Initial Wt./Vol.: 240 mL
Prep Extract Vol: 1 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-TS133Q-0719**

Client Sample ID: **SRF133-TS133Q-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786008
Lab Project ID: 1193786

Collection Date: 07/11/19 11:15
Received Date: 07/12/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	542		20.0	6.20	ug/L	20		07/17/19 23:23
1,3,5-Trimethylbenzene	345		20.0	6.20	ug/L	20		07/17/19 23:23
Benzene	45.3		0.400	0.120	ug/L	1		07/17/19 22:53
Ethylbenzene	1050		20.0	6.20	ug/L	20		07/17/19 23:23
Isopropylbenzene (Cumene)	308		20.0	6.20	ug/L	20		07/17/19 23:23
Naphthalene	41.3		1.00	0.310	ug/L	1		07/17/19 22:53
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 22:53
o-Xylene	2.28		1.00	0.310	ug/L	1		07/17/19 22:53
P & M -Xylene	1760		40.0	12.4	ug/L	20		07/17/19 23:23
sec-Butylbenzene	13.6		1.00	0.310	ug/L	1		07/17/19 22:53
tert-Butylbenzene	280		20.0	6.20	ug/L	20		07/17/19 23:23
Toluene	0.660	J	1.00	0.310	ug/L	1		07/17/19 22:53
Xylenes (total)	1760		60.0	20.0	ug/L	20		07/17/19 23:23
Surrogates								
1,2-Dichloroethane-D4 (surr)	96.1		81-118		%	1		07/17/19 22:53
4-Bromofluorobenzene (surr)	112		85-114		%	20		07/17/19 23:23
Toluene-d8 (surr)	95.6		89-112		%	1		07/17/19 22:53

Batch Information

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 22:53
Container ID: 1193786008-C

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 23:23
Container ID: 1193786008-C

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-FS133F-0719**

Client Sample ID: **SRF133-FS133F-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786011
Lab Project ID: 1193786

Collection Date: 07/09/19 17:10
Received Date: 07/12/19 16:39
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	0.146		0.0504	0.0151	ug/L	1		07/21/19 21:20
2-Methylnaphthalene	0.132		0.0504	0.0151	ug/L	1		07/21/19 21:20
Acenaphthene	0.0252 U		0.0504	0.0151	ug/L	1		07/21/19 21:20
Acenaphthylene	0.0252 U		0.0504	0.0151	ug/L	1		07/21/19 21:20
Anthracene	0.0252 U		0.0504	0.0151	ug/L	1		07/21/19 21:20
Benzo(a)Anthracene	0.0252 U		0.0504	0.0151	ug/L	1		07/21/19 21:20
Benzo[a]pyrene	0.0101 U		0.0202	0.00625	ug/L	1		07/21/19 21:20
Benzo[b]Fluoranthene	0.0252 U		0.0504	0.0151	ug/L	1		07/21/19 21:20
Benzo[g,h,i]perylene	0.0252 U		0.0504	0.0151	ug/L	1		07/21/19 21:20
Benzo[k]fluoranthene	0.0252 U		0.0504	0.0151	ug/L	1		07/21/19 21:20
Chrysene	0.0252 U		0.0504	0.0151	ug/L	1		07/21/19 21:20
Dibenzo[a,h]anthracene	0.0101 U		0.0202	0.00625	ug/L	1		07/21/19 21:20
Fluoranthene	0.0252 U		0.0504	0.0151	ug/L	1		07/21/19 21:20
Fluorene	0.0252 U		0.0504	0.0151	ug/L	1		07/21/19 21:20
Indeno[1,2,3-c,d] pyrene	0.0252 U		0.0504	0.0151	ug/L	1		07/21/19 21:20
Naphthalene	0.300		0.101	0.0313	ug/L	1		07/21/19 21:20
Phenanthrene	0.0252 U		0.0504	0.0151	ug/L	1		07/21/19 21:20
Pyrene	0.0252 U		0.0504	0.0151	ug/L	1		07/21/19 21:20
Surrogates								
2-Methylnaphthalene-d10 (surr)	60.7		47-106		%	1		07/21/19 21:20
Fluoranthene-d10 (surr)	77.8		24-116		%	1		07/21/19 21:20

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/21/19 21:20
Container ID: 1193786011-A

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 07/18/19 11:43
Prep Initial Wt./Vol.: 248 mL
Prep Extract Vol: 1 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-FS133F-0719**

Client Sample ID: **SRF133-FS133F-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786011
Lab Project ID: 1193786

Collection Date: 07/09/19 17:10
Received Date: 07/12/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.490	J	1.00	0.310	ug/L	1		07/18/19 16:41
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:41
Benzene	123		0.400	0.120	ug/L	1		07/18/19 16:41
Ethylbenzene	0.680	J	1.00	0.310	ug/L	1		07/18/19 16:41
Isopropylbenzene (Cumene)	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:41
Naphthalene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:41
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:41
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:41
P & M -Xylene	3.22		2.00	0.620	ug/L	1		07/18/19 16:41
sec-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:41
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:41
Toluene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:41
Xylenes (total)	3.22		3.00	1.00	ug/L	1		07/18/19 16:41
Surrogates								
1,2-Dichloroethane-D4 (surr)	96.9		81-118		%	1		07/18/19 16:41
4-Bromofluorobenzene (surr)	114		85-114		%	1		07/18/19 16:41
Toluene-d8 (surr)	96.7		89-112		%	1		07/18/19 16:41

Batch Information

Analytical Batch: VMS19183
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/18/19 16:41
Container ID: 1193786011-E

Prep Batch: VXX34466
Prep Method: SW5030B
Prep Date/Time: 07/18/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF133-FS133FZ-0719**

Client Sample ID: **SRF133-FS133FZ-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786012
Lab Project ID: 1193786

Collection Date: 07/09/19 17:20
Received Date: 07/12/19 16:39
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	0.170		0.0500	0.0150	ug/L	1		07/19/19 19:37
2-Methylnaphthalene	0.148		0.0500	0.0150	ug/L	1		07/19/19 19:37
Acenaphthene	0.0250 U		0.0500	0.0150	ug/L	1		07/19/19 19:37
Acenaphthylene	0.0250 U		0.0500	0.0150	ug/L	1		07/19/19 19:37
Anthracene	0.0250 U		0.0500	0.0150	ug/L	1		07/19/19 19:37
Benzo(a)Anthracene	0.0250 U		0.0500	0.0150	ug/L	1		07/19/19 19:37
Benzo[a]pyrene	0.0100 U		0.0200	0.00620	ug/L	1		07/19/19 19:37
Benzo[b]Fluoranthene	0.0250 U		0.0500	0.0150	ug/L	1		07/19/19 19:37
Benzo[g,h,i]perylene	0.0250 U		0.0500	0.0150	ug/L	1		07/19/19 19:37
Benzo[k]fluoranthene	0.0250 U		0.0500	0.0150	ug/L	1		07/19/19 19:37
Chrysene	0.0250 U		0.0500	0.0150	ug/L	1		07/19/19 19:37
Dibenzo[a,h]anthracene	0.0100 U		0.0200	0.00620	ug/L	1		07/19/19 19:37
Fluoranthene	0.0250 U		0.0500	0.0150	ug/L	1		07/19/19 19:37
Fluorene	0.0250 U		0.0500	0.0150	ug/L	1		07/19/19 19:37
Indeno[1,2,3-c,d] pyrene	0.0250 U		0.0500	0.0150	ug/L	1		07/19/19 19:37
Naphthalene	0.333		0.100	0.0310	ug/L	1		07/19/19 19:37
Phenanthrene	0.0250 U		0.0500	0.0150	ug/L	1		07/19/19 19:37
Pyrene	0.0250 U		0.0500	0.0150	ug/L	1		07/19/19 19:37
Surrogates								
2-Methylnaphthalene-d10 (surr)	66		47-106		%	1		07/19/19 19:37
Fluoranthene-d10 (surr)	77.8		24-116		%	1		07/19/19 19:37

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/19/19 19:37
Container ID: 1193786012-A

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 07/16/19 11:03
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Print Date: 12/16/2019 4:43:56PM

J flagging is activated

Results of **SRF133-FS133FZ-0719**

Client Sample ID: **SRF133-FS133FZ-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786012
Lab Project ID: 1193786

Collection Date: 07/09/19 17:20
Received Date: 07/12/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.350	J	1.00	0.310	ug/L	1		07/18/19 16:56
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:56
Benzene	73.2		0.400	0.120	ug/L	1		07/18/19 16:56
Ethylbenzene	0.420	J	1.00	0.310	ug/L	1		07/18/19 16:56
Isopropylbenzene (Cumene)	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:56
Naphthalene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:56
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:56
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:56
P & M -Xylene	2.17		2.00	0.620	ug/L	1		07/18/19 16:56
sec-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:56
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:56
Toluene	0.500	U	1.00	0.310	ug/L	1		07/18/19 16:56
Xylenes (total)	2.17	J	3.00	1.00	ug/L	1		07/18/19 16:56
Surrogates								
1,2-Dichloroethane-D4 (surr)	98.4		81-118		%	1		07/18/19 16:56
4-Bromofluorobenzene (surr)	111		85-114		%	1		07/18/19 16:56
Toluene-d8 (surr)	95.9		89-112		%	1		07/18/19 16:56

Batch Information

Analytical Batch: VMS19183
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/18/19 16:56
Container ID: 1193786012-E

Prep Batch: VXX34466
Prep Method: SW5030B
Prep Date/Time: 07/18/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF133-TB01-0719**

Client Sample ID: **SRF133-TB01-0719**
Client Project ID: **SRF TS-1-33 HAK CS GWM Program**
Lab Sample ID: 1193786013
Lab Project ID: 1193786

Collection Date: 07/09/19 08:00
Received Date: 07/12/19 16:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:18
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:18
Benzene	0.200 U		0.400	0.120	ug/L	1		07/17/19 18:18
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:18
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:18
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:18
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:18
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:18
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/17/19 18:18
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:18
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:18
Toluene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:18
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/17/19 18:18
Surrogates								
1,2-Dichloroethane-D4 (surr)	106		81-118		%	1		07/17/19 18:18
4-Bromofluorobenzene (surr)	110		85-114		%	1		07/17/19 18:18
Toluene-d8 (surr)	95.6		89-112		%	1		07/17/19 18:18

Batch Information

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 18:18
Container ID: 1193786013-A

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1796517 [VXX/34456]
Blank Lab ID: 1519625

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193786001, 1193786002, 1193786003, 1193786004, 1193786005, 1193786006, 1193786007, 1193786008, 1193786013

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	105	81-118		%
4-Bromofluorobenzene (surr)	111	85-114		%
Toluene-d8 (surr)	96.2	89-112		%

Batch Information

Analytical Batch: VMS19179
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: CMC
Analytical Date/Time: 7/17/2019 2:44:00PM

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 7/17/2019 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193786 [VXX34456]
Blank Spike Lab ID: 1519626
Date Analyzed: 07/17/2019 14:59

Spike Duplicate ID: LCSD for HBN 1193786 [VXX34456]
Spike Duplicate Lab ID: 1519627
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193786001, 1193786002, 1193786003, 1193786004, 1193786005, 1193786006, 1193786007, 1193786008, 1193786013

Results by **SW8260C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	30.8	103	30	30.0	100	(79-124)	2.60	(< 20)
1,3,5-Trimethylbenzene	30	30.1	100	30	29.8	99	(75-124)	1.00	(< 20)
Benzene	30	28.0	93	30	27.2	91	(79-120)	3.00	(< 20)
Ethylbenzene	30	26.7	89	30	25.9	87	(79-121)	2.90	(< 20)
Isopropylbenzene (Cumene)	30	26.8	89	30	26.2	87	(72-131)	2.30	(< 20)
Naphthalene	30	27.4	91	30	28.7	96	(61-128)	4.90	(< 20)
n-Butylbenzene	30	29.9	100	30	29.1	97	(75-128)	2.60	(< 20)
o-Xylene	30	27.2	91	30	26.5	88	(78-122)	2.70	(< 20)
P & M -Xylene	60	52.8	88	60	51.1	85	(80-121)	3.20	(< 20)
sec-Butylbenzene	30	29.2	97	30	28.1	94	(77-126)	3.60	(< 20)
tert-Butylbenzene	30	29.7	99	30	28.6	96	(78-124)	3.50	(< 20)
Toluene	30	25.1	84	30	24.4	81	(80-121)	2.90	(< 20)
Xylenes (total)	90	80.1	89	90	77.6	86	(79-121)	3.10	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	97.3	97	30	98.4	98	(81-118)	1.10	
4-Bromofluorobenzene (surr)	30	115	115 *	30	114	114	(85-114)	0.66	
Toluene-d8 (surr)	30	95.8	96	30	96.1	96	(89-112)	0.24	

Batch Information

Analytical Batch: **VMS19179**
Analytical Method: **SW8260C**
Instrument: **Agilent 7890-75MS**
Analyst: **CMC**

Prep Batch: **VXX34456**
Prep Method: **SW5030B**
Prep Date/Time: **07/17/2019 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

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Billable Matrix Spike Summary

Original Sample ID: 1193786008
MS Sample ID: 1193786009 BMS
MSD Sample ID: 1193786010 BMSD

Analysis Date: 07/17/2019 23:23
Analysis Date: 07/17/2019 23:39
Analysis Date: 07/17/2019 23:54
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by **SW8260C**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	542	600	1210	112	600	1210	112	79-124	0.28	(< 20)
1,3,5-Trimethylbenzene	345	600	1040	116	600	1010	111	75-124	3.10	(< 20)
Benzene	45.3	30.0	66.4	70 *	30.0	65.5	67 *	79-120	1.30	(< 20)
Ethylbenzene	1050	600	1650	99	600	1620	95	79-121	1.50	(< 20)
Isopropylbenzene (Cumene)	308	600	939	105	600	929	104	72-131	1.10	(< 20)
Naphthalene	41.3	30.0	64.6	78	30.0	72.0	102	61-128	10.80	(< 20)
n-Butylbenzene	0.500U	30.0	39.3	131 *	30.0	38.5	128	75-128	2.00	(< 20)
o-Xylene	2.28	30.0	29.9	92	30.0	29.4	90	78-122	1.60	(< 20)
P & M -Xylene	1760	1200	2910	96	1200	2840	90	80-121	2.80	(< 20)
sec-Butylbenzene	13.6	30.0	46.7	110	30.0	45.1	105	77-126	3.40	(< 20)
tert-Butylbenzene	280	600	979	116	600	952	112	78-124	2.80	(< 20)
Toluene	0.660J	30.0	26.7	87	30.0	26.6	86	80-121	0.53	(< 20)
Xylenes (total)	1760	1800	3520	98	1800	3440	93	79-121	2.40	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		30.0	27.9	93	30.0	27.8	93	81-118	0.49	
4-Bromofluorobenzene (surr)		600	673	112	600	677	113	85-114	0.63	
Toluene-d8 (surr)		30.0	29	97	30.0	29.0	97	89-112	0.03	

Batch Information

Analytical Batch: VMS19179
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: CMC
Analytical Date/Time: 7/17/2019 11:39:00PM

Prep Batch: VXX34456
Prep Method: Volatiles Extraction 8240/8260 FULL
Prep Date/Time: 7/17/2019 6:00:00AM
Prep Initial Wt./Vol.: 5.00mL
Prep Extract Vol: 5.00mL

Print Date: 12/16/2019 4:44:02PM

Method Blank

Blank ID: MB for HBN 1796601 [VXX/34466]
Blank Lab ID: 1519957

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193786004, 1193786006, 1193786007, 1193786011, 1193786012

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	104	81-118		%
4-Bromofluorobenzene (surr)	111	85-114		%
Toluene-d8 (surr)	95.7	89-112		%

Batch Information

Analytical Batch: VMS19183
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: CMC
Analytical Date/Time: 7/18/2019 2:53:00PM

Prep Batch: VXX34466
Prep Method: SW5030B
Prep Date/Time: 7/18/2019 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193786 [VXX34466]
Blank Spike Lab ID: 1519958
Date Analyzed: 07/18/2019 15:08

Spike Duplicate ID: LCSD for HBN 1193786 [VXX34466]
Spike Duplicate Lab ID: 1519959
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193786004, 1193786006, 1193786007, 1193786011, 1193786012

Results by **SW8260C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	31.9	106	30	31.9	106	(79-124)	0.07	(< 20)
1,3,5-Trimethylbenzene	30	31.9	106	30	31.5	105	(75-124)	1.40	(< 20)
Benzene	30	28.6	95	30	27.6	92	(79-120)	3.50	(< 20)
Ethylbenzene	30	27.5	92	30	27.6	92	(79-121)	0.43	(< 20)
Isopropylbenzene (Cumene)	30	28.5	95	30	28.2	94	(72-131)	1.00	(< 20)
Naphthalene	30	28.5	95	30	29.7	99	(61-128)	4.10	(< 20)
n-Butylbenzene	30	32.3	108	30	31.3	104	(75-128)	3.10	(< 20)
o-Xylene	30	27.9	93	30	27.4	91	(78-122)	2.10	(< 20)
P & M -Xylene	60	54.6	91	60	54.3	91	(80-121)	0.45	(< 20)
sec-Butylbenzene	30	31.4	105	30	30.8	103	(77-126)	1.80	(< 20)
tert-Butylbenzene	30	31.4	105	30	31.2	104	(78-124)	0.88	(< 20)
Toluene	30	26.2	87	30	25.4	85	(80-121)	3.10	(< 20)
Xylenes (total)	90	82.5	92	90	81.7	91	(79-121)	0.99	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	97.1	97	30	97	97	(81-118)	0.16	
4-Bromofluorobenzene (surr)	30	114	114	30	117	117	* (85-114)	2.30	
Toluene-d8 (surr)	30	96.3	96	30	95.1	95	(89-112)	1.20	

Batch Information

Analytical Batch: **VMS19183**
Analytical Method: **SW8260C**
Instrument: **Agilent 7890-75MS**
Analyst: **CMC**

Prep Batch: **VXX34466**
Prep Method: **SW5030B**
Prep Date/Time: **07/18/2019 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1796372 [XXX/41767]
Blank Lab ID: 1518946

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193786012

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)	64.6	47-106		%
Fluoranthene-d10 (surr)	89.2	24-116		%

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/19/2019 11:44:00AM

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 7/16/2019 11:03:21AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Print Date: 12/16/2019 4:44:10PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1193786 [XXX41767]
Blank Spike Lab ID: 1518947
Date Analyzed: 07/19/2019 12:04

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193786012

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

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	2	1.43	72	(41-115)
2-Methylnaphthalene	2	1.40	70	(39-114)
Acenaphthene	2	1.47	74	(48-114)
Acenaphthylene	2	1.61	80	(35-121)
Anthracene	2	1.62	81	(53-119)
Benzo(a)Anthracene	2	1.78	89	(59-120)
Benzo[a]pyrene	2	1.73	87	(53-120)
Benzo[b]Fluoranthene	2	1.80	90	(53-126)
Benzo[g,h,i]perylene	2	1.60	80	(44-128)
Benzo[k]fluoranthene	2	1.76	88	(54-125)
Chrysene	2	1.80	90	(57-120)
Dibenzo[a,h]anthracene	2	1.52	76	(44-131)
Fluoranthene	2	1.88	94	(58-120)
Fluorene	2	1.60	80	(50-118)
Indeno[1,2,3-c,d] pyrene	2	1.74	87	(48-130)
Naphthalene	2	1.46	73	(43-114)
Phenanthrene	2	1.54	77	(53-115)
Pyrene	2	1.95	98	(53-121)
Surrogates				
2-Methylnaphthalene-d10 (surr)	2	67.3	67	(47-106)
Fluoranthene-d10 (surr)	2	93.1	93	(24-116)

Batch Information

Analytical Batch: **XMS11539**
Analytical Method: **8270D SIM LV (PAH)**
Instrument: **Agilent GC 7890B/5977A SWA**
Analyst: **DSD**

Prep Batch: **XXX41767**
Prep Method: **SW3520C**
Prep Date/Time: **07/16/2019 11:03**
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: 1193792004
MS Sample ID: 1518948 MS
MSD Sample ID: 1518949 MSD

QC for Samples: 1193786012

Analysis Date: 07/19/2019 13:27
Analysis Date: 07/19/2019 13:47
Analysis Date: 07/19/2019 14:08
Matrix: Water (Surface, Eff., Ground)

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	0.0227U	1.92	1.25	65		1.92	1.25	65		41-115	0.55	(< 20)
2-Methylnaphthalene	0.0227U	1.92	1.25	65		1.92	1.24	65		39-114	0.52	(< 20)
Acenaphthene	0.0227U	1.92	1.27	66		1.92	1.26	65		48-114	0.89	(< 20)
Acenaphthylene	0.0227U	1.92	1.35	70		1.92	1.34	70		35-121	0.88	(< 20)
Anthracene	0.0227U	1.92	1.32	69		1.92	1.30	68		53-119	1.80	(< 20)
Benzo(a)Anthracene	0.0227U	1.92	1.09	57	*	1.92	1.07	56	*	59-120	2.30	(< 20)
Benzo[a]pyrene	0.00910U	1.92	.782	41	*	1.92	0.802	42	*	53-120	2.50	(< 20)
Benzo[b]Fluoranthene	0.0227U	1.92	.924	48	*	1.92	0.913	48	*	53-126	1.20	(< 20)
Benzo[g,h,i]perylene	0.0227U	1.92	.478	25	*	1.92	0.492	26	*	44-128	3.00	(< 20)
Benzo[k]fluoranthene	0.0227U	1.92	.78	41	*	1.92	0.807	42	*	54-125	3.40	(< 20)
Chrysene	0.0227U	1.92	1.05	55	*	1.92	1.05	55	*	57-120	0.51	(< 20)
Dibenzo[a,h]anthracene	0.00910U	1.92	.42	22	*	1.92	0.440	23	*	44-131	4.60	(< 20)
Fluoranthene	0.0227U	1.92	1.4	73		1.92	1.39	72		58-120	0.92	(< 20)
Fluorene	0.0227U	1.92	1.31	68		1.92	1.30	68		50-118	0.62	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0227U	1.92	.616	32	*	1.92	0.631	33	*	48-130	2.50	(< 20)
Naphthalene	0.0454U	1.92	1.3	67		1.92	1.28	67		43-114	0.90	(< 20)
Phenanthrene	0.0227U	1.92	1.29	67		1.92	1.26	66		53-115	2.20	(< 20)
Pyrene	0.0227U	1.92	1.47	77		1.92	1.46	76		53-121	0.80	(< 20)
Surrogates												
2-Methylnaphthalene-d10 (surr)		1.92	1.26	66		1.92	1.24	64		47-106	1.90	
Fluoranthene-d10 (surr)		1.92	1.37	71		1.92	1.35	70		24-116	2.00	

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/19/2019 1:47:00PM

Prep Batch: XXX41767
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/16/2019 11:03:21AM
Prep Initial Wt./Vol.: 260.00mL
Prep Extract Vol: 1.00mL

Print Date: 12/16/2019 4:44:15PM

Method Blank

Blank ID: MB for HBN 1796425 [XXX/41777]
Blank Lab ID: 1519211

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193786003, 1193786004, 1193786005, 1193786006, 1193786008

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)	69.1	47-106		%
Fluoranthene-d10 (surr)	78.6	24-116		%

Batch Information

Analytical Batch: XMS11550
Analytical Method: 8270D SIM LV (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 7/21/2019 4:23:00PM

Prep Batch: XXX41777
Prep Method: SW3520C
Prep Date/Time: 7/17/2019 10:53:54AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193786 [XXX41777]
Blank Spike Lab ID: 1519212
Date Analyzed: 07/21/2019 16:44

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193786003, 1193786004, 1193786005, 1193786006, 1193786008

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

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	2	1.48	74	(41-115)
2-Methylnaphthalene	2	1.45	73	(39-114)
Acenaphthene	2	1.48	74	(48-114)
Acenaphthylene	2	1.54	77	(35-121)
Anthracene	2	1.52	76	(53-119)
Benzo(a)Anthracene	2	1.63	82	(59-120)
Benzo[a]pyrene	2	1.69	84	(53-120)
Benzo[b]Fluoranthene	2	1.78	89	(53-126)
Benzo[g,h,i]perylene	2	1.69	84	(44-128)
Benzo[k]fluoranthene	2	1.68	84	(54-125)
Chrysene	2	1.65	83	(57-120)
Dibenzo[a,h]anthracene	2	1.68	84	(44-131)
Fluoranthene	2	1.73	87	(58-120)
Fluorene	2	1.53	77	(50-118)
Indeno[1,2,3-c,d] pyrene	2	1.81	91	(48-130)
Naphthalene	2	1.47	74	(43-114)
Phenanthrene	2	1.49	75	(53-115)
Pyrene	2	1.80	90	(53-121)
Surrogates				
2-Methylnaphthalene-d10 (surr)	2	70.5	71	(47-106)
Fluoranthene-d10 (surr)	2	82.1	82	(24-116)

Batch Information

Analytical Batch: **XMS11550**
Analytical Method: **8270D SIM LV (PAH)**
Instrument: **SVA Agilent 780/5975 GC/MS**
Analyst: **BMZ**

Prep Batch: **XXX41777**
Prep Method: **SW3520C**
Prep Date/Time: **07/17/2019 10:53**
Spike Init Wt./Vol.: 2 ug/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: Extract Vol:

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Billable Matrix Spike Summary

Original Sample ID: 1193786008
MS Sample ID: 1193786009 BMS
MSD Sample ID: 1193786010 BMSD

Analysis Date: 07/21/2019 18:27
Analysis Date: 07/21/2019 18:47
Analysis Date: 07/21/2019 19:08
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

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	3.43	2.16	5.43	93		2.05	4.88	71		41-115	10.70	(< 20)
2-Methylnaphthalene	2.12	2.16	3.77	77		2.05	3.40	63		39-114	10.40	(< 20)
Acenaphthene	0.0261U	2.16	1.35	62		2.05	1.27	62		48-114	5.90	(< 20)
Acenaphthylene	0.0261U	2.16	1.28	59		2.05	1.23	60		35-121	4.10	(< 20)
Anthracene	0.0261U	2.16	1.2	56		2.05	1.14	56		53-119	5.70	(< 20)
Benzo(a)Anthracene	0.0261U	2.16	1.15	54	*	2.05	1.03	50	*	59-120	11.40	(< 20)
Benzo[a]pyrene	0.0104U	2.16	.976	45	*	2.05	0.830	41	*	53-120	16.20	(< 20)
Benzo[b]Fluoranthene	0.0261U	2.16	1.08	50	*	2.05	0.926	45	*	53-126	15.80	(< 20)
Benzo[g,h,i]perylene	0.0261U	2.16	.798	37	*	2.05	0.675	33	*	44-128	16.60	(< 20)
Benzo[k]fluoranthene	0.0261U	2.16	1.02	48	*	2.05	0.893	44	*	54-125	13.60	(< 20)
Chrysene	0.0261U	2.16	1.2	56	*	2.05	1.08	53	*	57-120	10.70	(< 20)
Dibenzo[a,h]anthracene	0.0104U	2.16	.669	31	*	2.05	0.594	29	*	44-131	11.90	(< 20)
Fluoranthene	0.0261U	2.16	1.41	65		2.05	1.33	65		58-120	6.00	(< 20)
Fluorene	0.0261U	2.16	1.24	58		2.05	1.21	59		50-118	3.10	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0261U	2.16	.832	39	*	2.05	0.693	34	*	48-130	18.30	(< 20)
Phenanthrene	0.0261U	2.16	1.2	56		2.05	1.13	55		53-115	6.10	(< 20)
Pyrene	0.0261U	2.16	1.47	68		2.05	1.38	67		53-121	6.40	(< 20)
Naphthalene	17.0	2.16	23.4	298	*	2.05	20.3	162	*	43-114	14.20	(< 20)
Surrogates												
2-Methylnaphthalene-d10 (surr)		2.16	1.24	57		2.05	1.19	58		47-106	4.20	
Fluoranthene-d10 (surr)		2.16	1.33	62		2.05	1.26	61		24-116	5.80	

Batch Information

Analytical Batch: XMS11550
Analytical Method: 8270D SIM LV (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 7/21/2019 6:47:00PM

Prep Batch: XXX41777
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/17/2019 10:53:54AM
Prep Initial Wt./Vol.: 232.00mL
Prep Extract Vol: 1.00mL

Analytical Batch: XMS11554
Analytical Method: 8270D SIM LV (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 7/22/2019 7:00:00PM

Prep Batch: XXX41777
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/17/2019 10:53:54AM
Prep Initial Wt./Vol.: 232.00mL
Prep Extract Vol: 1.00mL

Print Date: 12/16/2019 4:44:21PM

Method Blank

Blank ID: MB for HBN 1796503 [XXX/41787]
Blank Lab ID: 1519521

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193786001, 1193786002, 1193786007, 1193786011

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)	66.6	47-106		%
Fluoranthene-d10 (surr)	91.4	24-116		%

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/21/2019 2:50:00PM

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 7/18/2019 11:43:13AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193786 [XXX41787]
Blank Spike Lab ID: 1519522
Date Analyzed: 07/21/2019 15:10

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193786001, 1193786002, 1193786007, 1193786011

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

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	2	1.41	70	(41-115)
2-Methylnaphthalene	2	1.38	69	(39-114)
Acenaphthene	2	1.48	74	(48-114)
Acenaphthylene	2	1.57	78	(35-121)
Anthracene	2	1.65	83	(53-119)
Benzo(a)Anthracene	2	1.83	92	(59-120)
Benzo[a]pyrene	2	1.69	85	(53-120)
Benzo[b]Fluoranthene	2	1.77	89	(53-126)
Benzo[g,h,i]perylene	2	1.58	79	(44-128)
Benzo[k]fluoranthene	2	1.70	85	(54-125)
Chrysene	2	1.87	93	(57-120)
Dibenzo[a,h]anthracene	2	1.56	78	(44-131)
Fluoranthene	2	1.96	98	(58-120)
Fluorene	2	1.57	78	(50-118)
Indeno[1,2,3-c,d] pyrene	2	1.70	85	(48-130)
Naphthalene	2	1.38	69	(43-114)
Phenanthrene	2	1.53	77	(53-115)
Pyrene	2	2.02	101	(53-121)
Surrogates				
2-Methylnaphthalene-d10 (surr)	2	68.5	69	(47-106)
Fluoranthene-d10 (surr)	2	93.9	94	(24-116)

Batch Information

Analytical Batch: **XMS11549**
Analytical Method: **8270D SIM LV (PAH)**
Instrument: **Agilent GC 7890B/5977A SWA**
Analyst: **DSD**

Prep Batch: **XXX41787**
Prep Method: **SW3520C**
Prep Date/Time: **07/18/2019 11:43**
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: 1193799014
MS Sample ID: 1519644 MS
MSD Sample ID: 1519645 MSD

Analysis Date: 07/21/2019 17:55
Analysis Date: 07/21/2019 18:15
Analysis Date: 07/21/2019 18:36
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193786001, 1193786002, 1193786007, 1193786011

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	0.0252U	2.17	1.51	69		2.00	1.39	69		41-115	8.10	(< 20)
2-Methylnaphthalene	0.0252U	2.17	1.47	67		2.00	1.35	67		39-114	8.40	(< 20)
Acenaphthene	0.0252U	2.17	1.56	72		2.00	1.39	70		48-114	11.60	(< 20)
Acenaphthylene	0.0252U	2.17	1.62	74		2.00	1.49	75		35-121	7.90	(< 20)
Anthracene	0.0252U	2.17	1.67	77		2.00	1.49	75		53-119	11.60	(< 20)
Benzo(a)Anthracene	0.0252U	2.17	1.59	73		2.00	1.39	70		59-120	13.30	(< 20)
Benzo[a]pyrene	0.0101U	2.17	1.25	57		2.00	1.06	53	*	53-120	16.60	(< 20)
Benzo[b]Fluoranthene	0.0252U	2.17	1.35	62		2.00	1.15	57		53-126	16.50	(< 20)
Benzo[g,h,i]perylene	0.0252U	2.17	.917	42	*	2.00	0.740	37	*	44-128	21.40	* (< 20)
Benzo[k]fluoranthene	0.0252U	2.17	1.32	61		2.00	1.12	56		54-125	16.20	(< 20)
Chrysene	0.0252U	2.17	1.63	75		2.00	1.42	71		57-120	13.40	(< 20)
Dibenzo[a,h]anthracene	0.0101U	2.17	.841	39	*	2.00	0.661	33	*	44-131	23.90	* (< 20)
Fluoranthene	0.0252U	2.17	1.91	88		2.00	1.69	84		58-120	12.30	(< 20)
Fluorene	0.0252U	2.17	1.66	77		2.00	1.50	75		50-118	10.20	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0252U	2.17	1.01	46	*	2.00	0.822	41	*	48-130	20.20	* (< 20)
Naphthalene	0.0505U	2.17	1.5	69		2.00	1.36	68		43-114	9.80	(< 20)
Phenanthrene	0.0252U	2.17	1.57	72		2.00	1.45	72		53-115	7.90	(< 20)
Pyrene	0.0252U	2.17	2	92		2.00	1.77	88		53-121	12.50	(< 20)
Surrogates												
2-Methylnaphthalene-d10 (surr)		2.17	1.53	71		2.00	1.39	70		47-106	9.70	
Fluoranthene-d10 (surr)		2.17	1.86	86		2.00	1.67	84		24-116	10.80	

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/21/2019 6:15:00PM

Prep Batch: XXX41787
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/18/2019 11:43:13AM
Prep Initial Wt./Vol.: 230.00mL
Prep Extract Vol: 1.00mL

Print Date: 12/16/2019 4:44:28PM

SGS

SGS North America Inc.

CHAIN OF CUSTODY 1193786

Locations Nationwide

Alaska Maryland
New Jersey New York
North Carolina Indiana
West Virgina Kentucky

Revised Report - Revision 2

www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out.
Omissions may delay the onset of analysis.

Section 1

CLIENT: BRICE ENVIRONMENTAL

CONTACT: Kimi Lloyd PHONE NO: 907-317-7999

PROJECT NAME: 2019 HAK CS GWM PROGRAM PROJECT/ PWSID/ PERMIT#: SRF TS-1-33

REPORTS TO: Kelly Carson E-MAIL: kcarson@briceenvironmental.com

INVOICE TO: Hilcorp AK QUOTE #: P.O. #: 1952573

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incre-mental Soils	Preservative: HCl	HCl	HCl	HCl	HCl	—	—			REMARKS/ LOC ID
							AK 101 (GRO)	AK 102 (DRO)	AK 103 (RRO)	SW8260C (AK PETRO LIST VOC)	SW8260C (BTEX ONLY)	SW8270D SIM (PAH)	SW8015C (ETHYLENE GLYCOL)			
1	AE	SRF133-FS133H-0719	7/11/19	1655	GW	5	—	—	—	3	—	2	—			
2	AE	SRF133-TS133WR-0719	7/11/19	1520	GW	5	—	—	—	3	—	2	—			
3	AE	SRF133-TS13302-0719	7/11/19	1500	GW	5	—	—	—	3	—	2	—			
4	AE	SRF133-FS1335-0719	7/11/19	1015	GW	5	—	—	—	3	—	2	—			
5	AE	SRF133-TS133JJ-0719	7/11/19	1210	GW	5	—	—	—	3	—	2	—			
6	AE	SRF133-TS13302Z-0719	7/11/19	1400	GW	5	—	—	—	3	—	2	—			
7	AE	SRF133-TS133W-0719	7/9/19	1720	GW	5	—	—	—	3	—	2	—			
8-10	AE	SRF133-TS133Q-0719	7/11/19	1115	GW	15	—	—	—	9	—	6	—			Added volume for MS/MSD
11	AE	SRF133-FS133F-0719	7/9/19	1710	GW	5	—	—	—	3	—	2	—			
12	AE	SRF133-FS133F2-0719	7/9/19	1720	GW	5	—	—	—	3	—	2	—			

Section 5

	Date	Time	
Relinquished By: (1) [SEE PAGE 2]			Received By:
Relinquished By: (2)			Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	07/12/19	16:39	Received For Laboratory By:

Section 4

DOD Project? Yes (No)

Cooler ID: OSCAR

Data Deliverable Requirements: LEVEL II

Requested Turnaround Time and/or Special Instructions:

Profile: 34/882 JKJ

Temp Blank °C: 2.7° DUS

or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)

INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

AMG LE 07/12/19

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms-and-conditions

SGS

1193786

RD

Locations Nationwide
Alaska Maryland
New Jersey New York
North Carolina Indiana
West Virgina Kentucky
www.us.sgs.com

Revised Report - Revision 2

...ions: Sections 1 - 5 must be filled out.
Omissions may delay the onset of analysis.

Section 1

CLIENT: BRICE ENVIRONMENTAL

CONTACT: KIMI LLOYD PHONE NO: 907-317-7999

PROJECT NAME: 2019 HAK CS GWM PROGRAM PROJECT/ PWSID/ PERMIT#: SRF TS 1-33

REPORTS TO: KELLY CARSON E-MAIL: KCARSON@BRICEENVIRONMENTAL.COM

INVOICE TO: HILCORP AK QUOTE #: P.O. #: 1952573

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incre-mental Soils	Preservative: HCl	HCl	HCl	HCl	HCl	—	—			REMARKS/ LOC ID
							AK 101 (GRO)	AK 102 (DRO)	AK 103 (RRO)	SW8260C (AK PETRO LIST VOC)	SW8260C (BTEX ONLY)	SW8270D SIM (PAH)	SW8015C (ETHYLENE GLYCOL)			
(3) AE	SRF33-TB01-0719	7/9/19	0800	GW	3		—	—	—	3	—	—	—			
	SRF14-TS14EE-0719	7/7/19	0825	GW	3		—	—	—	3	—	—	—			These did not make it on the first cooler ("MARY JANE" ON 7/9/19)

Section 3

Section 4 DOD Project? Yes No

Cooler ID: OSCAR

Data Deliverable Requirements: LEVEL II

Requested Turnaround Time and/or Special Instructions:

Section 5

	Date	Time	Received By:
Relinquished By: (1) Kimi Lloyd	7/12	1045	[RAVN]
Relinquished By: (2)			
Relinquished By: (3)			
Relinquished By: (4)	07/12/19	16:31	Received For Laboratory By: AMG

Temp Blank °C: 2.8° DUS
or Ambient [ ]
(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) Commercial
INTACT BROKEN ABSENT
(See attached Sample Receipt Form)

Shipper's Name and Address
SGS ENVIRONMENTAL 50012
200 W POTTER DR
ANCHORAGE, AK 99518
562, 2343

Consignee:
BRICE ENVIRONMENTAL SERVICES CORP 40272
5015 BUSINESS PARK BLVD.
ANCHORAGE , AK 99503
907, 3609261

Ravn ALASKA

RAVN AIR
4700 OLD INTERNATIONAL AIRPORT ROAD
ANCHORAGE AK. 99502

It is agreed that the goods described herein are accepted in good order and undamaged condition (except as noted) for carriage SUBJECT TO THE "TERMS OF CONTRACT". The Shippers attention is drawn to the "TERMS OF CONTRACT LIMIT OF LIABILITY". The maximum liability by declaring a value of the goods and paying a supplemental charge of $0.75 per $100.00 up to a maximum of $5,000.00 declared value.

Accounting Information
GEN - GENERAL FREIGHT

Origin	ENA	Currency	USD
Destination	ANC	Charge Code	CX
Handling Information		Declared Value for Carriage	0

Pieces	Gross Weight	Nature of Goods	Chargeable Weight	Rate/Charge	Total	Length	Width	Height	Dim Weight
4		GEN//WATER SAMPLES				5	5	5	3
4	190		190						3

Fee	Prepaid	Collect
Weight Charge		70.30
Valuation Charge		0.00
Tax		4.39
Total Other Charges Due Agent		0.00
Total Other Charges Due Carrier		0.00
Total		74.69
Signature of Issuing Carrier or its Agent	WB Date	WB Time
BRAHUNSON KAAI	12-JUL-19	1133

Other Charges			
FSC Fee	0.00	SSC Fee	0.00
DOC Fees	0.00	DG Fee	0.00
OTH Fees	0.00	P/U Fee	0.00
DEL Fees	0.00	TSC Fees	0.00

The shipper certifies that the particulars on the face hereof are correct, and that the shipment does not contain dangerous goods, and that all ITEMS ARE ACCEPTED AT SHIPPER'S RISK.

KIMBERLY LLOYD
(Shipper's printed name and signature)

The consignee certifies that the shipment is received in good order except where noted below.

(Consignee's printed name and signature)

CARRIAGE SUBJECT TO "TERMS OF CONTRACT" found at https://www.flyravn.com/cargo-services/cargo-contract-carriage

Alert Expeditors Inc. Revised Report - Revision 2 **#394319**

Citywide Delivery • 440-3351
8421 Flamingo Drive • Anchorage, Alaska 99502

Date 7/12/11

From Bio Environmental

To SGS

Collect ☐	Prepay ☐ Account ☐	Advance Charges ☐
Job # ENA	PO# TH 1050 7154	

Water Samples

Shipped Signature

Total Charge

Received By: Ant Stein for Y Lee

e-Sample Receipt Form

Revised Report - Revision 2

SGS Workorder #: 1193786

1 1 9 3 7 8 6

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		N/A Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Yes	1F 1B
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?		
		**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: OSCAR @ 2.8 °C Therm. ID: D45
		Cooler ID: @ °C Therm. ID:
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
		***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):

One set of VOA missed the cooler Mary Jane and was in Oscar. Received with oscar but will be added to Mary Jane WO1193675

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1193786001-A	No Preservative Required	OK			
1193786001-B	No Preservative Required	OK			
1193786001-C	HCL to pH < 2	OK			
1193786001-D	HCL to pH < 2	OK			
1193786001-E	HCL to pH < 2	OK			
1193786002-A	No Preservative Required	OK			
1193786002-B	No Preservative Required	OK			
1193786002-C	HCL to pH < 2	OK			
1193786002-D	HCL to pH < 2	OK			
1193786002-E	HCL to pH < 2	OK			
1193786003-A	No Preservative Required	OK			
1193786003-B	No Preservative Required	OK			
1193786003-C	HCL to pH < 2	OK			
1193786003-D	HCL to pH < 2	OK			
1193786003-E	HCL to pH < 2	OK			
1193786004-A	No Preservative Required	OK			
1193786004-B	No Preservative Required	OK			
1193786004-C	HCL to pH < 2	OK			
1193786004-D	HCL to pH < 2	OK			
1193786004-E	HCL to pH < 2	OK			
1193786005-A	No Preservative Required	OK			
1193786005-B	No Preservative Required	OK			
1193786005-C	HCL to pH < 2	OK			
1193786005-D	HCL to pH < 2	OK			
1193786005-E	HCL to pH < 2	OK			
1193786006-A	No Preservative Required	OK			
1193786006-B	No Preservative Required	OK			
1193786006-C	HCL to pH < 2	OK			
1193786006-D	HCL to pH < 2	OK			
1193786006-E	HCL to pH < 2	OK			
1193786007-A	No Preservative Required	OK			
1193786007-B	No Preservative Required	OK			
1193786007-C	HCL to pH < 2	OK			
1193786007-D	HCL to pH < 2	OK			
1193786007-E	HCL to pH < 2	OK			
1193786008-A	No Preservative Required	OK			
1193786008-B	No Preservative Required	OK			
1193786008-C	HCL to pH < 2	OK			
1193786008-D	HCL to pH < 2	OK			
1193786008-E	HCL to pH < 2	OK			
1193786009-A	No Preservative Required	OK			
1193786009-B	No Preservative Required	OK			
1193786009-C	HCL to pH < 2	OK			
1193786009-D	HCL to pH < 2	OK			
1193786009-E	HCL to pH < 2	OK			
1193786010-A	No Preservative Required	OK			
1193786010-B	No Preservative Required	OK			
1193786010-C	HCL to pH < 2	OK			

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1193786010-D	HCL to pH < 2	OK			
1193786010-E	HCL to pH < 2	OK			
1193786011-A	No Preservative Required	OK			
1193786011-B	No Preservative Required	OK			
1193786011-C	HCL to pH < 2	OK			
1193786011-D	HCL to pH < 2	OK			
1193786011-E	HCL to pH < 2	OK			
1193786012-A	No Preservative Required	OK			
1193786012-B	No Preservative Required	OK			
1193786012-C	HCL to pH < 2	OK			
1193786012-D	HCL to pH < 2	OK			
1193786012-E	HCL to pH < 2	OK			
1193786013-A	HCL to pH < 2	OK			
1193786013-B	HCL to pH < 2	OK			
1193786013-C	HCL to pH < 2	OK			

Container Condition Glossary

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

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

Laboratory Report of Analysis

To: Hilcorp Alaska, LLC
3800 Centerpoint Dr. Suite 400
Anchorage, AK 99503
(907)277-7297

Report Number: **1193792**

Client Project: **SRF TS2-15 HAKCS GWM Program**

Dear Kelly Carson,

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 Justin 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.



SGS North America Inc.
Environmental Services – Alaska Division
Project Manager

Justin Nelson
2019.07.23
15:49:47 -08'00'

Justin Nelson Date
Project Manager
Justin.Nelson@sgs.com

Print Date: 07/23/2019 11:20:19AM

Results via Engage

Case Narrative

SGS Client: **Hilcorp Alaska, LLC**
SGS Project: **1193792**
Project Name/Site: **SRF TS2-15 HAKCS GWM Program**
Project Contact: **Kelly Carson**

Refer to sample receipt form for information on sample condition.

SRF215-TS215P-0719 MS (1193792005) BMS

8270D SIM - PAH BMS recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

SRF215-TS215P-0719 MSD (1193792006) BMSD

8270D SIM - PAH BMSD recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

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

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

Member of SGS Group

Report of Manual Integrations

Laboratory ID	Client Sample ID	Analytical Batch	Analyte	Reason
SW8260C				
1193792002	SRF215-TS215O-0719	VMS19171	n-Butylbenzene	SP
1193792003	SRF215-TS215OZ-0720	VMS19171	n-Butylbenzene	SP

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Print Date: 07/23/2019 11:20:23AM

Laboratory Qualifiers

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

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry (DW Chemistry (Provisionally Certified as of 6/20/19 for Turbidity by SM 2130B, and Copper by EPA 200.8) & 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). SGS is only certified for the analytes listed on our Drinking Water Certification, and only those analytes will be reported to the State of Alaska for compliance. Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

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

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

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

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
SRF215-FS215B-0719	1193792001	07/10/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF215-TS215O-0719	1193792002	07/10/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF215-TS215OZ-0720	1193792003	07/10/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF215-TS215P-0719	1193792004	07/10/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF215-TS215P-0719 MS	1193792005	07/10/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF215-TS215P-0719 MSD	1193792006	07/10/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF215-TS215R-0719	1193792007	07/10/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF215-TB01-0719	1193792008	07/10/2019	07/12/2019	Water (Surface, Eff., Ground)

Method	Method Description
SW8260C	8021B by 8260 (W)
8270D SIM LV (PAH)	8270 PAH SIM GC/MS Liq/Liq ext. LV

SGS North America Inc.
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Detectable Results Summary

Client Sample ID: **SRF215-TS215O-0719**
Lab Sample ID: 1193792002

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	2.62	ug/L
	2-Methylnaphthalene	2.87	ug/L
	Naphthalene	8.64	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	84.7	ug/L
	1,3,5-Trimethylbenzene	26.1	ug/L
	Benzene	6.44	ug/L
	Ethylbenzene	189	ug/L
	Isopropylbenzene (Cumene)	20.5	ug/L
	Naphthalene	14.4	ug/L
	n-Butylbenzene	1.38	ug/L
	o-Xylene	48.3	ug/L
	P & M -Xylene	584	ug/L
	sec-Butylbenzene	3.71	ug/L
	tert-Butylbenzene	0.650J	ug/L
	Toluene	1.24	ug/L
	Xylenes (total)	633	ug/L

Client Sample ID: **SRF215-TS215OZ-0720**
Lab Sample ID: 1193792003

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	2.61	ug/L
	2-Methylnaphthalene	2.86	ug/L
	Naphthalene	8.50	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	76.3	ug/L
	1,3,5-Trimethylbenzene	23.9	ug/L
	Benzene	6.02	ug/L
	Ethylbenzene	179	ug/L
	Isopropylbenzene (Cumene)	19.5	ug/L
	Naphthalene	13.4	ug/L
	n-Butylbenzene	1.22	ug/L
	o-Xylene	46.5	ug/L
	P & M -Xylene	547	ug/L
	sec-Butylbenzene	3.28	ug/L
	tert-Butylbenzene	0.570J	ug/L
	Toluene	1.19	ug/L
	Xylenes (total)	594	ug/L

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Results of **SRF215-FS215B-0719**

Client Sample ID: **SRF215-FS215B-0719**
Client Project ID: **SRF TS2-15 HAKCS GWM Program**
Lab Sample ID: 1193792001
Lab Project ID: 1193792

Collection Date: 07/10/19 15:00
Received Date: 07/12/19 16:34
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	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
2-Methylnaphthalene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Acenaphthene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Acenaphthylene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Anthracene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Benzo(a)Anthracene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Benzo[a]pyrene	0.0104	U	0.0208	0.00646	ug/L	1		07/19/19 12:25
Benzo[b]Fluoranthene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Benzo[g,h,i]perylene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Benzo[k]fluoranthene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Chrysene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Dibenzo[a,h]anthracene	0.0104	U	0.0208	0.00646	ug/L	1		07/19/19 12:25
Fluoranthene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Fluorene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Indeno[1,2,3-c,d] pyrene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Naphthalene	0.0520	U	0.104	0.0323	ug/L	1		07/19/19 12:25
Phenanthrene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Pyrene	0.0261	U	0.0521	0.0156	ug/L	1		07/19/19 12:25
Surrogates								
2-Methylnaphthalene-d10 (surr)	72.1		47-106		%	1		07/19/19 12:25
Fluoranthene-d10 (surr)	83.5		24-116		%	1		07/19/19 12:25

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/19/19 12:25
Container ID: 1193792001-A

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 07/16/19 11:03
Prep Initial Wt./Vol.: 240 mL
Prep Extract Vol: 1 mL

Print Date: 07/23/2019 11:20:29AM

J flagging is activated

Results of **SRF215-FS215B-0719**

Client Sample ID: **SRF215-FS215B-0719**
Client Project ID: **SRF TS2-15 HAKCS GWM Program**
Lab Sample ID: 1193792001
Lab Project ID: 1193792

Collection Date: 07/10/19 15:00
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/16/19 18:49
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 20:22
Benzene	0.200	U	0.400	0.120	ug/L	1		07/15/19 20:22
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 20:22
Isopropylbenzene (Cumene)	0.500	U	1.00	0.310	ug/L	1		07/15/19 20:22
Naphthalene	0.500	U	1.00	0.310	ug/L	1		07/16/19 18:49
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 20:22
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/15/19 20:22
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		07/15/19 20:22
sec-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 20:22
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 20:22
Toluene	0.500	U	1.00	0.310	ug/L	1		07/15/19 20:22
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/15/19 20:22
Surrogates								
1,2-Dichloroethane-D4 (surr)	107		81-118		%	1		07/15/19 20:22
4-Bromofluorobenzene (surr)	111		85-114		%	1		07/15/19 20:22
Toluene-d8 (surr)	98		89-112		%	1		07/15/19 20:22

Batch Information

Analytical Batch: VMS19175
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/16/19 18:49
Container ID: 1193792001-E

Prep Batch: VXX34455
Prep Method: SW5030B
Prep Date/Time: 07/16/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 20:22
Container ID: 1193792001-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/23/2019 11:20:29AM

J flagging is activated

Results of **SRF215-TS215O-0719**

Client Sample ID: **SRF215-TS215O-0719**
Client Project ID: **SRF TS2-15 HAKCS GWM Program**
Lab Sample ID: 1193792002
Lab Project ID: 1193792

Collection Date: 07/10/19 10:20
Received Date: 07/12/19 16:34
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	2.62		0.0512	0.0154	ug/L	1		07/19/19 12:45
2-Methylnaphthalene	2.87		0.0512	0.0154	ug/L	1		07/19/19 12:45
Acenaphthene	0.0256	U	0.0512	0.0154	ug/L	1		07/19/19 12:45
Acenaphthylene	0.0256	U	0.0512	0.0154	ug/L	1		07/19/19 12:45
Anthracene	0.0256	U	0.0512	0.0154	ug/L	1		07/19/19 12:45
Benzo(a)Anthracene	0.0256	U	0.0512	0.0154	ug/L	1		07/19/19 12:45
Benzo[a]pyrene	0.0103	U	0.0205	0.00635	ug/L	1		07/19/19 12:45
Benzo[b]Fluoranthene	0.0256	U	0.0512	0.0154	ug/L	1		07/19/19 12:45
Benzo[g,h,i]perylene	0.0256	U	0.0512	0.0154	ug/L	1		07/19/19 12:45
Benzo[k]fluoranthene	0.0256	U	0.0512	0.0154	ug/L	1		07/19/19 12:45
Chrysene	0.0256	U	0.0512	0.0154	ug/L	1		07/19/19 12:45
Dibenzo[a,h]anthracene	0.0103	U	0.0205	0.00635	ug/L	1		07/19/19 12:45
Fluoranthene	0.0256	U	0.0512	0.0154	ug/L	1		07/19/19 12:45
Fluorene	0.0256	U	0.0512	0.0154	ug/L	1		07/19/19 12:45
Indeno[1,2,3-c,d] pyrene	0.0256	U	0.0512	0.0154	ug/L	1		07/19/19 12:45
Naphthalene	8.64		0.102	0.0318	ug/L	1		07/19/19 12:45
Phenanthrene	0.0256	U	0.0512	0.0154	ug/L	1		07/19/19 12:45
Pyrene	0.0256	U	0.0512	0.0154	ug/L	1		07/19/19 12:45
Surrogates								
2-Methylnaphthalene-d10 (surr)	71.8		47-106		%	1		07/19/19 12:45
Fluoranthene-d10 (surr)	83.3		24-116		%	1		07/19/19 12:45

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/19/19 12:45
Container ID: 1193792002-A

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 07/16/19 11:03
Prep Initial Wt./Vol.: 244 mL
Prep Extract Vol: 1 mL

Print Date: 07/23/2019 11:20:29AM

J flagging is activated

Results of **SRF215-TS215O-0719**

Client Sample ID: **SRF215-TS215O-0719**
Client Project ID: **SRF TS2-15 HAKCS GWM Program**
Lab Sample ID: 1193792002
Lab Project ID: 1193792

Collection Date: 07/10/19 10:20
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	84.7		1.00	0.310	ug/L	1		07/15/19 20:37
1,3,5-Trimethylbenzene	26.1		1.00	0.310	ug/L	1		07/15/19 20:37
Benzene	6.44		0.400	0.120	ug/L	1		07/15/19 20:37
Ethylbenzene	189		1.00	0.310	ug/L	1		07/15/19 20:37
Isopropylbenzene (Cumene)	20.5		1.00	0.310	ug/L	1		07/15/19 20:37
Naphthalene	14.4		1.00	0.310	ug/L	1		07/15/19 20:37
n-Butylbenzene	1.38		1.00	0.310	ug/L	1		07/15/19 20:37
o-Xylene	48.3		20.0	6.20	ug/L	20		07/16/19 21:21
P & M -Xylene	584		40.0	12.4	ug/L	20		07/16/19 21:21
sec-Butylbenzene	3.71		1.00	0.310	ug/L	1		07/15/19 20:37
tert-Butylbenzene	0.650	J	1.00	0.310	ug/L	1		07/15/19 20:37
Toluene	1.24		1.00	0.310	ug/L	1		07/15/19 20:37
Xylenes (total)	633		60.0	20.0	ug/L	20		07/16/19 21:21
Surrogates								
1,2-Dichloroethane-D4 (surr)	106		81-118		%	1		07/15/19 20:37
4-Bromofluorobenzene (surr)	114		85-114		%	1		07/15/19 20:37
Toluene-d8 (surr)	94.2		89-112		%	1		07/15/19 20:37

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 20:37
Container ID: 1193792002-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19175
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/16/19 21:21
Container ID: 1193792002-E

Prep Batch: VXX34455
Prep Method: SW5030B
Prep Date/Time: 07/16/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/23/2019 11:20:29AM

J flagging is activated

Results of **SRF215-TS215OZ-0720**

Client Sample ID: **SRF215-TS215OZ-0720**
Client Project ID: **SRF TS2-15 HAKCS GWM Program**
Lab Sample ID: 1193792003
Lab Project ID: 1193792

Collection Date: 07/10/19 09:20
Received Date: 07/12/19 16:34
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	2.61		0.0517	0.0155	ug/L	1		07/19/19 13:06
2-Methylnaphthalene	2.86		0.0517	0.0155	ug/L	1		07/19/19 13:06
Acenaphthene	0.0259 U		0.0517	0.0155	ug/L	1		07/19/19 13:06
Acenaphthylene	0.0259 U		0.0517	0.0155	ug/L	1		07/19/19 13:06
Anthracene	0.0259 U		0.0517	0.0155	ug/L	1		07/19/19 13:06
Benzo(a)Anthracene	0.0259 U		0.0517	0.0155	ug/L	1		07/19/19 13:06
Benzo[a]pyrene	0.0104 U		0.0207	0.00640	ug/L	1		07/19/19 13:06
Benzo[b]Fluoranthene	0.0259 U		0.0517	0.0155	ug/L	1		07/19/19 13:06
Benzo[g,h,i]perylene	0.0259 U		0.0517	0.0155	ug/L	1		07/19/19 13:06
Benzo[k]fluoranthene	0.0259 U		0.0517	0.0155	ug/L	1		07/19/19 13:06
Chrysene	0.0259 U		0.0517	0.0155	ug/L	1		07/19/19 13:06
Dibenzo[a,h]anthracene	0.0104 U		0.0207	0.00640	ug/L	1		07/19/19 13:06
Fluoranthene	0.0259 U		0.0517	0.0155	ug/L	1		07/19/19 13:06
Fluorene	0.0259 U		0.0517	0.0155	ug/L	1		07/19/19 13:06
Indeno[1,2,3-c,d] pyrene	0.0259 U		0.0517	0.0155	ug/L	1		07/19/19 13:06
Naphthalene	8.50		0.103	0.0320	ug/L	1		07/19/19 13:06
Phenanthrene	0.0259 U		0.0517	0.0155	ug/L	1		07/19/19 13:06
Pyrene	0.0259 U		0.0517	0.0155	ug/L	1		07/19/19 13:06
Surrogates								
2-Methylnaphthalene-d10 (surr)	72.4		47-106		%	1		07/19/19 13:06
Fluoranthene-d10 (surr)	84.8		24-116		%	1		07/19/19 13:06

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/19/19 13:06
Container ID: 1193792003-A

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 07/16/19 11:03
Prep Initial Wt./Vol.: 242 mL
Prep Extract Vol: 1 mL

Print Date: 07/23/2019 11:20:29AM

J flagging is activated

Results of **SRF215-TS215OZ-0720**

Client Sample ID: **SRF215-TS215OZ-0720**
Client Project ID: **SRF TS2-15 HAKCS GWM Program**
Lab Sample ID: 1193792003
Lab Project ID: 1193792

Collection Date: 07/10/19 09:20
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	76.3		1.00	0.310	ug/L	1		07/15/19 20:52
1,3,5-Trimethylbenzene	23.9		1.00	0.310	ug/L	1		07/15/19 20:52
Benzene	6.02		0.400	0.120	ug/L	1		07/15/19 20:52
Ethylbenzene	179		1.00	0.310	ug/L	1		07/15/19 20:52
Isopropylbenzene (Cumene)	19.5		1.00	0.310	ug/L	1		07/15/19 20:52
Naphthalene	13.4		1.00	0.310	ug/L	1		07/15/19 20:52
n-Butylbenzene	1.22		1.00	0.310	ug/L	1		07/15/19 20:52
o-Xylene	46.5		20.0	6.20	ug/L	20		07/16/19 21:36
P & M -Xylene	547		40.0	12.4	ug/L	20		07/16/19 21:36
sec-Butylbenzene	3.28		1.00	0.310	ug/L	1		07/15/19 20:52
tert-Butylbenzene	0.570	J	1.00	0.310	ug/L	1		07/15/19 20:52
Toluene	1.19		1.00	0.310	ug/L	1		07/15/19 20:52
Xylenes (total)	594		60.0	20.0	ug/L	20		07/16/19 21:36
Surrogates								
1,2-Dichloroethane-D4 (surr)	106		81-118		%	1		07/15/19 20:52
4-Bromofluorobenzene (surr)	110		85-114		%	1		07/15/19 20:52
Toluene-d8 (surr)	96.3		89-112		%	1		07/15/19 20:52

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 20:52
Container ID: 1193792003-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19175
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/16/19 21:36
Container ID: 1193792003-E

Prep Batch: VXX34455
Prep Method: SW5030B
Prep Date/Time: 07/16/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/23/2019 11:20:29AM

J flagging is activated

Results of **SRF215-TS215P-0719**

Client Sample ID: **SRF215-TS215P-0719**
Client Project ID: **SRF TS2-15 HAKCS GWM Program**
Lab Sample ID: 1193792004
Lab Project ID: 1193792

Collection Date: 07/10/19 09:10
Received Date: 07/12/19 16:34
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	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
2-Methylnaphthalene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Acenaphthene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Acenaphthylene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Anthracene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Benzo(a)Anthracene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Benzo[a]pyrene	0.00910	U	0.0182	0.00564	ug/L	1		07/19/19 13:27
Benzo[b]Fluoranthene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Benzo[g,h,i]perylene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Benzo[k]fluoranthene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Chrysene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Dibenzo[a,h]anthracene	0.00910	U	0.0182	0.00564	ug/L	1		07/19/19 13:27
Fluoranthene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Fluorene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Indeno[1,2,3-c,d] pyrene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Naphthalene	0.0454	U	0.0909	0.0282	ug/L	1		07/19/19 13:27
Phenanthrene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Pyrene	0.0227	U	0.0455	0.0136	ug/L	1		07/19/19 13:27
Surrogates								
2-Methylnaphthalene-d10 (surr)	68.4		47-106		%	1		07/19/19 13:27
Fluoranthene-d10 (surr)	77.5		24-116		%	1		07/19/19 13:27

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/19/19 13:27
Container ID: 1193792004-A

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 07/16/19 11:03
Prep Initial Wt./Vol.: 275 mL
Prep Extract Vol: 1 mL

Print Date: 07/23/2019 11:20:29AM

J flagging is activated

Results of **SRF215-TS215P-0719**

Client Sample ID: **SRF215-TS215P-0719**
Client Project ID: **SRF TS2-15 HAKCS GWM Program**
Lab Sample ID: 1193792004
Lab Project ID: 1193792

Collection Date: 07/10/19 09:10
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:04
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:04
Benzene	0.200 U		0.400	0.120	ug/L	1		07/16/19 19:04
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:04
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:04
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:04
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:04
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:04
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/16/19 19:04
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:04
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:04
Toluene	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:04
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/16/19 19:04
Surrogates								
1,2-Dichloroethane-D4 (surr)	107		81-118		%	1		07/16/19 19:04
4-Bromofluorobenzene (surr)	111		85-114		%	1		07/16/19 19:04
Toluene-d8 (surr)	95.9		89-112		%	1		07/16/19 19:04

Batch Information

Analytical Batch: VMS19175
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/16/19 19:04
Container ID: 1193792004-C

Prep Batch: VXX34455
Prep Method: SW5030B
Prep Date/Time: 07/16/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/23/2019 11:20:29AM

J flagging is activated

Results of **SRF215-TS215R-0719**

Client Sample ID: **SRF215-TS215R-0719**
Client Project ID: **SRF TS2-15 HAKCS GWM Program**
Lab Sample ID: 1193792007
Lab Project ID: 1193792

Collection Date: 07/10/19 08:50
Received Date: 07/12/19 16:34
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	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
2-Methylnaphthalene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Acenaphthene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Acenaphthylene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Anthracene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Benzo(a)Anthracene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Benzo[a]pyrene	0.0107	U	0.0214	0.00662	ug/L	1		07/19/19 14:28
Benzo[b]Fluoranthene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Benzo[g,h,i]perylene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Benzo[k]fluoranthene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Chrysene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Dibenzo[a,h]anthracene	0.0107	U	0.0214	0.00662	ug/L	1		07/19/19 14:28
Fluoranthene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Fluorene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Indeno[1,2,3-c,d] pyrene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Naphthalene	0.0535	U	0.107	0.0331	ug/L	1		07/19/19 14:28
Phenanthrene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Pyrene	0.0267	U	0.0534	0.0160	ug/L	1		07/19/19 14:28
Surrogates								
2-Methylnaphthalene-d10 (surr)	64.6		47-106		%	1		07/19/19 14:28
Fluoranthene-d10 (surr)	80.9		24-116		%	1		07/19/19 14:28

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/19/19 14:28
Container ID: 1193792007-A

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 07/16/19 11:03
Prep Initial Wt./Vol.: 234 mL
Prep Extract Vol: 1 mL

Print Date: 07/23/2019 11:20:29AM

J flagging is activated

Results of **SRF215-TS215R-0719**

Client Sample ID: **SRF215-TS215R-0719**
Client Project ID: **SRF TS2-15 HAKCS GWM Program**
Lab Sample ID: 1193792007
Lab Project ID: 1193792

Collection Date: 07/10/19 08:50
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:19
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 21:07
Benzene	0.200 U		0.400	0.120	ug/L	1		07/15/19 21:07
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 21:07
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/15/19 21:07
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:19
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 21:07
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/16/19 19:19
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/16/19 19:19
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 21:07
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 21:07
Toluene	0.500 U		1.00	0.310	ug/L	1		07/15/19 21:07
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/16/19 19:19
Surrogates								
1,2-Dichloroethane-D4 (surr)	106		81-118		%	1		07/15/19 21:07
4-Bromofluorobenzene (surr)	110		85-114		%	1		07/15/19 21:07
Toluene-d8 (surr)	95.4		89-112		%	1		07/15/19 21:07

Batch Information

Analytical Batch: VMS19175
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/16/19 19:19
Container ID: 1193792007-D

Prep Batch: VXX34455
Prep Method: SW5030B
Prep Date/Time: 07/16/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 21:07
Container ID: 1193792007-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF215-TB01-0719**

Client Sample ID: **SRF215-TB01-0719**
Client Project ID: **SRF TS2-15 HAKCS GWM Program**
Lab Sample ID: 1193792008
Lab Project ID: 1193792

Collection Date: 07/10/19 08:50
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:34
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:34
Benzene	0.200	U	0.400	0.120	ug/L	1		07/15/19 16:34
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:34
Isopropylbenzene (Cumene)	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:34
Naphthalene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:34
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:34
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:34
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		07/15/19 16:34
sec-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:34
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:34
Toluene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:34
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/15/19 16:34
Surrogates								
1,2-Dichloroethane-D4 (surr)	107		81-118		%	1		07/15/19 16:34
4-Bromofluorobenzene (surr)	111		85-114		%	1		07/15/19 16:34
Toluene-d8 (surr)	97		89-112		%	1		07/15/19 16:34

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 16:34
Container ID: 1193792008-A

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/23/2019 11:20:29AM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1796460 [VXX/34446]
Blank Lab ID: 1519362

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193792001, 1193792002, 1193792003, 1193792007, 1193792008

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	107	81-118		%
4-Bromofluorobenzene (surr)	113	85-114		%
Toluene-d8 (surr)	96	89-112		%

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: CMC
Analytical Date/Time: 7/15/2019 2:48:00PM

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 7/15/2019 6:30:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1193792 [VXX34446]
Blank Spike Lab ID: 1519363
Date Analyzed: 07/15/2019 15:03

Spike Duplicate ID: LCSD for HBN 1193792 [VXX34446]
Spike Duplicate Lab ID: 1519364
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193792001, 1193792002, 1193792003, 1193792007, 1193792008

Results by **SW8260C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	32.2	107	30	31.2	104	(79-124)	3.10	(< 20)
1,3,5-Trimethylbenzene	30	31.7	106	30	30.8	103	(75-124)	2.70	(< 20)
Benzene	30	27.9	93	30	26.8	90	(79-120)	3.90	(< 20)
Ethylbenzene	30	27.9	93	30	27.0	90	(79-121)	3.10	(< 20)
Isopropylbenzene (Cumene)	30	27.7	92	30	27.4	91	(72-131)	1.40	(< 20)
Naphthalene	30	27.3	91	30	28.3	95	(61-128)	3.70	(< 20)
n-Butylbenzene	30	32.5	108	30	31.5	105	(75-128)	3.10	(< 20)
o-Xylene	30	27.5	92	30	27.0	90	(78-122)	2.00	(< 20)
P & M -Xylene	60	54.2	90	60	53.0	88	(80-121)	2.30	(< 20)
sec-Butylbenzene	30	31.7	106	30	30.5	102	(77-126)	3.80	(< 20)
tert-Butylbenzene	30	31.2	104	30	30.8	103	(78-124)	1.30	(< 20)
Toluene	30	26.5	88	30	25.8	86	(80-121)	2.50	(< 20)
Xylenes (total)	90	81.8	91	90	80.0	89	(79-121)	2.20	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	97.7	98	30	98.2	98	(81-118)	0.59	
4-Bromofluorobenzene (surr)	30	113	113	30	112	112	(85-114)	0.59	
Toluene-d8 (surr)	30	96.1	96	30	95.6	96	(89-112)	0.52	

Batch Information

Analytical Batch: **VMS19171**
Analytical Method: **SW8260C**
Instrument: **Agilent 7890-75MS**
Analyst: **CMC**

Prep Batch: **VXX34446**
Prep Method: **SW5030B**
Prep Date/Time: **07/15/2019 06:30**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

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

Member of SGS Group

Method Blank

Blank ID: MB for HBN 1796410 [VXX/03344]
Blank Lab ID: 1419450

Matrix: Watpr (Curfacp8Eff.8Ground)

2 Q for CaS mpe:
119079s, , 18119079s, , s8119079s, , 08119079s, , 38119079s, , 7

Rpeulte by **SW8260C**

ParaS ptpr	Rpeulte	LO2 /QL	DL	Unite
18s8-TriS pthylbpnzpnp	, .4, , U	1., ,	, .01,	ug/L
18084-TriS pthylbpnzpnp	, .4, , U	1., ,	, .01,	ug/L
Bpnzpnp	, .s, , U	, .3, ,	, .1s,	ug/L
Ethylbpnzpnp	, .4, , U	1., ,	, .01,	ug/L
Ieomromylbpnzpnp (QuS pnp)	, .4, , U	1., ,	, .01,	ug/L
Nam hthalpnp	, .4, , U	1., ,	, .01,	ug/L
n-Butylbpnzpnp	, .4, , U	1., ,	, .01,	ug/L
o-Xylpnp	, .4, , U	1., ,	, .01,	ug/L
P & M -Xylpnp	1., , U	s., ,	, .6s,	ug/L
epc-Butylbpnzpnp	, .4, , U	1., ,	, .01,	ug/L
tprt-Butylbpnzpnp	, .4, , U	1., ,	, .01,	ug/L
Tolupnp	, .4, , U	1., ,	, .01,	ug/L
Xylpnpe (total)	1.4, U	0., ,	1., ,	ug/L
Surrogates				
18s-Dichloropthanp-D3 (eurr)	1, 9	51-115		%
3-BroS ofluorobpnzpnp (eurr)	11s	54-113		%
Tolupnp-d5 (eurr)	96.s	59-11s		%

Batch Information

Analytical Batch: VMC19174
Analytical Mpthod: CW5s6, Q
InetruS pnt: Agilpnt 759, -74MC
Analyet: NRB
Analytical Datp/TiS p: 7/16/s, 19 0:, , :, , PM

PrpmBatch: VXX03344
PrpmMpthod: CW4, 0, B
PrpmDatp/TiS p: 7/16/s, 19 6:, , :, , AM
PrpmInitial Wt./Vol.: 4 S L
PrpmExtract Vol: 4 S L

Print Datp: , 7/s0/s, 19 11:s, :00AM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1193792 [VXX34466]
Blank Spike Lab ID: 1619654
Date Analyzed: 07/1u/2019 16:16

Spike DcpliRate ID: LCSD for HBN 1193792 [VXX34466]
Spike DcpliRate Lab ID: 1619656
x atriW (ater ,ScrfaReE. ffGE) rocndP

8 C for Sa%pleM 1193792001E1193792002E1193792003E1193792004E1193792007

s eMcltMby **SW8260C**

	Blank Spike ,cQLP			Spike DcpliRate ,cQLP					
mara%eter	Spike	s eMclt	s eR,g P	Spike	s eMclt	s eR,g P	CL	s mD ,g P	s mD CL
1E2E4-Tri%ethylbenzene	30	315	10u	30	312	104	, 79-124 P	20	,< 20 P
1E3E6-Tri%ethylbenzene	30	317	10u	30	299	100	, 76-124 P	u0	,< 20 P
Benzene	30	250	9u	30	254	96	, 79-120 P	07	,< 20 P
. thylbenzene	30	253	94	30	274	91	, 79-121 P	27	,< 20 P
IMopropylbenzene ,Cc%eneP	30	255	9u	30	272	91	, 72-131 P	67	,< 20 P
Naphthalene	30	275	93	30	304	101	, u1-125 P	50	,< 20 P
n-Bctylbenzene	30	316	106	30	303	100	, 76-125 P	46	,< 20 P
o-Xylene	30	252	94	30	273	90	, 75-122 P	43	,< 20 P
m & x -Xylene	u0	660	93	u0	639	90	, 50-121 P	32	,< 20 P
MeR-Bctylbenzene	30	306	102	30	297	99	, 77-12u P	26	,< 20 P
tert-Bctylbenzene	30	302	101	30	302	101	, 75-124 P	09	,< 20 P
Tolcene	30	274	91	30	265	5u	, 50-121 P	u2	,< 20 P
XyleneM,totalP	90	539	93	90	516	90	, 79-121 P	36	,< 20 P
Surrogates									
1E2-DiRhloroethane-D4 ,MtrrP	30	955	99	30	956	99	, 51-115 P	02	
4-Bro%oflcorobenzene ,MtrrP	30	111	111	30	111	111	, 56-114 P	00	
Tolcene-d5 ,MtrrP	30	976	95	30	964	96	, 59-112 P	20	

Batch Information

AnalytiRal BatRh: **VMS19175**
AnalytiRal x ethod: **SW8260C**
InMrc%ent: **Agilent 7890-75MS**
AnalyM: **NRB**

mrep BatRh: **VXX34455**
mrep x ethod: **SW5030B**
mrep Date/Ti%e: **07/16/2019 06:00**
Spike Init (tGVolG 30 cQL . WraRt Vol: 6 %L
Dcpe Init (tGVolG 30 cQL . WraRt Vol: 6 %L

Billable Matrix Spike Summary

Original Sample ID: 1193792004
MS Sample ID: 1193792005 BMS
MSD Sample ID: 1193792006 BMSD

Analysis Date: 07/16/2019 19:04
Analysis Date: 07/16/2019 16:16
Analysis Date: 07/16/2019 16:31
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by **SW8260C**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	0.500U	30.0	32.2	107	30.0	30.3	101	79-124	6.00	(< 20)
1,3,5-Trimethylbenzene	0.500U	30.0	31.6	105	30.0	29.9	100	75-124	5.30	(< 20)
Benzene	0.200U	30.0	27.7	92	30.0	26.4	88	79-120	4.70	(< 20)
Ethylbenzene	0.500U	30.0	27.5	92	30.0	26.6	89	79-121	3.10	(< 20)
Isopropylbenzene (Cumene)	0.500U	30.0	27.8	93	30.0	26.7	89	72-131	4.00	(< 20)
Naphthalene	0.500U	30.0	31.4	105	30.0	30.3	101	61-128	3.30	(< 20)
n-Butylbenzene	0.500U	30.0	31.2	104	30.0	29.3	98	75-128	6.10	(< 20)
o-Xylene	0.500U	30.0	27.8	93	30.0	26.9	90	78-122	3.30	(< 20)
P & M -Xylene	1.00U	60.0	55.2	92	60.0	52.9	88	80-121	4.20	(< 20)
sec-Butylbenzene	0.500U	30.0	30.1	100	30.0	28.4	95	77-126	5.90	(< 20)
tert-Butylbenzene	0.500U	30.0	30.3	101	30.0	29.0	97	78-124	4.20	(< 20)
Toluene	0.500U	30.0	25.5	85	30.0	24.8	83	80-121	2.80	(< 20)
Xylenes (total)	1.50U	90.0	83	92	90.0	79.9	89	79-121	3.90	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		30.0	29.6	99	30.0	29.2	97	81-118	1.10	
4-Bromofluorobenzene (surr)		30.0	33.9	113	30.0	33.5	112	85-114	1.20	
Toluene-d8 (surr)		30.0	28.7	96	30.0	28.8	96	89-112	0.19	

Batch Information

Analytical Batch: VMS19175
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: NRB
Analytical Date/Time: 7/16/2019 4:16:00PM

Prep Batch: VXX34455
Prep Method: Volatiles Extraction 8240/8260 FULL
Prep Date/Time: 7/16/2019 6:00:00AM
Prep Initial Wt./Vol.: 5.00mL
Prep Extract Vol: 5.00mL

Print Date: 07/23/2019 11:20:36AM

Method Blank

Blank ID: MB for HBN 1796372 [XXX/41767]
Blank Lab ID: 1518946

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193792001, 1193792002, 1193792003, 1193792004, 1193792007

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)	64.6	47-106		%
Fluoranthene-d10 (surr)	89.2	24-116		%

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/19/2019 11:44:00AM

Prep Batch: XXX41767
Prep Method: SW3520C
Prep Date/Time: 7/16/2019 11:03:21AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193792 [XXX41767]
Blank Spike Lab ID: 1518947
Date Analyzed: 07/19/2019 12:04

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193792001, 1193792002, 1193792003, 1193792004, 1193792007

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

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	2	1.43	72	(41-115)
2-Methylnaphthalene	2	1.40	70	(39-114)
Acenaphthene	2	1.47	74	(48-114)
Acenaphthylene	2	1.61	80	(35-121)
Anthracene	2	1.62	81	(53-119)
Benzo(a)Anthracene	2	1.78	89	(59-120)
Benzo[a]pyrene	2	1.73	87	(53-120)
Benzo[b]Fluoranthene	2	1.80	90	(53-126)
Benzo[g,h,i]perylene	2	1.60	80	(44-128)
Benzo[k]fluoranthene	2	1.76	88	(54-125)
Chrysene	2	1.80	90	(57-120)
Dibenzo[a,h]anthracene	2	1.52	76	(44-131)
Fluoranthene	2	1.88	94	(58-120)
Fluorene	2	1.60	80	(50-118)
Indeno[1,2,3-c,d] pyrene	2	1.74	87	(48-130)
Naphthalene	2	1.46	73	(43-114)
Phenanthrene	2	1.54	77	(53-115)
Pyrene	2	1.95	98	(53-121)
Surrogates				
2-Methylnaphthalene-d10 (surr)	2	67.3	67	(47-106)
Fluoranthene-d10 (surr)	2	93.1	93	(24-116)

Batch Information

Analytical Batch: **XMS11539**
Analytical Method: **8270D SIM LV (PAH)**
Instrument: **Agilent GC 7890B/5977A SWA**
Analyst: **DSD**

Prep Batch: **XXX41767**
Prep Method: **SW3520C**
Prep Date/Time: **07/16/2019 11:03**
Spike Init Wt./Vol.: 2 ug/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: Extract Vol:

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Billable Matrix Spike Summary

Original Sample ID: 1193792004
MS Sample ID: 1193792005 BMS
MSD Sample ID: 1193792006 BMSD

Analysis Date: 07/19/2019 13:27
Analysis Date: 07/19/2019 13:47
Analysis Date: 07/19/2019 14:08
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

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	0.0227U	1.92	1.25	65		1.92	1.25	65		41-115	0.55	(< 20)
2-Methylnaphthalene	0.0227U	1.92	1.25	65		1.92	1.24	65		39-114	0.52	(< 20)
Acenaphthene	0.0227U	1.92	1.27	66		1.92	1.26	65		48-114	0.89	(< 20)
Acenaphthylene	0.0227U	1.92	1.35	70		1.92	1.34	70		35-121	0.88	(< 20)
Anthracene	0.0227U	1.92	1.32	69		1.92	1.30	68		53-119	1.80	(< 20)
Benzo(a)Anthracene	0.0227U	1.92	1.09	57	*	1.92	1.07	56	*	59-120	2.30	(< 20)
Benzo[a]pyrene	0.00910U	1.92	.782	41	*	1.92	0.802	42	*	53-120	2.50	(< 20)
Benzo[b]Fluoranthene	0.0227U	1.92	.924	48	*	1.92	0.913	48	*	53-126	1.20	(< 20)
Benzo[g,h,i]perylene	0.0227U	1.92	.478	25	*	1.92	0.492	26	*	44-128	3.00	(< 20)
Benzo[k]fluoranthene	0.0227U	1.92	.78	41	*	1.92	0.807	42	*	54-125	3.40	(< 20)
Chrysene	0.0227U	1.92	1.05	55	*	1.92	1.05	55	*	57-120	0.51	(< 20)
Dibenzo[a,h]anthracene	0.00910U	1.92	.42	22	*	1.92	0.440	23	*	44-131	4.60	(< 20)
Fluoranthene	0.0227U	1.92	1.4	73		1.92	1.39	72		58-120	0.92	(< 20)
Fluorene	0.0227U	1.92	1.31	68		1.92	1.30	68		50-118	0.62	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0227U	1.92	.616	32	*	1.92	0.631	33	*	48-130	2.50	(< 20)
Naphthalene	0.0454U	1.92	1.3	67		1.92	1.28	67		43-114	0.90	(< 20)
Phenanthrene	0.0227U	1.92	1.29	67		1.92	1.26	66		53-115	2.20	(< 20)
Pyrene	0.0227U	1.92	1.47	77		1.92	1.46	76		53-121	0.80	(< 20)
Surrogates												
2-Methylnaphthalene-d10 (surr)		1.92	1.26	66		1.92	1.24	64		47-106	1.90	
Fluoranthene-d10 (surr)		1.92	1.37	71		1.92	1.35	70		24-116	2.00	

Batch Information

Analytical Batch: XMS11539
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/19/2019 1:47:00PM

Prep Batch: XXX41767
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/16/2019 11:03:21AM
Prep Initial Wt./Vol.: 260.00mL
Prep Extract Vol: 1.00mL

Print Date: 07/23/2019 11:20:39AM

SGS 1193792

SGS North America Inc.
CHAIN OF CUSTODY RECORD

Locations Nationwide
Alaska Maryland
New Jersey New York
North Carolina Indiana
West Virgina Kentucky
www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Page 1 of 1

Section 1

CLIENT: BRICE ENVIRONMENTAL
CONTACT: KIMI LLOYD PHONE NO: 907-317-7999
PROJECT NAME: 2019 HAK CS GWM PROGRAM PROJECT/ PWSID/ PERMIT#: SRF TS2-15
REPORTS TO: KELLY CARSON E-MAIL: KCARSON@BRICEENVIRONMENTAL.COM
INVOICE TO: HILCORP AK QUOTE #: P.O. #: 1952573

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: HCL	HCL	HCL	HCL	HCL					REMARKS/ LOC ID
							AK101 (GRO)	AK102 (DRO)	AK103 (RRO)	SW8260C (AK PETRO LIST VOC)	SW8260C (BTEX only)	SW8270D SIM (PAH)	SW8015C (ETHYLENE GLYCOL)			
(1)	AE SRF215-FS215B-0719	7/10/19	1500	GW	5		1	1	1	3	1	2	1			
(2)	AE SRF215-TS215D-0719	7/10/19	1020	GW	5		1	1	1	3	1	2	1			
(3)	AE SRF215-TS215DZ-0719	7/10/19	0920	GW	5		1	1	1	3	1	2	1			
(4-6)	AE SRF215-TS215P-0719	7/10/19	0910	GW	15		1	1	1	9	1	6	1			Added volume for MS/MSD
(7)	AE SRF215-TS215R-0719	7/10/19	0850	GW	5		1	1	1	3	1	2	1			
(8)	AE SRF215-TB01-0719	7/10/19	0800	GW	3		1	1	1	3	1	1	1			

Section 5

	Date	Time	
Relinquished By: (1) [signature]	7/12/19	0945	Received By: [RAVN]
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date 7.12.19	Time 16:34	Received For Laboratory By:

Section 4

DOD Project? Yes (No)

Cooler ID: A COMPUTA! FOR YOUR JOB!

Data Deliverable Requirements: LEVEL II

Requested Turnaround Time and/or Special Instructions:

Profile: 341882 JKJ

Temp Blank °C: 0.7C D30
or Ambient [ ]
(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)
(INTACT) BROKEN ABSENT
(See attached Sample Receipt Form)

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms-and-conditions

808 - 1050 0954 **Air Freight** **808 ENA 1050 0954**

Shipper's Name and Address
SGS ENVIRONMENTAL 50012
200 W POTTER DR
ANCHORAGE, AK 99518
562, 2343

Consignee:
BRICE ENVIRONMENTAL SERVICES CORP 40272
5015 BUSINESS PARK BLVD.
ANCHORAGE , AK 99503
907, 3609261

Ravn ALASKA

RAVN AIR
4700 OLD INTERNATIONAL AIRPORT ROAD
ANCHORAGE AK. 99502

It is agreed that the goods described herein are accepted in good order and undamaged condition (except as noted) for carriage SUBJECT TO THE "TERMS OF CONTRACT". The Shippers attention is drawn to the "TERMS OF CONTRACT LIMIT OF LIABILITY". The maximum liability by declaring a value of the goods and paying a supplemental charge of $0.75 per $100.00 up to a maximum of $5,000.00 declared value.

Accounting Information
GEN - GENERAL FREIGHT

Origin	ENA	Currency	USD
Destination	ANC	Charge Code	CX
Handling Information		Declared Value for Carriage	0

Pieces	Gross Weight	Nature of Goods	Chargeable Weight	Rate/Charge	Total	Length	Width	Height	Dim Weight
4		GEN//WATER SAMPLES				5	5	5	3

1193792

4	190		190						3

Fee	Prepaid	Collect
Weight Charge		70.30
Valuation Charge		0.00
Tax		4.39
Total Other Charges Due Agent		0.00
Total Other Charges Due Carrier		0.00
Total		74.69
Signature of Issuing Carrier or its Agent	WB Date	WB Time
BRAHUNSON KAAI	12-JUL-19	1133

Other Charges			
FSC Fee	0.00	SSC Fee	0.00
DOC Fees	0.00	DG Fee	0.00
OTH Fees	0.00	P/U Fee	0.00
DEL Fees	0.00	TSC Fees	0.00

The shipper certifies that the particulars on the face hereof are correct, and that the shipment does not contain dangerous goods, and that all ITEMS ARE ACCEPTED AT SHIPPER'S RISK.

KIMBERLY LLOYD
(Shipper's printed name and signature)

The consignee certifies that the shipment is received in good order except where noted below.

(Consignee's printed name and signature)

CARRIAGE SUBJECT TO "TERMS OF CONTRACT" found at https://www.flyravn.com/cargo-services/cargo-contract-carriage

Alert Expeditors Inc. **#394319**

Citywide Delivery • 440-3351
8421 Flamingo Drive • Anchorage, Alaska 99502

Date 7/12/19

From Bit Environmental

To SGS

Collect ☐	Prepay ☐ Account ☐	Advance Charges ☐
Job # ENA	PO# TH 050 0154	

Water Samples

Shipped Signature

Total Charge

Received By: Ant Alert Expeditors

1193792

e-Sample Receipt Form

SGS Workorder #: 1193792

1 1 9 3 7 9 2

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		N/A Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Yes	1F 1B
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?		
**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: A computa! Took @ 0.7 °C Therm. ID: D30
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: your Job @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
		***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	Container Id	Preservative	Container Condition
1193792001-A	No Preservative Required	OK			
1193792001-B	No Preservative Required	OK			
1193792001-C	HCL to pH < 2	OK			
1193792001-D	HCL to pH < 2	OK			
1193792001-E	HCL to pH < 2	OK			
1193792002-A	No Preservative Required	OK			
1193792002-B	No Preservative Required	OK			
1193792002-C	HCL to pH < 2	OK			
1193792002-D	HCL to pH < 2	OK			
1193792002-E	HCL to pH < 2	OK			
1193792003-A	No Preservative Required	OK			
1193792003-B	No Preservative Required	OK			
1193792003-C	HCL to pH < 2	OK			
1193792003-D	HCL to pH < 2	OK			
1193792003-E	HCL to pH < 2	OK			
1193792004-A	No Preservative Required	OK			
1193792004-B	No Preservative Required	OK			
1193792004-C	HCL to pH < 2	OK			
1193792004-D	HCL to pH < 2	OK			
1193792004-E	HCL to pH < 2	OK			
1193792005-A	No Preservative Required	OK			
1193792005-B	No Preservative Required	OK			
1193792005-C	HCL to pH < 2	OK			
1193792005-D	HCL to pH < 2	OK			
1193792005-E	HCL to pH < 2	OK			
1193792006-A	No Preservative Required	OK			
1193792006-B	No Preservative Required	OK			
1193792006-C	HCL to pH < 2	OK			
1193792006-D	HCL to pH < 2	OK			
1193792006-E	HCL to pH < 2	OK			
1193792007-A	No Preservative Required	OK			
1193792007-B	No Preservative Required	OK			
1193792007-C	HCL to pH < 2	OK			
1193792007-D	HCL to pH < 2	OK			
1193792007-E	HCL to pH < 2	OK			
1193792008-A	HCL to pH < 2	OK			
1193792008-B	HCL to pH < 2	OK			
1193792008-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.
NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

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Laboratory Report of Analysis

To: Hilcorp Alaska, LLC
3800 Centerpoint Dr. Suite 400
Anchorage, AK 99503
(907)277-7297

Report Number: **1193788**

Client Project: **SRFTS3-4 2019 HAK CS GWM Prog.**

Dear Kelly Carson,

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 Justin 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.



SGS North America Inc.
Environmental Services – Alaska Division
Project Manager

Justin Nelson
2019.07.25
16:51:01 -08'00'

Justin Nelson Date
Project Manager
Justin.Nelson@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

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Case Narrative

SGS Client: **Hilcorp Alaska, LLC**
SGS Project: **1193788**
Project Name/Site: **SRFTS3-4 2019 HAK CS GWM Prog.**
Project Contact: **Kelly Carson**

Refer to sample receipt form for information on sample condition.

SRF34-FS34F-0719 (1193788005) PS

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

SRF34-FS34A-0719 MS (1193788002) BMS

8270D SIM - PAH BMS recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.
8260C - Surrogate recovery for 4-bromofluorobenzene does not meet QC criteria. Sample was analyzed twice and results confirm.

SRF34-FS34A-0719 MSD (1193788003) BMSD

8270D SIM - PAH BMSD recovery for several analytes does not meet QC criteria. Refer to the LCS for accuracy requirements.
8270D SIM - PAH MS/MSD RPD for several analytes do not meet QC criteria. Results for this analyte are considered estimated in the parent sample.
8260C - Surrogate recovery for 4-bromofluorobenzene does not meet QC criteria. Sample was analyzed twice and results confirm.

LCSD for HBN 1796517 [VXX/3445 (1519627) LCSD

8260C - Surrogate recovery for 4-bromofluorobenzene does not meet QC criteria.

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

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

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Report of Manual Integrations

Laboratory ID	Client Sample ID	Analytical Batch	Analyte	Reason
SW8260C				
1193788009	SRF34-TS34P-0719	VMS19171	n-Butylbenzene	SP
1193788010	SRF34-TS34PZ-0719	VMS19171	n-Butylbenzene	SP

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Print Date: 07/25/2019 4:46:36PM

Laboratory Qualifiers

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

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry (DW Chemistry (Provisionally Certified as of 6/20/19 for Turbidity by SM 2130B, and Copper by EPA 200.8) & 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). SGS is only certified for the analytes listed on our Drinking Water Certification, and only those analytes will be reported to the State of Alaska for compliance. Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
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
SRF34-FS34A-0719	1193788001	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF34-FS34A-0719 MS	1193788002	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF34-FS34A-0719 MSD	1193788003	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF34-FS34B-0719	1193788004	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF34-FS34F-0719	1193788005	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF34-TS34CC-0719	1193788006	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF34-TS34MM-0719	1193788007	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF34-TS3400-0719	1193788008	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF34-TS34P-0719	1193788009	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF34-TS34PZ-0719	1193788010	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)
SRF34-TB01-0719	1193788011	07/09/2019	07/12/2019	Water (Surface, Eff., Ground)

Method	Method Description
SW8260C	8021B by 8260 (W)
8270D SIM LV (PAH)	8270 PAH SIM GC/MS Liq/Liq ext. LV

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Detectable Results Summary

Client Sample ID: **SRF34-FS34A-0719**
Lab Sample ID: 1193788001

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	0.0194J	ug/L
	2-Methylnaphthalene	0.0269J	ug/L
Volatile GC/MS	Benzene	2.05	ug/L
	Ethylbenzene	0.460J	ug/L
	Isopropylbenzene (Cumene)	4.07	ug/L

Client Sample ID: **SRF34-FS34B-0719**
Lab Sample ID: 1193788004

	Parameter	Result	Units
Volatile GC/MS	Benzene	0.560	ug/L

Client Sample ID: **SRF34-TS34CC-0719**
Lab Sample ID: 1193788006

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	2.90	ug/L
	2-Methylnaphthalene	2.80	ug/L
	Acenaphthene	0.0197J	ug/L
	Fluorene	0.0647	ug/L
	Naphthalene	6.55	ug/L
	Phenanthrene	0.0687	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	28.5	ug/L
	1,3,5-Trimethylbenzene	17.3	ug/L
	Benzene	0.440	ug/L
	Ethylbenzene	11.5	ug/L
	Isopropylbenzene (Cumene)	7.56	ug/L
	Naphthalene	3.08	ug/L
	o-Xylene	0.470J	ug/L
	P & M -Xylene	21.0	ug/L
	sec-Butylbenzene	1.20	ug/L
	Xylenes (total)	21.5	ug/L

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Detectable Results Summary

Client Sample ID: **SRF34-TS34P-0719**
Lab Sample ID: 1193788009

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	1.70	ug/L
	2-Methylnaphthalene	0.731	ug/L
	Acenaphthene	0.118	ug/L
	Naphthalene	11.6	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	27.4	ug/L
	1,3,5-Trimethylbenzene	48.6	ug/L
	Benzene	586	ug/L
	Ethylbenzene	176	ug/L
	Isopropylbenzene (Cumene)	22.9	ug/L
	Naphthalene	29.4	ug/L
	n-Butylbenzene	2.62	ug/L
	o-Xylene	5.72	ug/L
	P & M -Xylene	137	ug/L
	sec-Butylbenzene	6.71	ug/L
	tert-Butylbenzene	1.32	ug/L
	Toluene	33.0	ug/L
	Xylenes (total)	142	ug/L

Client Sample ID: **SRF34-TS34PZ-0719**
Lab Sample ID: 1193788010

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	1.56	ug/L
	2-Methylnaphthalene	0.597	ug/L
	Acenaphthene	0.124	ug/L
	Naphthalene	11.8	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	27.2	ug/L
	1,3,5-Trimethylbenzene	49.0	ug/L
	Benzene	595	ug/L
	Ethylbenzene	172	ug/L
	Isopropylbenzene (Cumene)	22.1	ug/L
	Naphthalene	30.1	ug/L
	n-Butylbenzene	2.63	ug/L
	o-Xylene	5.65	ug/L
	P & M -Xylene	134	ug/L
	sec-Butylbenzene	6.95	ug/L
	tert-Butylbenzene	1.38	ug/L
	Toluene	32.2	ug/L
	Xylenes (total)	140	ug/L

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Results of **SRF34-FS34A-0719**

Client Sample ID: **SRF34-FS34A-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788001
Lab Project ID: 1193788

Collection Date: 07/09/19 08:20
Received Date: 07/12/19 16:34
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	0.0194	J	0.0472	0.0142	ug/L	1		07/18/19 01:08
2-Methylnaphthalene	0.0269	J	0.0472	0.0142	ug/L	1		07/18/19 01:08
Acenaphthene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 01:08
Acenaphthylene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 01:08
Anthracene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 01:08
Benzo(a)Anthracene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 01:08
Benzo[a]pyrene	0.00945	U	0.0189	0.00585	ug/L	1		07/18/19 01:08
Benzo[b]Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 01:08
Benzo[g,h,i]perylene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 01:08
Benzo[k]fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 01:08
Chrysene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 01:08
Dibenzo[a,h]anthracene	0.00945	U	0.0189	0.00585	ug/L	1		07/18/19 01:08
Fluoranthene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 01:08
Fluorene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 01:08
Indeno[1,2,3-c,d] pyrene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 01:08
Naphthalene	0.0471	U	0.0943	0.0292	ug/L	1		07/18/19 01:08
Phenanthrene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 01:08
Pyrene	0.0236	U	0.0472	0.0142	ug/L	1		07/18/19 01:08
Surrogates								
2-Methylnaphthalene-d10 (surr)	60.2		47-106		%	1		07/18/19 01:08
Fluoranthene-d10 (surr)	58.2		24-116		%	1		07/18/19 01:08

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 01:08
Container ID: 1193788001-A

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 07/15/19 11:28
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Print Date: 07/25/2019 4:46:40PM

J flagging is activated

Results of **SRF34-FS34A-0719**

Client Sample ID: **SRF34-FS34A-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788001
Lab Project ID: 1193788

Collection Date: 07/09/19 08:20
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:34
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:34
Benzene	2.05		0.400	0.120	ug/L	1		07/17/19 18:34
Ethylbenzene	0.460 J		1.00	0.310	ug/L	1		07/17/19 18:34
Isopropylbenzene (Cumene)	4.07		1.00	0.310	ug/L	1		07/17/19 18:34
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:34
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:34
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:34
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/17/19 18:34
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:34
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:34
Toluene	0.500 U		1.00	0.310	ug/L	1		07/17/19 18:34
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/17/19 18:34
Surrogates								
1,2-Dichloroethane-D4 (surr)	106		81-118		%	1		07/17/19 18:34
4-Bromofluorobenzene (surr)	111		85-114		%	1		07/17/19 18:34
Toluene-d8 (surr)	95.5		89-112		%	1		07/17/19 18:34

Batch Information

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 18:34
Container ID: 1193788001-D

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/25/2019 4:46:40PM

J flagging is activated

Results of **SRF34-FS34B-0719**

Client Sample ID: **SRF34-FS34B-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788004
Lab Project ID: 1193788

Collection Date: 07/09/19 08:25
Received Date: 07/12/19 16:34
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	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
2-Methylnaphthalene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Acenaphthene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Acenaphthylene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Anthracene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Benzo(a)Anthracene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Benzo[a]pyrene	0.00990	U	0.0198	0.00615	ug/L	1		07/18/19 02:10
Benzo[b]Fluoranthene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Benzo[g,h,i]perylene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Benzo[k]fluoranthene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Chrysene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Dibenzo[a,h]anthracene	0.00990	U	0.0198	0.00615	ug/L	1		07/18/19 02:10
Fluoranthene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Fluorene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Indeno[1,2,3-c,d] pyrene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Naphthalene	0.0496	U	0.0992	0.0308	ug/L	1		07/18/19 02:10
Phenanthrene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Pyrene	0.0248	U	0.0496	0.0149	ug/L	1		07/18/19 02:10
Surrogates								
2-Methylnaphthalene-d10 (surr)	50.6		47-106		%	1		07/18/19 02:10
Fluoranthene-d10 (surr)	49.4		24-116		%	1		07/18/19 02:10

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 02:10
Container ID: 1193788004-A

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 07/15/19 11:28
Prep Initial Wt./Vol.: 252 mL
Prep Extract Vol: 1 mL

Print Date: 07/25/2019 4:46:40PM

J flagging is activated

Results of **SRF34-FS34B-0719**

Client Sample ID: **SRF34-FS34B-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788004
Lab Project ID: 1193788

Collection Date: 07/09/19 08:25
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 18:49
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 18:49
Benzene	0.560		0.400	0.120	ug/L	1		07/17/19 18:49
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 18:49
Isopropylbenzene (Cumene)	0.500	U	1.00	0.310	ug/L	1		07/17/19 18:49
Naphthalene	0.500	U	1.00	0.310	ug/L	1		07/17/19 18:49
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 18:49
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/17/19 18:49
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		07/17/19 18:49
sec-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 18:49
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/17/19 18:49
Toluene	0.500	U	1.00	0.310	ug/L	1		07/17/19 18:49
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/17/19 18:49
Surrogates								
1,2-Dichloroethane-D4 (surr)	106		81-118		%	1		07/17/19 18:49
4-Bromofluorobenzene (surr)	110		85-114		%	1		07/17/19 18:49
Toluene-d8 (surr)	96.4		89-112		%	1		07/17/19 18:49

Batch Information

Analytical Batch: VMS19179
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/17/19 18:49
Container ID: 1193788004-D

Prep Batch: VXX34456
Prep Method: SW5030B
Prep Date/Time: 07/17/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF34-FS34F-0719**

Client Sample ID: **SRF34-FS34F-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788005
Lab Project ID: 1193788

Collection Date: 07/09/19 14:30
Received Date: 07/12/19 16:34
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	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
2-Methylnaphthalene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Acenaphthene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Acenaphthylene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Anthracene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Benzo(a)Anthracene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Benzo[a]pyrene	0.00910 U		0.0182	0.00564	ug/L	1		07/18/19 02:31
Benzo[b]Fluoranthene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Benzo[g,h,i]perylene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Benzo[k]fluoranthene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Chrysene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Dibenzo[a,h]anthracene	0.00910 U		0.0182	0.00564	ug/L	1		07/18/19 02:31
Fluoranthene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Fluorene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Indeno[1,2,3-c,d] pyrene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Naphthalene	0.0454 U		0.0909	0.0282	ug/L	1		07/18/19 02:31
Phenanthrene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Pyrene	0.0227 U		0.0455	0.0136	ug/L	1		07/18/19 02:31
Surrogates								
2-Methylnaphthalene-d10 (surr)	46.2	*	47-106		%	1		07/18/19 02:31
Fluoranthene-d10 (surr)	43.4		24-116		%	1		07/18/19 02:31

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 02:31
Container ID: 1193788005-A

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 07/15/19 11:28
Prep Initial Wt./Vol.: 275 mL
Prep Extract Vol: 1 mL

Print Date: 07/25/2019 4:46:40PM

J flagging is activated

Results of **SRF34-FS34F-0719**

Client Sample ID: **SRF34-FS34F-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788005
Lab Project ID: 1193788

Collection Date: 07/09/19 14:30
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 17:35
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 17:35
Benzene	0.200 U		0.400	0.120	ug/L	1		07/15/19 17:35
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 17:35
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/15/19 17:35
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/15/19 17:35
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 17:35
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/15/19 17:35
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/15/19 17:35
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 17:35
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 17:35
Toluene	0.500 U		1.00	0.310	ug/L	1		07/15/19 17:35
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/15/19 17:35
Surrogates								
1,2-Dichloroethane-D4 (surr)	108		81-118		%	1		07/15/19 17:35
4-Bromofluorobenzene (surr)	111		85-114		%	1		07/15/19 17:35
Toluene-d8 (surr)	97.7		89-112		%	1		07/15/19 17:35

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 17:35
Container ID: 1193788005-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF34-TS34CC-0719**

Client Sample ID: **SRF34-TS34CC-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788006
Lab Project ID: 1193788

Collection Date: 07/09/19 14:20
Received Date: 07/12/19 16:34
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	2.90		0.0525	0.0158	ug/L	1		07/18/19 02:51
2-Methylnaphthalene	2.80		0.0525	0.0158	ug/L	1		07/18/19 02:51
Acenaphthene	0.0197	J	0.0525	0.0158	ug/L	1		07/18/19 02:51
Acenaphthylene	0.0262	U	0.0525	0.0158	ug/L	1		07/18/19 02:51
Anthracene	0.0262	U	0.0525	0.0158	ug/L	1		07/18/19 02:51
Benzo(a)Anthracene	0.0262	U	0.0525	0.0158	ug/L	1		07/18/19 02:51
Benzo[a]pyrene	0.0105	U	0.0210	0.00651	ug/L	1		07/18/19 02:51
Benzo[b]Fluoranthene	0.0262	U	0.0525	0.0158	ug/L	1		07/18/19 02:51
Benzo[g,h,i]perylene	0.0262	U	0.0525	0.0158	ug/L	1		07/18/19 02:51
Benzo[k]fluoranthene	0.0262	U	0.0525	0.0158	ug/L	1		07/18/19 02:51
Chrysene	0.0262	U	0.0525	0.0158	ug/L	1		07/18/19 02:51
Dibenzo[a,h]anthracene	0.0105	U	0.0210	0.00651	ug/L	1		07/18/19 02:51
Fluoranthene	0.0262	U	0.0525	0.0158	ug/L	1		07/18/19 02:51
Fluorene	0.0647		0.0525	0.0158	ug/L	1		07/18/19 02:51
Indeno[1,2,3-c,d] pyrene	0.0262	U	0.0525	0.0158	ug/L	1		07/18/19 02:51
Naphthalene	6.55		0.105	0.0326	ug/L	1		07/18/19 02:51
Phenanthrene	0.0687		0.0525	0.0158	ug/L	1		07/18/19 02:51
Pyrene	0.0262	U	0.0525	0.0158	ug/L	1		07/18/19 02:51
Surrogates								
2-Methylnaphthalene-d10 (surr)	57.3		47-106		%	1		07/18/19 02:51
Fluoranthene-d10 (surr)	55		24-116		%	1		07/18/19 02:51

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 02:51
Container ID: 1193788006-A

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 07/15/19 11:28
Prep Initial Wt./Vol.: 238 mL
Prep Extract Vol: 1 mL

Print Date: 07/25/2019 4:46:40PM

J flagging is activated

Results of **SRF34-TS34CC-0719**

Client Sample ID: **SRF34-TS34CC-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788006
Lab Project ID: 1193788

Collection Date: 07/09/19 14:20
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	28.5		1.00	0.310	ug/L	1		07/15/19 17:50
1,3,5-Trimethylbenzene	17.3		1.00	0.310	ug/L	1		07/15/19 17:50
Benzene	0.440		0.400	0.120	ug/L	1		07/15/19 17:50
Ethylbenzene	11.5		1.00	0.310	ug/L	1		07/15/19 17:50
Isopropylbenzene (Cumene)	7.56		1.00	0.310	ug/L	1		07/15/19 17:50
Naphthalene	3.08		1.00	0.310	ug/L	1		07/15/19 17:50
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 17:50
o-Xylene	0.470	J	1.00	0.310	ug/L	1		07/15/19 17:50
P & M -Xylene	21.0		2.00	0.620	ug/L	1		07/15/19 17:50
sec-Butylbenzene	1.20		1.00	0.310	ug/L	1		07/15/19 17:50
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 17:50
Toluene	0.500	U	1.00	0.310	ug/L	1		07/15/19 17:50
Xylenes (total)	21.5		3.00	1.00	ug/L	1		07/15/19 17:50
Surrogates								
1,2-Dichloroethane-D4 (surr)	103		81-118		%	1		07/15/19 17:50
4-Bromofluorobenzene (surr)	111		85-114		%	1		07/15/19 17:50
Toluene-d8 (surr)	96.4		89-112		%	1		07/15/19 17:50

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 17:50
Container ID: 1193788006-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF34-TS34MM-0719**

Client Sample ID: **SRF34-TS34MM-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788007
Lab Project ID: 1193788

Collection Date: 07/09/19 12:05
Received Date: 07/12/19 16:34
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	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
2-Methylnaphthalene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Acenaphthene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Acenaphthylene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Anthracene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Benzo(a)Anthracene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Benzo[a]pyrene	0.0101	U	0.0203	0.00630	ug/L	1		07/18/19 03:12
Benzo[b]Fluoranthene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Benzo[g,h,i]perylene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Benzo[k]fluoranthene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Chrysene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Dibenzo[a,h]anthracene	0.0101	U	0.0203	0.00630	ug/L	1		07/18/19 03:12
Fluoranthene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Fluorene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Indeno[1,2,3-c,d] pyrene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Naphthalene	0.0510	U	0.102	0.0315	ug/L	1		07/18/19 03:12
Phenanthrene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Pyrene	0.0254	U	0.0508	0.0152	ug/L	1		07/18/19 03:12
Surrogates								
2-Methylnaphthalene-d10 (surr)	56.5		47-106		%	1		07/18/19 03:12
Fluoranthene-d10 (surr)	53		24-116		%	1		07/18/19 03:12

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 03:12
Container ID: 1193788007-A

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 07/15/19 11:28
Prep Initial Wt./Vol.: 246 mL
Prep Extract Vol: 1 mL

Print Date: 07/25/2019 4:46:40PM

J flagging is activated

Results of **SRF34-TS34MM-0719**

Client Sample ID: **SRF34-TS34MM-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788007
Lab Project ID: 1193788

Collection Date: 07/09/19 12:05
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:05
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:05
Benzene	0.200 U		0.400	0.120	ug/L	1		07/15/19 18:05
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:05
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:05
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:05
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:05
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:05
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/15/19 18:05
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:05
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:05
Toluene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:05
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/15/19 18:05
Surrogates								
1,2-Dichloroethane-D4 (surr)	106		81-118		%	1		07/15/19 18:05
4-Bromofluorobenzene (surr)	109		85-114		%	1		07/15/19 18:05
Toluene-d8 (surr)	98.2		89-112		%	1		07/15/19 18:05

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 18:05
Container ID: 1193788007-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF34-TS3400-0719**

Client Sample ID: **SRF34-TS3400-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788008
Lab Project ID: 1193788

Collection Date: 07/09/19 12:00
Received Date: 07/12/19 16:34
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	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
2-Methylnaphthalene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Acenaphthene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Acenaphthylene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Anthracene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Benzo(a)Anthracene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Benzo[a]pyrene	0.0107	U	0.0214	0.00662	ug/L	1		07/18/19 03:33
Benzo[b]Fluoranthene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Benzo[g,h,i]perylene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Benzo[k]fluoranthene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Chrysene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Dibenzo[a,h]anthracene	0.0107	U	0.0214	0.00662	ug/L	1		07/18/19 03:33
Fluoranthene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Fluorene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Indeno[1,2,3-c,d] pyrene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Naphthalene	0.0535	U	0.107	0.0331	ug/L	1		07/18/19 03:33
Phenanthrene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Pyrene	0.0267	U	0.0534	0.0160	ug/L	1		07/18/19 03:33
Surrogates								
2-Methylnaphthalene-d10 (surr)	54.7		47-106		%	1		07/18/19 03:33
Fluoranthene-d10 (surr)	55		24-116		%	1		07/18/19 03:33

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 03:33
Container ID: 1193788008-A

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 07/15/19 11:28
Prep Initial Wt./Vol.: 234 mL
Prep Extract Vol: 1 mL

Print Date: 07/25/2019 4:46:40PM

J flagging is activated

Results of **SRF34-TS3400-0719**

Client Sample ID: **SRF34-TS3400-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788008
Lab Project ID: 1193788

Collection Date: 07/09/19 12:00
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:20
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:20
Benzene	0.200 U		0.400	0.120	ug/L	1		07/15/19 18:20
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:20
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:20
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:20
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:20
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:20
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/15/19 18:20
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:20
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:20
Toluene	0.500 U		1.00	0.310	ug/L	1		07/15/19 18:20
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/15/19 18:20
Surrogates								
1,2-Dichloroethane-D4 (surr)	106		81-118		%	1		07/15/19 18:20
4-Bromofluorobenzene (surr)	109		85-114		%	1		07/15/19 18:20
Toluene-d8 (surr)	96.8		89-112		%	1		07/15/19 18:20

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 18:20
Container ID: 1193788008-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/25/2019 4:46:40PM

J flagging is activated

Results of **SRF34-TS34P-0719**

Client Sample ID: **SRF34-TS34P-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788009
Lab Project ID: 1193788

Collection Date: 07/09/19 10:40
Received Date: 07/12/19 16:34
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	1.70		0.0525	0.0158	ug/L	1		07/18/19 03:53
2-Methylnaphthalene	0.731		0.0525	0.0158	ug/L	1		07/18/19 03:53
Acenaphthene	0.118		0.0525	0.0158	ug/L	1		07/18/19 03:53
Acenaphthylene	0.0262 U		0.0525	0.0158	ug/L	1		07/18/19 03:53
Anthracene	0.0262 U		0.0525	0.0158	ug/L	1		07/18/19 03:53
Benzo(a)Anthracene	0.0262 U		0.0525	0.0158	ug/L	1		07/18/19 03:53
Benzo[a]pyrene	0.0105 U		0.0210	0.00651	ug/L	1		07/18/19 03:53
Benzo[b]Fluoranthene	0.0262 U		0.0525	0.0158	ug/L	1		07/18/19 03:53
Benzo[g,h,i]perylene	0.0262 U		0.0525	0.0158	ug/L	1		07/18/19 03:53
Benzo[k]fluoranthene	0.0262 U		0.0525	0.0158	ug/L	1		07/18/19 03:53
Chrysene	0.0262 U		0.0525	0.0158	ug/L	1		07/18/19 03:53
Dibenzo[a,h]anthracene	0.0105 U		0.0210	0.00651	ug/L	1		07/18/19 03:53
Fluoranthene	0.0262 U		0.0525	0.0158	ug/L	1		07/18/19 03:53
Fluorene	0.0262 U		0.0525	0.0158	ug/L	1		07/18/19 03:53
Indeno[1,2,3-c,d] pyrene	0.0262 U		0.0525	0.0158	ug/L	1		07/18/19 03:53
Naphthalene	11.6		0.210	0.0651	ug/L	2		07/18/19 12:55
Phenanthrene	0.0262 U		0.0525	0.0158	ug/L	1		07/18/19 03:53
Pyrene	0.0262 U		0.0525	0.0158	ug/L	1		07/18/19 03:53
Surrogates								
2-Methylnaphthalene-d10 (surr)	51.6		47-106		%	1		07/18/19 03:53
Fluoranthene-d10 (surr)	43.4		24-116		%	1		07/18/19 03:53

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 03:53
Container ID: 1193788009-A

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 07/15/19 11:28
Prep Initial Wt./Vol.: 238 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11535
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 12:55
Container ID: 1193788009-A

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 07/15/19 11:28
Prep Initial Wt./Vol.: 238 mL
Prep Extract Vol: 1 mL

Results of **SRF34-TS34P-0719**

Client Sample ID: **SRF34-TS34P-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788009
Lab Project ID: 1193788

Collection Date: 07/09/19 10:40
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	27.4		1.00	0.310	ug/L	1		07/15/19 18:35
1,3,5-Trimethylbenzene	48.6		1.00	0.310	ug/L	1		07/15/19 18:35
Benzene	586		8.00	2.40	ug/L	20		07/16/19 20:50
Ethylbenzene	176		1.00	0.310	ug/L	1		07/15/19 18:35
Isopropylbenzene (Cumene)	22.9		1.00	0.310	ug/L	1		07/15/19 18:35
Naphthalene	29.4		1.00	0.310	ug/L	1		07/15/19 18:35
n-Butylbenzene	2.62		1.00	0.310	ug/L	1		07/15/19 18:35
o-Xylene	5.72		1.00	0.310	ug/L	1		07/15/19 18:35
P & M -Xylene	137		2.00	0.620	ug/L	1		07/15/19 18:35
sec-Butylbenzene	6.71		1.00	0.310	ug/L	1		07/15/19 18:35
tert-Butylbenzene	1.32		1.00	0.310	ug/L	1		07/15/19 18:35
Toluene	33.0		1.00	0.310	ug/L	1		07/15/19 18:35
Xylenes (total)	142		3.00	1.00	ug/L	1		07/15/19 18:35
Surrogates								
1,2-Dichloroethane-D4 (surr)	92.7		81-118		%	1		07/15/19 18:35
4-Bromofluorobenzene (surr)	114		85-114		%	1		07/15/19 18:35
Toluene-d8 (surr)	98.2		89-112		%	1		07/15/19 18:35

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 18:35
Container ID: 1193788009-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19175
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/16/19 20:50
Container ID: 1193788009-E

Prep Batch: VXX34455
Prep Method: SW5030B
Prep Date/Time: 07/16/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/25/2019 4:46:40PM

J flagging is activated

Results of **SRF34-TS34PZ-0719**

Client Sample ID: **SRF34-TS34PZ-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788010
Lab Project ID: 1193788

Collection Date: 07/09/19 10:50
Received Date: 07/12/19 16:34
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	1.56		0.0548	0.0164	ug/L	1		07/18/19 04:14
2-Methylnaphthalene	0.597		0.0548	0.0164	ug/L	1		07/18/19 04:14
Acenaphthene	0.124		0.0548	0.0164	ug/L	1		07/18/19 04:14
Acenaphthylene	0.0274 U		0.0548	0.0164	ug/L	1		07/18/19 04:14
Anthracene	0.0274 U		0.0548	0.0164	ug/L	1		07/18/19 04:14
Benzo(a)Anthracene	0.0274 U		0.0548	0.0164	ug/L	1		07/18/19 04:14
Benzo[a]pyrene	0.0110 U		0.0219	0.00680	ug/L	1		07/18/19 04:14
Benzo[b]Fluoranthene	0.0274 U		0.0548	0.0164	ug/L	1		07/18/19 04:14
Benzo[g,h,i]perylene	0.0274 U		0.0548	0.0164	ug/L	1		07/18/19 04:14
Benzo[k]fluoranthene	0.0274 U		0.0548	0.0164	ug/L	1		07/18/19 04:14
Chrysene	0.0274 U		0.0548	0.0164	ug/L	1		07/18/19 04:14
Dibenzo[a,h]anthracene	0.0110 U		0.0219	0.00680	ug/L	1		07/18/19 04:14
Fluoranthene	0.0274 U		0.0548	0.0164	ug/L	1		07/18/19 04:14
Fluorene	0.0274 U		0.0548	0.0164	ug/L	1		07/18/19 04:14
Indeno[1,2,3-c,d] pyrene	0.0274 U		0.0548	0.0164	ug/L	1		07/18/19 04:14
Naphthalene	11.8		0.219	0.0680	ug/L	2		07/18/19 13:15
Phenanthrene	0.0274 U		0.0548	0.0164	ug/L	1		07/18/19 04:14
Pyrene	0.0274 U		0.0548	0.0164	ug/L	1		07/18/19 04:14
Surrogates								
2-Methylnaphthalene-d10 (surr)	53.8		47-106		%	1		07/18/19 04:14
Fluoranthene-d10 (surr)	48.5		24-116		%	1		07/18/19 04:14

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 04:14
Container ID: 1193788010-A

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 07/15/19 11:28
Prep Initial Wt./Vol.: 228 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11535
Analytical Method: 8270D SIM LV (PAH)
Analyst: BMZ
Analytical Date/Time: 07/18/19 13:15
Container ID: 1193788010-A

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 07/15/19 11:28
Prep Initial Wt./Vol.: 228 mL
Prep Extract Vol: 1 mL

Results of **SRF34-TS34PZ-0719**

Client Sample ID: **SRF34-TS34PZ-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788010
Lab Project ID: 1193788

Collection Date: 07/09/19 10:50
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	27.2		1.00	0.310	ug/L	1		07/15/19 18:51
1,3,5-Trimethylbenzene	49.0		1.00	0.310	ug/L	1		07/15/19 18:51
Benzene	595		8.00	2.40	ug/L	20		07/16/19 21:06
Ethylbenzene	172		1.00	0.310	ug/L	1		07/15/19 18:51
Isopropylbenzene (Cumene)	22.1		1.00	0.310	ug/L	1		07/15/19 18:51
Naphthalene	30.1		1.00	0.310	ug/L	1		07/15/19 18:51
n-Butylbenzene	2.63		1.00	0.310	ug/L	1		07/15/19 18:51
o-Xylene	5.65		1.00	0.310	ug/L	1		07/15/19 18:51
P & M -Xylene	134		2.00	0.620	ug/L	1		07/15/19 18:51
sec-Butylbenzene	6.95		1.00	0.310	ug/L	1		07/15/19 18:51
tert-Butylbenzene	1.38		1.00	0.310	ug/L	1		07/15/19 18:51
Toluene	32.2		1.00	0.310	ug/L	1		07/15/19 18:51
Xylenes (total)	140		3.00	1.00	ug/L	1		07/15/19 18:51
Surrogates								
1,2-Dichloroethane-D4 (surr)	91.9		81-118		%	1		07/15/19 18:51
4-Bromofluorobenzene (surr)	114		85-114		%	1		07/15/19 18:51
Toluene-d8 (surr)	97		89-112		%	1		07/15/19 18:51

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 18:51
Container ID: 1193788010-C

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS19175
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/16/19 21:06
Container ID: 1193788010-E

Prep Batch: VXX34455
Prep Method: SW5030B
Prep Date/Time: 07/16/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/25/2019 4:46:40PM

J flagging is activated

Results of **SRF34-TB01-0719**

Client Sample ID: **SRF34-TB01-0719**
Client Project ID: **SRFTS3-4 2019 HAK CS GWM Prog.**
Lab Sample ID: 1193788011
Lab Project ID: 1193788

Collection Date: 07/09/19 08:00
Received Date: 07/12/19 16:34
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:49
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:49
Benzene	0.200	U	0.400	0.120	ug/L	1		07/15/19 16:49
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:49
Isopropylbenzene (Cumene)	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:49
Naphthalene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:49
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:49
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:49
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		07/15/19 16:49
sec-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:49
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:49
Toluene	0.500	U	1.00	0.310	ug/L	1		07/15/19 16:49
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/15/19 16:49
Surrogates								
1,2-Dichloroethane-D4 (surr)	108		81-118		%	1		07/15/19 16:49
4-Bromofluorobenzene (surr)	109		85-114		%	1		07/15/19 16:49
Toluene-d8 (surr)	96.3		89-112		%	1		07/15/19 16:49

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Analyst: CMC
Analytical Date/Time: 07/15/19 16:49
Container ID: 1193788011-A

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 07/15/19 06:30
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/25/2019 4:46:40PM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1796460 [VXX/34446]
Blank Lab ID: 1519362

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193788005, 1193788006, 1193788007, 1193788008, 1193788009, 1193788010, 1193788011

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	107	81-118		%
4-Bromofluorobenzene (surr)	113	85-114		%
Toluene-d8 (surr)	96	89-112		%

Batch Information

Analytical Batch: VMS19171
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: CMC
Analytical Date/Time: 7/15/2019 2:48:00PM

Prep Batch: VXX34446
Prep Method: SW5030B
Prep Date/Time: 7/15/2019 6:30:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193788 [VXX34446]
Blank Spike Lab ID: 1519363
Date Analyzed: 07/15/2019 15:03

Spike Duplicate ID: LCSD for HBN 1193788 [VXX34446]
Spike Duplicate Lab ID: 1519364
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193788005, 1193788006, 1193788007, 1193788008, 1193788009, 1193788010, 1193788011

Results by **SW8260C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	32.2	107	30	31.2	104	(79-124)	3.10	(< 20)
1,3,5-Trimethylbenzene	30	31.7	106	30	30.8	103	(75-124)	2.70	(< 20)
Benzene	30	27.9	93	30	26.8	90	(79-120)	3.90	(< 20)
Ethylbenzene	30	27.9	93	30	27.0	90	(79-121)	3.10	(< 20)
Isopropylbenzene (Cumene)	30	27.7	92	30	27.4	91	(72-131)	1.40	(< 20)
Naphthalene	30	27.3	91	30	28.3	95	(61-128)	3.70	(< 20)
n-Butylbenzene	30	32.5	108	30	31.5	105	(75-128)	3.10	(< 20)
o-Xylene	30	27.5	92	30	27.0	90	(78-122)	2.00	(< 20)
P & M -Xylene	60	54.2	90	60	53.0	88	(80-121)	2.30	(< 20)
sec-Butylbenzene	30	31.7	106	30	30.5	102	(77-126)	3.80	(< 20)
tert-Butylbenzene	30	31.2	104	30	30.8	103	(78-124)	1.30	(< 20)
Toluene	30	26.5	88	30	25.8	86	(80-121)	2.50	(< 20)
Xylenes (total)	90	81.8	91	90	80.0	89	(79-121)	2.20	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	97.7	98	30	98.2	98	(81-118)	0.59	
4-Bromofluorobenzene (surr)	30	113	113	30	112	112	(85-114)	0.59	
Toluene-d8 (surr)	30	96.1	96	30	95.6	96	(89-112)	0.52	

Batch Information

Analytical Batch: **VMS19171**
Analytical Method: **SW8260C**
Instrument: **Agilent 7890-75MS**
Analyst: **CMC**

Prep Batch: **VXX34446**
Prep Method: **SW5030B**
Prep Date/Time: **07/15/2019 06:30**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1796513 [VXX/34455]
Blank Lab ID: 1519583

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193788009, 1193788010

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
Benzene	0.200U	0.400	0.120	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	109	81-118		%
4-Bromofluorobenzene (surr)	112	85-114		%
Toluene-d8 (surr)	96.2	89-112		%

Batch Information

Analytical Batch: VMS19175
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: NRB
Analytical Date/Time: 7/16/2019 3:00:00PM

Prep Batch: VXX34455
Prep Method: SW5030B
Prep Date/Time: 7/16/2019 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193788 [VXX34455]
Blank Spike Lab ID: 1519584
Date Analyzed: 07/16/2019 15:15

Spike Duplicate ID: LCSD for HBN 1193788 [VXX34455]
Spike Duplicate Lab ID: 1519585
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193788009, 1193788010

Results by **SW8260C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	30	28.6	96	30	28.4	95	(79-120)	0.77	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	98.8	99	30	98.5	99	(81-118)	0.32	
4-Bromofluorobenzene (surr)	30	111	111	30	111	111	(85-114)	0.60	
Toluene-d8 (surr)	30	97.5	98	30	95.4	95	(89-112)	2.20	

Batch Information

Analytical Batch: **VMS19175**
Analytical Method: **SW8260C**
Instrument: **Agilent 7890-75MS**
Analyst: **NRB**

Prep Batch: **VXX34455**
Prep Method: **SW5030B**
Prep Date/Time: **07/16/2019 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1796417 (; VVX 3346]
Blank Lab ID: 1419654

2 Q for CaS mpe:
119/ 7ss881, 119/ 7ss883

Matrix: Watpr (Curfacp, Eff., Ground)

Rpeulte by **SW8260C**

ParaS ptpr	Rpeulte	LO2 XQL	DL	Unite
1,5,3-TriS pthylbpnzpnp	8.488U	1.88	8./ 18	ugX
1,/ ,4-TriS pthylbpnzpnp	8.488U	1.88	8./ 18	ugX
Bpnzpnp	8.588U	8.388	8.158	ugX
Ethylbpnzpnp	8.488U	1.88	8./ 18	ugX
Ieomromylbpnzpnp (QuS pnp)	8.488U	1.88	8./ 18	ugX
Nam hthalpnp	8.488U	1.88	8./ 18	ugX
n-Butylbpnzpnp	8.488U	1.88	8./ 18	ugX
o-Vylpnp	8.488U	1.88	8./ 18	ugX
P & M -Vylpnp	1.88U	5.88	8.658	ugX
epc-Butylbpnzpnp	8.488U	1.88	8./ 18	ugX
tprt-Butylbpnzpnp	8.488U	1.88	8./ 18	ugX
Tolupnp	8.488U	1.88	8./ 18	ugX
Vylpnpe (total)	1.48U	/ .88	1.88	ugX
Surrogates				
1,5-Dichloropthanp-D3 (eurr)	184	s1-11s		%
3-BroS ofluorobpnzpnp (eurr)	111	s4-113		%
Tolupnp-ds (eurr)	96.5	s9-115		%

Batch Information

Analytical Batch: [MC19179
Analytical Mpthod: CWs568Q
InetruS pnt: Agilpnt 7s98-74MC
Analyet: QMQ
Analytical DatpXTiS p: 7X17X6819 5:33:88PM

PrpmBatch: [VV/ 3346
PrpmMpthod: CW48/ 8B
PrpmDatpXTiS p: 7X17X6819 6:88:88AM
PrpmInitial Wt.X ol.: 4 S L
PrpmExtract [ol: 4 S L

Print Datp: 87X64X6819 3:36:3sPM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1193788 [VXX34456]
Blank Spike Lab ID: 1519626
Date Analyzed: 07/17/2019 14:59

Spike Duplicate ID: LCSD for HBN 1193788 [VXX34456]
Spike Duplicate Lab ID: 1519627
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193788001, 1193788004

Results by **SW8260C**

	Blank Spike (ug/L)				Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)		Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	30.8	103		30	30.0	100	(79-124)	2.60	(< 20)
1,3,5-Trimethylbenzene	30	30.1	100		30	29.8	99	(75-124)	1.00	(< 20)
Benzene	30	28.0	93		30	27.2	91	(79-120)	3.00	(< 20)
Ethylbenzene	30	26.7	89		30	25.9	87	(79-121)	2.90	(< 20)
Isopropylbenzene (Cumene)	30	26.8	89		30	26.2	87	(72-131)	2.30	(< 20)
Naphthalene	30	27.4	91		30	28.7	96	(61-128)	4.90	(< 20)
n-Butylbenzene	30	29.9	100		30	29.1	97	(75-128)	2.60	(< 20)
o-Xylene	30	27.2	91		30	26.5	88	(78-122)	2.70	(< 20)
P & M -Xylene	60	52.8	88		60	51.1	85	(80-121)	3.20	(< 20)
sec-Butylbenzene	30	29.2	97		30	28.1	94	(77-126)	3.60	(< 20)
tert-Butylbenzene	30	29.7	99		30	28.6	96	(78-124)	3.50	(< 20)
Toluene	30	25.1	84		30	24.4	81	(80-121)	2.90	(< 20)
Xylenes (total)	90	80.1	89		90	77.6	86	(79-121)	3.10	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)	30	97.3	97		30	98.4	98	(81-118)	1.10	
4-Bromofluorobenzene (surr)	30	115	115	*	30	114	114	(85-114)	0.66	
Toluene-d8 (surr)	30	95.8	96		30	96.1	96	(89-112)	0.24	

Batch Information

Analytical Batch: **VMS19179**
Analytical Method: **SW8260C**
Instrument: **Agilent 7890-75MS**
Analyst: **CMC**

Prep Batch: **VXX34456**
Prep Method: **SW5030B**
Prep Date/Time: **07/17/2019 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

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Billable Matrix Spike Summary

Original Sample ID: 1193788001
MS Sample ID: 1193788002 BMS
MSD Sample ID: 1193788003 BMSD

Analysis Date: 07/17/2019 18:34
Analysis Date: 07/17/2019 16:46
Analysis Date: 07/17/2019 17:02
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by **SW8260C**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	0.500U	30.0	34	113	30.0	33.3	111	79-124	2.10	(< 20)
1,3,5-Trimethylbenzene	0.500U	30.0	33.3	111	30.0	32.7	109	75-124	1.60	(< 20)
Benzene	2.05	30.0	30.8	96	30.0	30.4	94	79-120	1.30	(< 20)
Ethylbenzene	0.460J	30.0	28.9	95	30.0	28.7	94	79-121	0.58	(< 20)
Isopropylbenzene (Cumene)	4.07	30.0	33.2	97	30.0	33.4	98	72-131	0.48	(< 20)
Naphthalene	0.500U	30.0	32.2	107	30.0	31.0	103	61-128	3.70	(< 20)
n-Butylbenzene	0.500U	30.0	33.6	112	30.0	34.0	113	75-128	1.20	(< 20)
o-Xylene	0.500U	30.0	28.9	96	30.0	28.6	95	78-122	0.90	(< 20)
P & M -Xylene	1.00U	60.0	56.9	95	60.0	56.2	94	80-121	1.30	(< 20)
sec-Butylbenzene	0.500U	30.0	33.6	112	30.0	33.0	110	77-126	1.80	(< 20)
tert-Butylbenzene	0.500U	30.0	34.3	114	30.0	33.5	112	78-124	2.30	(< 20)
Toluene	0.500U	30.0	26.7	89	30.0	26.6	89	80-121	0.61	(< 20)
Xylenes (total)	1.50U	90.0	85.7	95	90.0	84.7	94	79-121	1.10	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		30.0	29.2	97	30.0	29.3	98	81-118	0.23	
4-Bromofluorobenzene (surr)		30.0	35.1	117 *	30.0	34.5	115 *	85-114	1.70	
Toluene-d8 (surr)		30.0	28.8	96	30.0	28.8	96	89-112	0.26	

Batch Information

Analytical Batch: VMS19179
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: CMC
Analytical Date/Time: 7/17/2019 4:46:00PM

Prep Batch: VXX34456
Prep Method: Volatiles Extraction 8240/8260 FULL
Prep Date/Time: 7/17/2019 6:00:00AM
Prep Initial Wt./Vol.: 5.00mL
Prep Extract Vol: 5.00mL

Print Date: 07/25/2019 4:46:50PM

Method Blank

Blank ID: MB for HBN 1796314 [XXX/41758]
Blank Lab ID: 1518724

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193788001, 1193788004, 1193788005, 1193788006, 1193788007, 1193788008, 1193788009, 1193788010

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)	63	47-106		%
Fluoranthene-d10 (surr)	63.4	24-116		%

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 7/17/2019 10:44:00PM

Prep Batch: XXX41758
Prep Method: SW3520C
Prep Date/Time: 7/15/2019 11:28:11AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193788 [XXX41758]
Blank Spike Lab ID: 1518725
Date Analyzed: 07/17/2019 23:05

Spike Duplicate ID: LCSD for HBN 1193788 [XXX41758]
Spike Duplicate Lab ID: 1518726
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193788001, 1193788004, 1193788005, 1193788006, 1193788007, 1193788008, 1193788009, 1193788010

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

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1-Methylnaphthalene	2	1.50	75	2	1.41	70	(41-115)	6.20	(< 20)
2-Methylnaphthalene	2	1.46	73	2	1.37	69	(39-114)	5.80	(< 20)
Acenaphthene	2	1.48	74	2	1.37	69	(48-114)	7.60	(< 20)
Acenaphthylene	2	1.57	79	2	1.45	72	(35-121)	8.20	(< 20)
Anthracene	2	1.54	77	2	1.41	71	(53-119)	9.00	(< 20)
Benzo(a)Anthracene	2	1.50	75	2	1.37	68	(59-120)	9.10	(< 20)
Benzo[a]pyrene	2	1.52	76	2	1.40	70	(53-120)	7.90	(< 20)
Benzo[b]Fluoranthene	2	1.61	81	2	1.50	75	(53-126)	7.00	(< 20)
Benzo[g,h,i]perylene	2	1.45	73	2	1.32	66	(44-128)	9.50	(< 20)
Benzo[k]fluoranthene	2	1.51	76	2	1.40	70	(54-125)	8.10	(< 20)
Chrysene	2	1.50	75	2	1.39	69	(57-120)	7.90	(< 20)
Dibenzo[a,h]anthracene	2	1.37	69	2	1.24	62	(44-131)	10.50	(< 20)
Fluoranthene	2	1.58	79	2	1.42	71	(58-120)	10.80	(< 20)
Fluorene	2	1.53	77	2	1.42	71	(50-118)	7.60	(< 20)
Indeno[1,2,3-c,d] pyrene	2	1.58	79	2	1.46	73	(48-130)	7.50	(< 20)
Naphthalene	2	1.53	76	2	1.42	71	(43-114)	6.90	(< 20)
Phenanthrene	2	1.50	75	2	1.37	68	(53-115)	9.40	(< 20)
Pyrene	2	1.62	81	2	1.48	74	(53-121)	9.20	(< 20)
Surrogates									
2-Methylnaphthalene-d10 (surr)	2	69.1	69	2	64	64	(47-106)	7.60	
Fluoranthene-d10 (surr)	2	69.9	70	2	64.3	64	(24-116)	8.30	

Batch Information

Analytical Batch: **XMS11531**
Analytical Method: **8270D SIM LV (PAH)**
Instrument: **SVA Agilent 780/5975 GC/MS**
Analyst: **BMZ**

Prep Batch: **XXX41758**
Prep Method: **SW3520C**
Prep Date/Time: **07/15/2019 11:28**
Spike Init Wt./Vol.: 2 ug/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 2 ug/L Extract Vol: 1 mL

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Billable Matrix Spike Summary

Original Sample ID: 1193788001
MS Sample ID: 1193788002 BMS
MSD Sample ID: 1193788003 BMSD

Analysis Date: 07/18/2019 1:08
Analysis Date: 07/18/2019 1:29
Analysis Date: 07/18/2019 1:50
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

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	0.0194J	2.05	1.13	54		1.92	1.38	71		41-115	20.10	* (< 20)
2-Methylnaphthalene	0.0269J	2.05	1.1	52		1.92	1.35	69		39-114	20.80	* (< 20)
Acenaphthene	0.0236U	2.05	1.09	53		1.92	1.35	70		48-114	21.60	* (< 20)
Acenaphthylene	0.0236U	2.05	1.16	57		1.92	1.45	76		35-121	22.30	* (< 20)
Anthracene	0.0236U	2.05	1.1	54		1.92	1.38	72		53-119	22.20	* (< 20)
Benzo(a)Anthracene	0.0236U	2.05	.958	47	*	1.92	1.09	57	*	59-120	12.60	(< 20)
Benzo[a]pyrene	0.00945U	2.05	.903	44	*	1.92	0.985	51	*	53-120	8.60	(< 20)
Benzo[b]Fluoranthene	0.0236U	2.05	.945	46	*	1.92	1.02	53		53-126	7.60	(< 20)
Benzo[g,h,i]perylene	0.0236U	2.05	.691	34	*	1.92	0.778	41	*	44-128	11.80	(< 20)
Benzo[k]fluoranthene	0.0236U	2.05	.897	44	*	1.92	0.976	51	*	54-125	8.40	(< 20)
Chrysene	0.0236U	2.05	.979	48	*	1.92	1.12	58		57-120	13.70	(< 20)
Dibenzo[a,h]anthracene	0.00945U	2.05	.554	27	*	1.92	0.664	35	*	44-131	18.00	(< 20)
Fluoranthene	0.0236U	2.05	1.1	54	*	1.92	1.33	69		58-120	19.30	(< 20)
Fluorene	0.0236U	2.05	1.12	55		1.92	1.38	72		50-118	21.30	* (< 20)
Indeno[1,2,3-c,d] pyrene	0.0236U	2.05	.787	38	*	1.92	0.859	45	*	48-130	8.80	(< 20)
Naphthalene	0.0471U	2.05	1.15	56		1.92	1.40	73		43-114	19.30	(< 20)
Phenanthrene	0.0236U	2.05	1.08	53	*	1.92	1.33	69		53-115	21.00	* (< 20)
Pyrene	0.0236U	2.05	1.15	56		1.92	1.38	72		53-121	18.20	(< 20)
Surrogates												
2-Methylnaphthalene-d10 (surr)		2.05	1.02	50		1.92	1.21	63		47-106	17.60	
Fluoranthene-d10 (surr)		2.05	.985	48		1.92	1.20	62		24-116	19.60	

Batch Information

Analytical Batch: XMS11531
Analytical Method: 8270D SIM LV (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: BMZ
Analytical Date/Time: 7/18/2019 1:29:00AM

Prep Batch: XXX41758
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/15/2019 11:28:11AM
Prep Initial Wt./Vol.: 244.00mL
Prep Extract Vol: 1.00mL

Print Date: 07/25/2019 4:46:54PM

SGS

1193788

Inc.
ECORD

Locations Nationwide

Alaska	Maryland
New Jersey	New York
North Carolina	Indiana
West Virgina	Kentucky

www.us.sgs.com

uctions: Sections 1 - 5 must be filled out.
Omissions may delay the onset of analysis.

Page 1 of 1

Section 1

CLIENT: BRICE ENVIRONMENTAL

CONTACT: KIMI LLOYD PHONE NO: 907-317-7999

PROJECT NAME: 2019 HAK CS GWM PROGRAM PROJECT/ PWSID/ PERMIT#: SRF TS 3-4

REPORTS TO: KELLY CARSON E-MAIL: KCARSON@BRICEENVIRONMENTAL.COM

INVOICE TO: HILCORP AK QUOTE #: P.O. #: 1952573

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incre-mental Soils	Preservative: HCl	HCl	HCl	HCl	HCl	—	—			REMARKS/ LOC ID
							AK101 (GRO)	AK102 (DRO)	AK103 (RRO)	SW8260C (AK PETRO LIST VOC)	SW8260C (BTEX only)	SW8270D SIM (PAH)	SW8015C (ETHYLENE GLYCOL)			
(3) (3)	AE	SRF34-FS34A-0719	7/9/19	0820	GW	15	-	-	-	9	-	6	-			Added volume for MS/MSD
(4)	AE	SRF34-FS34B-0719	7/9/19	0825	GW	5	-	-	-	3	-	2	-			
(5)	AE	SRF34-FS34F-0719	7/9/19	1430	GW	5	-	-	-	3	-	2	-			
(6)	AE	SRF34-TS34CC-0719	7/9/19	1420	GW	5	-	-	-	3	-	2	-			
(7)	AE	SRF34-TS34MM-0719	7/9/19	1205	GW	5	-	-	-	3	-	2	-			
(8)	AE	SRF34-TS34OO-0719	7/9/19	1200	GW	5	-	-	-	3	-	2	-			
(9)	AE	SRF34-TS34P-0719	7/9/19	1040	GW	5	-	-	-	3	-	2	-			
(10)	A-E	SRF34-TS34PZ-0719	7/9/19	1050	GW	5	-	-	-	3	-	2	-			
(11)	A-C	SRF34-TB01-0719	7/9/19	0800	GW	3	-	-	-	3	-	-	-			

Section 5

	Date	Time	Received By:
Relinquished By: (1)	7/12/19	1015	[RAVN]
Relinquished By: (2)			
Relinquished By: (3)			
Relinquished By: (4)	07/12/19	16:34	Received For Laboratory By: AMC

Section 4

DOD Project? Yes (No)

Cooler ID: HALIBUT

Data Deliverable Requirements: LEVEL II

Requested Turnaround Time and/or Special Instructions:

Profile: 341882 JKJ

Temp Blank °C: 0.4° DUS

or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) 1E 1B

INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms-and-conditions

808 - 1050 0954 **Air Freight** **808 ENA 1050 0954**

Shipper's Name and Address
SGS ENVIRONMENTAL 50012
200 W POTTER DR
ANCHORAGE, AK 99518
562, 2343

Consignee:
BRICE ENVIRONMENTAL SERVICES CORP 40272
5015 BUSINESS PARK BLVD.
ANCHORAGE , AK 99503
907, 3609261

Ravn ALASKA

RAVN AIR
4700 OLD INTERNATIONAL AIRPORT ROAD
ANCHORAGE AK. 99502

It is agreed that the goods described herein are accepted in good order and undamaged condition (except as noted) for carriage SUBJECT TO THE "TERMS OF CONTRACT". The Shippers attention is drawn to the "TERMS OF CONTRACT LIMIT OF LIABILITY". The maximum liability by declaring a value of the goods and paying a supplemental charge of $0.75 per $100.00 up to a maximum of $5,000.00 declared value.

Accounting Information
GEN - GENERAL FREIGHT

Origin	ENA	Currency	USD
Destination	ANC	Charge Code	CX
Handling Information		Declared Value for Carriage	0

Pieces	Gross Weight	Nature of Goods	Chargeable Weight	Rate/Charge	Total	Length	Width	Height	Dim Weight
4		GEN//WATER SAMPLES				5	5	5	3
4	190		190						3

Fee	Prepaid	Collect
Weight Charge		70.30
Valuation Charge		0.00
Tax		4.39
Total Other Charges Due Agent		0.00
Total Other Charges Due Carrier		0.00
Total		74.69
Signature of Issuing Carrier or its Agent	WB Date	WB Time
BRAHUNSON KAAI	12-JUL-19	1133

Other Charges			
FSC Fee	0.00	SSC Fee	0.00
DOC Fees	0.00	DG Fee	0.00
OTH Fees	0.00	P/U Fee	0.00
DEL Fees	0.00	TSC Fees	0.00

The shipper certifies that the particulars on the face hereof are correct, and that the shipment does not contain dangerous goods, and that all ITEMS ARE ACCEPTED AT SHIPPER'S RISK.

KIMBERLY LLOYD
(Shipper's printed name and signature)

The consignee certifies that the shipment is received in good order except where noted below.

(Consignee's printed name and signature)

CARRIAGE SUBJECT TO "TERMS OF CONTRACT" found at https://www.flyravn.com/cargo-services/cargo-contract-carriage

Alert Expeditors Inc. **#394319**

Citywide Delivery • 440-3351
8421 Flamingo Drive • Anchorage, Alaska 99502

Date 7/12/19

From Bristol Environmental

To SGS

Collect ☐	Prepay ☐ Account ☐	Advance Charges ☐
Job # ENA	PO# TH 1250 0154	

Water Samples

Shipped Signature

Total Charge

Received By: Alert Alaska

e-Sample Receipt Form

SGS Workorder #: **1193788**

1 1 9 3 7 8 8

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		N/A — Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Yes	1F 1B
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
N/A — **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: Halibut @ 0.4 °C Therm. ID: D45
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
		N/A — ***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	Containers 1E, 2D, 2E, 3D, 3E, 4E, 8E, and 10E all have bubbles greater than 6mm, limited volume stickers applied
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	No	
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
1193788001-A	No Preservative Required	OK
1193788001-B	No Preservative Required	OK
1193788001-C	HCL to pH < 2	OK
1193788001-D	HCL to pH < 2	OK
1193788001-E	HCL to pH < 2	BU
1193788002-A	No Preservative Required	OK
1193788002-B	No Preservative Required	OK
1193788002-C	HCL to pH < 2	OK
1193788002-D	HCL to pH < 2	BU
1193788002-E	HCL to pH < 2	BU
1193788003-A	No Preservative Required	OK
1193788003-B	No Preservative Required	OK
1193788003-C	HCL to pH < 2	OK
1193788003-D	HCL to pH < 2	BU
1193788003-E	HCL to pH < 2	BU
1193788004-A	No Preservative Required	OK
1193788004-B	No Preservative Required	OK
1193788004-C	HCL to pH < 2	OK
1193788004-D	HCL to pH < 2	OK
1193788004-E	HCL to pH < 2	BU
1193788005-A	No Preservative Required	OK
1193788005-B	No Preservative Required	OK
1193788005-C	HCL to pH < 2	OK
1193788005-D	HCL to pH < 2	OK
1193788005-E	HCL to pH < 2	OK
1193788006-A	No Preservative Required	OK
1193788006-B	No Preservative Required	OK
1193788006-C	HCL to pH < 2	OK
1193788006-D	HCL to pH < 2	OK
1193788006-E	HCL to pH < 2	OK
1193788007-A	No Preservative Required	OK
1193788007-B	No Preservative Required	OK
1193788007-C	HCL to pH < 2	OK
1193788007-D	HCL to pH < 2	OK
1193788007-E	HCL to pH < 2	OK
1193788008-A	No Preservative Required	OK
1193788008-B	No Preservative Required	OK
1193788008-C	HCL to pH < 2	OK
1193788008-D	HCL to pH < 2	OK
1193788008-E	HCL to pH < 2	BU
1193788009-A	No Preservative Required	OK
1193788009-B	No Preservative Required	OK
1193788009-C	HCL to pH < 2	OK
1193788009-D	HCL to pH < 2	OK
1193788009-E	HCL to pH < 2	OK
1193788010-A	No Preservative Required	OK
1193788010-B	No Preservative Required	OK
1193788010-C	HCL to pH < 2	OK
1193788010-D	HCL to pH < 2	OK
1193788010-E	HCL to pH < 2	BU
1193788011-A	HCL to pH < 2	OK
1193788011-B	HCL to pH < 2	OK
1193788011-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.
NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

Laboratory Report of Analysis

To: Hilcorp Alaska, LLC
3800 Centerpoint Dr. Suite 400
Anchorage, AK 99503
(907)277-7297

Report Number: **1193574**

Client Project: **SRF TS 3-9 2019 HAK CS GWM**

Dear Kelly Carson,

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 Justin 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.



Justin Nelson
2019.07.15
16:04:12 -08'00'

SGS North America Inc.
Environmental Services – Alaska Division
Project Manager

Justin Nelson Date
Project Manager
Justin.Nelson@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

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Case Narrative

SGS Client: **Hilcorp Alaska, LLC**
SGS Project: **1193574**
Project Name/Site: **SRF TS 3-9 2019 HAK CS GWM**
Project Contact: **Kelly Carson**

Refer to sample receipt form for information on sample condition.

SRF39-FS39B-0719 MS (1193574006) BMS

8270D SIM - PAH BMS recovery for Dibenzo[a,h]anthracene does not meet QC criteria. Refer to the LCS for accuracy requirements.

SRF39-FS39B-0719 MSD (1193574007) BMSD

8270D SIM - PAH BMS/BMSD RPD for several analytes do not meet QC criteria. Results for this analyte are considered estimated in the parent sample.

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

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Laboratory Qualifiers

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

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry (DW Chemistry (Provisionally Certified as of 6/20/19 for Turbidity by SM 2130B, and Copper by EPA 200.8) & 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
SRF39-TS39AA-0719	1193574001	06/30/2019	07/03/2019	Water (Surface, Eff., Ground)
SRF39-TS39BBZ-0719	1193574002	06/30/2019	07/03/2019	Water (Surface, Eff., Ground)
SRF39-TS39BB-0719	1193574003	06/30/2019	07/03/2019	Water (Surface, Eff., Ground)
SRF39-TS39DD-0719	1193574004	06/30/2019	07/03/2019	Water (Surface, Eff., Ground)
SRF39-FS39B-0719	1193574005	06/30/2019	07/03/2019	Water (Surface, Eff., Ground)
SRF39-FS39B-0719 MS	1193574006	06/30/2019	07/03/2019	Water (Surface, Eff., Ground)
SRF39-FS39B-0719 MSD	1193574007	06/30/2019	07/03/2019	Water (Surface, Eff., Ground)
SRF39-TB01-0719	1193574008	06/30/2019	07/03/2019	Water (Surface, Eff., Ground)

Method	Method Description
SW8260C	8021B by 8260 (W)
8270D SIM LV (PAH)	8270 PAH SIM GC/MS Liq/Liq ext. LV

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Detectable Results Summary

Client Sample ID: **SRF39-TS39AA-0719**
Lab Sample ID: 1193574001

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	0.0330J	ug/L
	2-Methylnaphthalene	0.0370J	ug/L
	Naphthalene	0.272	ug/L
Volatile GC/MS	1,3,5-Trimethylbenzene	0.413J	ug/L
	Benzene	0.786	ug/L
	Ethylbenzene	2.87	ug/L
	Isopropylbenzene (Cumene)	4.88	ug/L
	Naphthalene	0.420J	ug/L
	sec-Butylbenzene	3.60	ug/L
	tert-Butylbenzene	0.438J	ug/L
	Toluene	0.449J	ug/L

Client Sample ID: **SRF39-TS39BBZ-0719**
Lab Sample ID: 1193574002

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	Naphthalene	0.547	ug/L
Volatile GC/MS	1,3,5-Trimethylbenzene	2.17	ug/L
	Benzene	5.25	ug/L
	Ethylbenzene	33.5	ug/L
	Isopropylbenzene (Cumene)	15.7	ug/L
	Naphthalene	0.803J	ug/L
	sec-Butylbenzene	3.69	ug/L
	tert-Butylbenzene	0.888J	ug/L
	Toluene	0.383J	ug/L

Client Sample ID: **SRF39-TS39BB-0719**
Lab Sample ID: 1193574003

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	Naphthalene	0.633	ug/L
Volatile GC/MS	1,3,5-Trimethylbenzene	2.27	ug/L
	Benzene	5.34	ug/L
	Ethylbenzene	35.9	ug/L
	Isopropylbenzene (Cumene)	16.4	ug/L
	Naphthalene	0.842J	ug/L
	sec-Butylbenzene	3.73	ug/L
	tert-Butylbenzene	0.908J	ug/L
	Toluene	0.388J	ug/L

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Results of **SRF39-TS39AA-0719**

Client Sample ID: **SRF39-TS39AA-0719**
Client Project ID: **SRF TS 3-9 2019 HAK CS GWM**
Lab Sample ID: 1193574001
Lab Project ID: 1193574

Collection Date: 06/30/19 16:45
Received Date: 07/03/19 13:41
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	0.0330	J	0.0463	0.0139	ug/L	1		07/12/19 16:40
2-Methylnaphthalene	0.0370	J	0.0463	0.0139	ug/L	1		07/12/19 16:40
Acenaphthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 16:40
Acenaphthylene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 16:40
Anthracene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 16:40
Benzo(a)Anthracene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 16:40
Benzo[a]pyrene	0.00925	U	0.0185	0.00574	ug/L	1		07/12/19 16:40
Benzo[b]Fluoranthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 16:40
Benzo[g,h,i]perylene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 16:40
Benzo[k]fluoranthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 16:40
Chrysene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 16:40
Dibenzo[a,h]anthracene	0.00925	U	0.0185	0.00574	ug/L	1		07/12/19 16:40
Fluoranthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 16:40
Fluorene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 16:40
Indeno[1,2,3-c,d] pyrene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 16:40
Naphthalene	0.272		0.0926	0.0287	ug/L	1		07/12/19 16:40
Phenanthrene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 16:40
Pyrene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 16:40
Surrogates								
2-Methylnaphthalene-d10 (surr)	67.3		47-106		%	1		07/12/19 16:40
Fluoranthene-d10 (surr)	62		24-116		%	1		07/12/19 16:40

Batch Information

Analytical Batch: XMS11513
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/12/19 16:40
Container ID: 1193574001-A

Prep Batch: XXX41711
Prep Method: SW3520C
Prep Date/Time: 07/05/19 10:21
Prep Initial Wt./Vol.: 270 mL
Prep Extract Vol: 1 mL

Print Date: 07/15/2019 8:55:31AM

J flagging is activated

Results of **SRF39-TS39AA-0719**

Client Sample ID: **SRF39-TS39AA-0719**
Client Project ID: **SRF TS 3-9 2019 HAK CS GWM**
Lab Sample ID: 1193574001
Lab Project ID: 1193574

Collection Date: 06/30/19 16:45
Received Date: 07/03/19 13:41
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/05/19 21:53
1,3,5-Trimethylbenzene	0.413	J	1.00	0.310	ug/L	1		07/05/19 21:53
Benzene	0.786		0.400	0.120	ug/L	1		07/05/19 21:53
Ethylbenzene	2.87		1.00	0.310	ug/L	1		07/05/19 21:53
Isopropylbenzene (Cumene)	4.88		1.00	0.310	ug/L	1		07/05/19 21:53
Naphthalene	0.420	J	1.00	0.310	ug/L	1		07/05/19 21:53
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/05/19 21:53
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/05/19 21:53
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		07/05/19 21:53
sec-Butylbenzene	3.60		1.00	0.310	ug/L	1		07/05/19 21:53
tert-Butylbenzene	0.438	J	1.00	0.310	ug/L	1		07/05/19 21:53
Toluene	0.449	J	1.00	0.310	ug/L	1		07/05/19 21:53
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/05/19 21:53
Surrogates								
1,2-Dichloroethane-D4 (surr)	99		81-118		%	1		07/05/19 21:53
4-Bromofluorobenzene (surr)	106		85-114		%	1		07/05/19 21:53
Toluene-d8 (surr)	102		89-112		%	1		07/05/19 21:53

Batch Information

Analytical Batch: VMS19124
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/05/19 21:53
Container ID: 1193574001-C

Prep Batch: VXX34377
Prep Method: SW5030B
Prep Date/Time: 07/05/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF39-TS39BBZ-0719**

Client Sample ID: **SRF39-TS39BBZ-0719**
Client Project ID: **SRF TS 3-9 2019 HAK CS GWM**
Lab Sample ID: 1193574002
Lab Project ID: 1193574

Collection Date: 06/30/19 16:05
Received Date: 07/03/19 13:41
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	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
2-Methylnaphthalene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Acenaphthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Acenaphthylene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Anthracene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Benzo(a)Anthracene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Benzo[a]pyrene	0.00925	U	0.0185	0.00574	ug/L	1		07/12/19 17:01
Benzo[b]Fluoranthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Benzo[g,h,i]perylene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Benzo[k]fluoranthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Chrysene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Dibenzo[a,h]anthracene	0.00925	U	0.0185	0.00574	ug/L	1		07/12/19 17:01
Fluoranthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Fluorene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Indeno[1,2,3-c,d] pyrene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Naphthalene	0.547		0.0926	0.0287	ug/L	1		07/12/19 17:01
Phenanthrene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Pyrene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:01
Surrogates								
2-Methylnaphthalene-d10 (surr)	74.8		47-106		%	1		07/12/19 17:01
Fluoranthene-d10 (surr)	69.6		24-116		%	1		07/12/19 17:01

Batch Information

Analytical Batch: XMS11513
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/12/19 17:01
Container ID: 1193574002-A

Prep Batch: XXX41711
Prep Method: SW3520C
Prep Date/Time: 07/05/19 10:21
Prep Initial Wt./Vol.: 270 mL
Prep Extract Vol: 1 mL

Print Date: 07/15/2019 8:55:31AM

J flagging is activated

Results of **SRF39-TS39BBZ-0719**

Client Sample ID: **SRF39-TS39BBZ-0719**
Client Project ID: **SRF TS 3-9 2019 HAK CS GWM**
Lab Sample ID: 1193574002
Lab Project ID: 1193574

Collection Date: 06/30/19 16:05
Received Date: 07/03/19 13:41
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/05/19 22:08
1,3,5-Trimethylbenzene	2.17		1.00	0.310	ug/L	1		07/05/19 22:08
Benzene	5.25		0.400	0.120	ug/L	1		07/05/19 22:08
Ethylbenzene	33.5		1.00	0.310	ug/L	1		07/05/19 22:08
Isopropylbenzene (Cumene)	15.7		1.00	0.310	ug/L	1		07/05/19 22:08
Naphthalene	0.803	J	1.00	0.310	ug/L	1		07/05/19 22:08
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/05/19 22:08
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/05/19 22:08
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		07/05/19 22:08
sec-Butylbenzene	3.69		1.00	0.310	ug/L	1		07/05/19 22:08
tert-Butylbenzene	0.888	J	1.00	0.310	ug/L	1		07/05/19 22:08
Toluene	0.383	J	1.00	0.310	ug/L	1		07/05/19 22:08
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/05/19 22:08
Surrogates								
1,2-Dichloroethane-D4 (surr)	99.6		81-118		%	1		07/05/19 22:08
4-Bromofluorobenzene (surr)	108		85-114		%	1		07/05/19 22:08
Toluene-d8 (surr)	100		89-112		%	1		07/05/19 22:08

Batch Information

Analytical Batch: VMS19124
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/05/19 22:08
Container ID: 1193574002-C

Prep Batch: VXX34377
Prep Method: SW5030B
Prep Date/Time: 07/05/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF39-TS39BB-0719**

Client Sample ID: **SRF39-TS39BB-0719**
Client Project ID: **SRF TS 3-9 2019 HAK CS GWM**
Lab Sample ID: 1193574003
Lab Project ID: 1193574

Collection Date: 06/30/19 17:05
Received Date: 07/03/19 13:41
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		07/12/19 17:21
2-Methylnaphthalene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Acenaphthene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Acenaphthylene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Anthracene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Benzo(a)Anthracene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Benzo[a]pyrene	0.00960	U	0.0192	0.00596	ug/L	1		07/12/19 17:21
Benzo[b]Fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Benzo[g,h,i]perylene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Benzo[k]fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Chrysene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Dibenzo[a,h]anthracene	0.00960	U	0.0192	0.00596	ug/L	1		07/12/19 17:21
Fluoranthene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Fluorene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Indeno[1,2,3-c,d] pyrene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Naphthalene	0.633		0.0962	0.0298	ug/L	1		07/12/19 17:21
Phenanthrene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Pyrene	0.0240	U	0.0481	0.0144	ug/L	1		07/12/19 17:21
Surrogates								
2-Methylnaphthalene-d10 (surr)	79		47-106		%	1		07/12/19 17:21
Fluoranthene-d10 (surr)	75.1		24-116		%	1		07/12/19 17:21

Batch Information

Analytical Batch: XMS11513
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/12/19 17:21
Container ID: 1193574003-A

Prep Batch: XXX41711
Prep Method: SW3520C
Prep Date/Time: 07/05/19 10:21
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 07/15/2019 8:55:31AM

J flagging is activated

Results of **SRF39-TS39BB-0719**

Client Sample ID: **SRF39-TS39BB-0719**
Client Project ID: **SRF TS 3-9 2019 HAK CS GWM**
Lab Sample ID: 1193574003
Lab Project ID: 1193574

Collection Date: 06/30/19 17:05
Received Date: 07/03/19 13:41
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/05/19 22:24
1,3,5-Trimethylbenzene	2.27		1.00	0.310	ug/L	1		07/05/19 22:24
Benzene	5.34		0.400	0.120	ug/L	1		07/05/19 22:24
Ethylbenzene	35.9		1.00	0.310	ug/L	1		07/05/19 22:24
Isopropylbenzene (Cumene)	16.4		1.00	0.310	ug/L	1		07/05/19 22:24
Naphthalene	0.842	J	1.00	0.310	ug/L	1		07/05/19 22:24
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/05/19 22:24
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/05/19 22:24
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		07/05/19 22:24
sec-Butylbenzene	3.73		1.00	0.310	ug/L	1		07/05/19 22:24
tert-Butylbenzene	0.908	J	1.00	0.310	ug/L	1		07/05/19 22:24
Toluene	0.388	J	1.00	0.310	ug/L	1		07/05/19 22:24
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/05/19 22:24
Surrogates								
1,2-Dichloroethane-D4 (surr)	100		81-118		%	1		07/05/19 22:24
4-Bromofluorobenzene (surr)	107		85-114		%	1		07/05/19 22:24
Toluene-d8 (surr)	100		89-112		%	1		07/05/19 22:24

Batch Information

Analytical Batch: VMS19124
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/05/19 22:24
Container ID: 1193574003-C

Prep Batch: VXX34377
Prep Method: SW5030B
Prep Date/Time: 07/05/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/15/2019 8:55:31AM

J flagging is activated

Results of **SRF39-TS39DD-0719**

Client Sample ID: **SRF39-TS39DD-0719**
Client Project ID: **SRF TS 3-9 2019 HAK CS GWM**
Lab Sample ID: 1193574004
Lab Project ID: 1193574

Collection Date: 06/30/19 12:25
Received Date: 07/03/19 13:41
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	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
2-Methylnaphthalene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Acenaphthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Acenaphthylene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Anthracene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Benzo(a)Anthracene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Benzo[a]pyrene	0.00925	U	0.0185	0.00574	ug/L	1		07/12/19 17:42
Benzo[b]Fluoranthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Benzo[g,h,i]perylene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Benzo[k]fluoranthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Chrysene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Dibenzo[a,h]anthracene	0.00925	U	0.0185	0.00574	ug/L	1		07/12/19 17:42
Fluoranthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Fluorene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Indeno[1,2,3-c,d] pyrene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Naphthalene	0.0463	U	0.0926	0.0287	ug/L	1		07/12/19 17:42
Phenanthrene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Pyrene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 17:42
Surrogates								
2-Methylnaphthalene-d10 (surr)	60.2		47-106		%	1		07/12/19 17:42
Fluoranthene-d10 (surr)	57.3		24-116		%	1		07/12/19 17:42

Batch Information

Analytical Batch: XMS11513
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/12/19 17:42
Container ID: 1193574004-A

Prep Batch: XXX41711
Prep Method: SW3520C
Prep Date/Time: 07/05/19 10:21
Prep Initial Wt./Vol.: 270 mL
Prep Extract Vol: 1 mL

Print Date: 07/15/2019 8:55:31AM

J flagging is activated

Results of **SRF39-TS39DD-0719**

Client Sample ID: **SRF39-TS39DD-0719**
Client Project ID: **SRF TS 3-9 2019 HAK CS GWM**
Lab Sample ID: 1193574004
Lab Project ID: 1193574

Collection Date: 06/30/19 12:25
Received Date: 07/03/19 13:41
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:39
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:39
Benzene	0.200 U		0.400	0.120	ug/L	1		07/05/19 22:39
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:39
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:39
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:39
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:39
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:39
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/05/19 22:39
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:39
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:39
Toluene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:39
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/05/19 22:39
Surrogates								
1,2-Dichloroethane-D4 (surr)	109		81-118		%	1		07/05/19 22:39
4-Bromofluorobenzene (surr)	106		85-114		%	1		07/05/19 22:39
Toluene-d8 (surr)	98.8		89-112		%	1		07/05/19 22:39

Batch Information

Analytical Batch: VMS19124
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/05/19 22:39
Container ID: 1193574004-C

Prep Batch: VXX34377
Prep Method: SW5030B
Prep Date/Time: 07/05/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF39-FS39B-0719**

Client Sample ID: **SRF39-FS39B-0719**
Client Project ID: **SRF TS 3-9 2019 HAK CS GWM**
Lab Sample ID: 1193574005
Lab Project ID: 1193574

Collection Date: 06/30/19 11:35
Received Date: 07/03/19 13:41
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	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
2-Methylnaphthalene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Acenaphthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Acenaphthylene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Anthracene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Benzo(a)Anthracene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Benzo[a]pyrene	0.00925	U	0.0185	0.00574	ug/L	1		07/12/19 18:02
Benzo[b]Fluoranthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Benzo[g,h,i]perylene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Benzo[k]fluoranthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Chrysene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Dibenzo[a,h]anthracene	0.00925	U	0.0185	0.00574	ug/L	1		07/12/19 18:02
Fluoranthene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Fluorene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Indeno[1,2,3-c,d] pyrene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Naphthalene	0.0463	U	0.0926	0.0287	ug/L	1		07/12/19 18:02
Phenanthrene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Pyrene	0.0232	U	0.0463	0.0139	ug/L	1		07/12/19 18:02
Surrogates								
2-Methylnaphthalene-d10 (surr)	71.6		47-106		%	1		07/12/19 18:02
Fluoranthene-d10 (surr)	77.2		24-116		%	1		07/12/19 18:02

Batch Information

Analytical Batch: XMS11513
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/12/19 18:02
Container ID: 1193574005-A

Prep Batch: XXX41711
Prep Method: SW3520C
Prep Date/Time: 07/05/19 10:21
Prep Initial Wt./Vol.: 270 mL
Prep Extract Vol: 1 mL

Print Date: 07/15/2019 8:55:31AM

J flagging is activated

Results of **SRF39-FS39B-0719**

Client Sample ID: **SRF39-FS39B-0719**
Client Project ID: **SRF TS 3-9 2019 HAK CS GWM**
Lab Sample ID: 1193574005
Lab Project ID: 1193574

Collection Date: 06/30/19 11:35
Received Date: 07/03/19 13:41
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:54
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:54
Benzene	0.200 U		0.400	0.120	ug/L	1		07/05/19 22:54
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:54
Isopropylbenzene (Cumene)	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:54
Naphthalene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:54
n-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:54
o-Xylene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:54
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		07/05/19 22:54
sec-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:54
tert-Butylbenzene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:54
Toluene	0.500 U		1.00	0.310	ug/L	1		07/05/19 22:54
Xylenes (total)	1.50 U		3.00	1.00	ug/L	1		07/05/19 22:54
Surrogates								
1,2-Dichloroethane-D4 (surr)	111		81-118		%	1		07/05/19 22:54
4-Bromofluorobenzene (surr)	105		85-114		%	1		07/05/19 22:54
Toluene-d8 (surr)	98.9		89-112		%	1		07/05/19 22:54

Batch Information

Analytical Batch: VMS19124
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/05/19 22:54
Container ID: 1193574005-C

Prep Batch: VXX34377
Prep Method: SW5030B
Prep Date/Time: 07/05/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/15/2019 8:55:31AM

J flagging is activated

Results of **SRF39-TB01-0719**

Client Sample ID: **SRF39-TB01-0719**
Client Project ID: **SRF TS 3-9 2019 HAK CS GWM**
Lab Sample ID: 1193574008
Lab Project ID: 1193574

Collection Date: 06/30/19 08:00
Received Date: 07/03/19 13:41
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/05/19 21:07
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/05/19 21:07
Benzene	0.200	U	0.400	0.120	ug/L	1		07/05/19 21:07
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/05/19 21:07
Isopropylbenzene (Cumene)	0.500	U	1.00	0.310	ug/L	1		07/05/19 21:07
Naphthalene	0.500	U	1.00	0.310	ug/L	1		07/05/19 21:07
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/05/19 21:07
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/05/19 21:07
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		07/05/19 21:07
sec-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/05/19 21:07
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/05/19 21:07
Toluene	0.500	U	1.00	0.310	ug/L	1		07/05/19 21:07
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/05/19 21:07
Surrogates								
1,2-Dichloroethane-D4 (surr)	108		81-118		%	1		07/05/19 21:07
4-Bromofluorobenzene (surr)	103		85-114		%	1		07/05/19 21:07
Toluene-d8 (surr)	102		89-112		%	1		07/05/19 21:07

Batch Information

Analytical Batch: VMS19124
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/05/19 21:07
Container ID: 1193574008-A

Prep Batch: VXX34377
Prep Method: SW5030B
Prep Date/Time: 07/05/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1795918 [VXX/34377]
Blank Lab ID: 1517023

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193574001, 1193574002, 1193574003, 1193574004, 1193574005, 1193574008

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	108	81-118		%
4-Bromofluorobenzene (surr)	110	85-114		%
Toluene-d8 (surr)	99.9	89-112		%

Batch Information

Analytical Batch: VMS19124
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: NRB
Analytical Date/Time: 7/5/2019 3:50:00PM

Prep Batch: VXX34377
Prep Method: SW5030B
Prep Date/Time: 7/5/2019 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Leaching Blank

Blank ID: LB for HBN 1795780 [TCLP/10111
Blank Lab ID: 1516317

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193574001, 1193574002, 1193574003, 1193574004, 1193574005, 1193574008

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
Benzene	10.0U	20.0	6.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	109	81-118		%
4-Bromofluorobenzene (surr)	104	85-114		%
Toluene-d8 (surr)	99.4	89-112		%

Batch Information

Analytical Batch: VMS19124
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: NRB
Analytical Date/Time: 7/6/2019 1:12:00AM

Prep Batch: VXX34377
Prep Method: SW5030B
Prep Date/Time: 7/5/2019 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193574 [VXX34377]
Blank Spike Lab ID: 1517024
Date Analyzed: 07/05/2019 16:05

Spike Duplicate ID: LCSD for HBN 1193574 [VXX34377]
Spike Duplicate Lab ID: 1517025
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193574001, 1193574002, 1193574003, 1193574004, 1193574005, 1193574008

Results by **SW8260C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	31.9	106	30	31.2	104	(79-124)	2.30	(< 20)
1,3,5-Trimethylbenzene	30	31.5	105	30	31.1	104	(75-124)	1.20	(< 20)
Benzene	30	28.0	94	30	27.1	90	(79-120)	3.30	(< 20)
Ethylbenzene	30	30.0	100	30	28.8	96	(79-121)	4.10	(< 20)
Isopropylbenzene (Cumene)	30	31.0	103	30	29.7	99	(72-131)	4.20	(< 20)
Naphthalene	30	28.1	94	30	27.9	93	(61-128)	0.94	(< 20)
n-Butylbenzene	30	31.0	103	30	30.5	102	(75-128)	1.60	(< 20)
o-Xylene	30	30.1	100	30	29.1	97	(78-122)	3.60	(< 20)
P & M -Xylene	60	58.9	98	60	56.7	95	(80-121)	3.90	(< 20)
sec-Butylbenzene	30	31.9	106	30	30.9	103	(77-126)	3.20	(< 20)
tert-Butylbenzene	30	32.0	107	30	31.6	105	(78-124)	1.10	(< 20)
Toluene	30	26.9	90	30	25.9	86	(80-121)	3.90	(< 20)
Xylenes (total)	90	89.1	99	90	85.8	95	(79-121)	3.80	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	101	101	30	100	100	(81-118)	0.52	
4-Bromofluorobenzene (surr)	30	108	108	30	108	108	(85-114)	0.25	
Toluene-d8 (surr)	30	98.6	99	30	99.3	99	(89-112)	0.75	

Batch Information

Analytical Batch: **VMS19124**
Analytical Method: **SW8260C**
Instrument: **Agilent 7890-75MS**
Analyst: **NRB**

Prep Batch: **VXX34377**
Prep Method: **SW5030B**
Prep Date/Time: **07/05/2019 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

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Billable Matrix Spike Summary

Original Sample ID: 1193574005
MS Sample ID: 1193574006 BMS
MSD Sample ID: 1193574007 BMSD

Analysis Date: 07/05/2019 22:54
Analysis Date: 07/05/2019 19:19
Analysis Date: 07/05/2019 19:34
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193574001, 1193574002, 1193574003, 1193574004, 1193574005

Results by **SW8260C**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	0.500U	30.0	32.5	108	30.0	32.3	108	79-124	0.44	(< 20)
1,3,5-Trimethylbenzene	0.500U	30.0	32.4	108	30.0	32.1	107	75-124	0.92	(< 20)
Benzene	0.200U	30.0	28.9	96	30.0	28.6	96	79-120	0.90	(< 20)
Ethylbenzene	0.500U	30.0	30.2	101	30.0	29.9	100	79-121	0.71	(< 20)
Isopropylbenzene (Cumene)	0.500U	30.0	30.6	102	30.0	30.4	101	72-131	0.75	(< 20)
Naphthalene	0.500U	30.0	28.3	95	30.0	29.6	99	61-128	4.50	(< 20)
n-Butylbenzene	0.500U	30.0	31.9	106	30.0	32.3	108	75-128	1.20	(< 20)
o-Xylene	0.500U	30.0	29.6	99	30.0	29.5	98	78-122	0.12	(< 20)
P & M -Xylene	1.00U	60.0	58.6	98	60.0	59.4	99	80-121	1.40	(< 20)
sec-Butylbenzene	0.500U	30.0	31.6	105	30.0	32.6	109	77-126	3.20	(< 20)
tert-Butylbenzene	0.500U	30.0	32.7	109	30.0	32.3	108	78-124	1.10	(< 20)
Toluene	0.500U	30.0	27.6	92	30.0	27.6	92	80-121	0.31	(< 20)
Xylenes (total)	1.50U	90.0	88.2	98	90.0	89.0	99	79-121	0.89	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		30.0	29.9	100	30.0	29.6	99	81-118	0.94	
4-Bromofluorobenzene (surr)		30.0	32.6	109	30.0	32.5	108	85-114	0.38	
Toluene-d8 (surr)		30.0	29.8	99	30.0	30.3	101	89-112	1.70	

Batch Information

Analytical Batch: VMS19124
Analytical Method: SW8260C
Instrument: Agilent 7890-75MS
Analyst: NRB
Analytical Date/Time: 7/5/2019 7:19:00PM

Prep Batch: VXX34377
Prep Method: Volatiles Extraction 8240/8260 FULL
Prep Date/Time: 7/5/2019 6:00:00AM
Prep Initial Wt./Vol.: 5.00mL
Prep Extract Vol: 5.00mL

Print Date: 07/15/2019 8:55:36AM

Method Blank

Blank ID: MB for HBN 1795854 [XXX/41711]
Blank Lab ID: 1516616

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193574001, 1193574002, 1193574003, 1193574004, 1193574005

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)	70.4	47-106		%
Fluoranthene-d10 (surr)	77.6	24-116		%

Batch Information

Analytical Batch: XMS11513
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/12/2019 10:29:00AM

Prep Batch: XXX41711
Prep Method: SW3520C
Prep Date/Time: 7/5/2019 10:21:41AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Member of SGS Group

Blank Spike Summary

Blank Spike ID: LCS for HBN 1193574 [XXX41711]
Blank Spike Lab ID: 1516617
Date Analyzed: 07/12/2019 10:50

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193574001, 1193574002, 1193574003, 1193574004, 1193574005

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

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	2	1.48	74	(41-115)
2-Methylnaphthalene	2	1.42	71	(39-114)
Acenaphthene	2	1.48	74	(48-114)
Acenaphthylene	2	1.62	81	(35-121)
Anthracene	2	1.65	83	(53-119)
Benzo(a)Anthracene	2	1.60	80	(59-120)
Benzo[a]pyrene	2	1.59	79	(53-120)
Benzo[b]Fluoranthene	2	1.66	83	(53-126)
Benzo[g,h,i]perylene	2	1.50	75	(44-128)
Benzo[k]fluoranthene	2	1.55	78	(54-125)
Chrysene	2	1.60	80	(57-120)
Dibenzo[a,h]anthracene	2	1.38	69	(44-131)
Fluoranthene	2	1.69	85	(58-120)
Fluorene	2	1.61	81	(50-118)
Indeno[1,2,3-c,d] pyrene	2	1.66	83	(48-130)
Naphthalene	2	1.48	74	(43-114)
Phenanthrene	2	1.55	78	(53-115)
Pyrene	2	1.72	86	(53-121)
Surrogates				
2-Methylnaphthalene-d10 (surr)	2	67.9	68	(47-106)
Fluoranthene-d10 (surr)	2	77	77	(24-116)

Batch Information

Analytical Batch: **XMS11513**
Analytical Method: **8270D SIM LV (PAH)**
Instrument: **Agilent GC 7890B/5977A SWA**
Analyst: **DSD**

Prep Batch: **XXX41711**
Prep Method: **SW3520C**
Prep Date/Time: **07/05/2019 10:21**
Spike Init Wt./Vol.: 2 ug/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: Extract Vol:

Print Date: 07/15/2019 8:55:40AM

Matrix Spike Summary

Original Sample ID: 1193530003
MS Sample ID: 1516676 MS
MSD Sample ID: 1516677 MSD

Analysis Date: 07/12/2019 12:12
Analysis Date: 07/12/2019 12:33
Analysis Date: 07/12/2019 12:53
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193574001, 1193574002, 1193574003, 1193574004, 1193574005

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	0.0252U	2.12	1.64	78	2.10	1.63	78	41-115	0.80	(< 20)
2-Methylnaphthalene	0.0252U	2.12	1.59	75	2.10	1.58	75	39-114	0.71	(< 20)
Acenaphthene	0.0252U	2.12	1.67	79	2.10	1.65	78	48-114	1.30	(< 20)
Acenaphthylene	0.0252U	2.12	1.78	84	2.10	1.77	84	35-121	0.51	(< 20)
Anthracene	0.0252U	2.12	1.77	84	2.10	1.77	84	53-119	0.16	(< 20)
Benzo(a)Anthracene	0.0252U	2.12	1.65	78	2.10	1.67	80	59-120	1.40	(< 20)
Benzo[a]pyrene	0.0101U	2.12	1.56	74	2.10	1.55	74	53-120	0.60	(< 20)
Benzo[b]Fluoranthene	0.0252U	2.12	1.62	76	2.10	1.61	77	53-126	0.09	(< 20)
Benzo[g,h,i]perylene	0.0252U	2.12	1.38	65	2.10	1.38	66	44-128	0.24	(< 20)
Benzo[k]fluoranthene	0.0252U	2.12	1.52	72	2.10	1.55	74	54-125	2.00	(< 20)
Chrysene	0.0252U	2.12	1.67	79	2.10	1.70	81	57-120	2.00	(< 20)
Dibenzo[a,h]anthracene	0.0101U	2.12	1.25	59	2.10	1.26	60	44-131	0.47	(< 20)
Fluoranthene	0.0252U	2.12	1.76	83	2.10	1.79	85	58-120	1.60	(< 20)
Fluorene	0.0252U	2.12	1.79	85	2.10	1.78	85	50-118	0.43	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0252U	2.12	1.44	68	2.10	1.45	69	48-130	0.95	(< 20)
Naphthalene	0.0505U	2.12	1.67	79	2.10	1.63	77	43-114	2.80	(< 20)
Phenanthrene	0.0252U	2.12	1.73	82	2.10	1.74	83	53-115	0.56	(< 20)
Pyrene	0.0252U	2.12	1.83	87	2.10	1.85	88	53-121	0.74	(< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		2.12	1.52	72	2.10	1.51	72	47-106	0.80	
Fluoranthene-d10 (surr)		2.12	1.61	76	2.10	1.63	78	24-116	1.70	

Batch Information

Analytical Batch: XMS11513
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/12/2019 12:33:00PM

Prep Batch: XXX41711
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/5/2019 10:21:41AM
Prep Initial Wt./Vol.: 236.00mL
Prep Extract Vol: 1.00mL

Print Date: 07/15/2019 8:55:41AM

Billable Matrix Spike Summary

Original Sample ID: 1193574005
MS Sample ID: 1193574006 BMS
MSD Sample ID: 1193574007 BMSD

Analysis Date: 07/12/2019 18:02
Analysis Date: 07/12/2019 18:23
Analysis Date: 07/12/2019 18:44
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193574001, 1193574002, 1193574003, 1193574004, 1193574005

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	0.0232U	1.89	1.38	73		1.92	1.49	77	41-115	7.30	(< 20)
2-Methylnaphthalene	0.0232U	1.89	1.36	72		1.92	1.44	75	39-114	5.80	(< 20)
Acenaphthene	0.0232U	1.89	1.41	75		1.92	1.52	79	48-114	7.40	(< 20)
Acenaphthylene	0.0232U	1.89	1.5	79		1.92	1.61	84	35-121	7.50	(< 20)
Anthracene	0.0232U	1.89	1.5	79		1.92	1.62	84	53-119	8.10	(< 20)
Benzo(a)Anthracene	0.0232U	1.89	1.26	67		1.92	1.46	76	59-120	14.60	(< 20)
Benzo[a]pyrene	0.00925U	1.89	1.1	58		1.92	1.35	70	53-120	20.20	* (< 20)
Benzo[b]Fluoranthene	0.0232U	1.89	1.12	59		1.92	1.41	74	53-126	23.20	* (< 20)
Benzo[g,h,i]perylene	0.0232U	1.89	.861	46		1.92	1.21	63	44-128	33.70	* (< 20)
Benzo[k]fluoranthene	0.0232U	1.89	1.08	57		1.92	1.34	70	54-125	22.00	* (< 20)
Chrysene	0.0232U	1.89	1.27	67		1.92	1.47	77	57-120	14.70	(< 20)
Dibenzo[a,h]anthracene	0.00925U	1.89	.761	40	*	1.92	1.12	58	44-131	37.90	* (< 20)
Fluoranthene	0.0232U	1.89	1.46	78		1.92	1.61	84	58-120	9.30	(< 20)
Fluorene	0.0232U	1.89	1.52	80		1.92	1.64	85	50-118	7.70	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0232U	1.89	.983	52		1.92	1.32	68	48-130	29.00	* (< 20)
Naphthalene	0.0463U	1.89	1.41	75		1.92	1.49	77	43-114	5.60	(< 20)
Phenanthrene	0.0232U	1.89	1.46	77		1.92	1.58	82	53-115	7.70	(< 20)
Pyrene	0.0232U	1.89	1.48	79		1.92	1.66	86	53-121	11.10	(< 20)
Surrogates											
2-Methylnaphthalene-d10 (surr)		1.89	1.32	70		1.92	1.34	70	47-106	1.70	
Fluoranthene-d10 (surr)		1.89	1.36	72		1.92	1.45	75	24-116	6.00	

Batch Information

Analytical Batch: XMS11513
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/12/2019 6:23:00PM

Prep Batch: XXX41711
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/5/2019 10:21:41AM
Prep Initial Wt./Vol.: 265.00mL
Prep Extract Vol: 1.00mL

Print Date: 07/15/2019 8:55:41AM

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1193574

Locations Nationwide

Alaska	Maryland
New Jersey	New York
North Carolina	Indiana
West Virgina	Kentucky

www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Page 1 of 1

Section 1

CLIENT: BRICE ENVIRONMENTAL

CONTACT: KIMI LLOYD PHONE NO: 907-317-7999

PROJECT NAME: 2019 HAK CS GWM PROJECT/ PWSID/ PERMIT#: SRF TS 3-9

REPORTS TO: KELLY CARSON KCARSON@BRICEENVIRONMENTAL.COM E-MAIL:

INVOICE TO: HILCORP AK QUOTE #: P.O. #: 1952573

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION MA 7-3-19	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incre-mental Soils	Preservative: HCl	Preservative: —								REMARKS/ LOC ID
							AK Petroleum list SW8260C	PAH SW8270D SIM								
1A-E	SRF39-TS39AA-0719	6/30/19	1645	GW	5	G	X	X								
2A-E	SRF39-TS39BBZ-0719	6/30/19	1605	GW	5	G	X	X								
3A-E	SRF39-TS39BB-0719	6/30/19	1705	GW	5	G	X	X								
4A-E	SRF39-TS39DD-0719	6/30/19	1225	GW	5	G	X	X								~~Extra Volume MS/MSD~~ AS
5A-E 6A-C 7A-E	SRF39-FS39B-0719	6/30/19	1135	GW	15	G	X	X								Extra Volume MS/MSD
8A-C	SRF39-TB01-0719	6/30/19	0800	~~G~~	3	—	X									Trip Blank

Section 5

	Date	Time	
Relinquished By: (1)	7/2/19	1610	Received By: [RAVN]
Relinquished By: (2)			Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	7/3/19	13:41	Received For Laboratory By:

Section 4

DOD Project? Yes (No)

Cooler ID:

Data Deliverable Requirements: LEVEL II

Requested Turnaround Time and/or Special Instructions:
VOC - AK petroleum list
Profile 341882

Temp Blank °C: 4.6C DS2
or Ambient [ ]
(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)
(INTACT) BROKEN ABSENT
(See attached Sample Receipt Form)

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms-and-conditions

1F 1B

F083-Kit_Request_and_COC_Templates-Blank
Revised 2013-03-24

e-Sample Receipt Form

SGS Workorder #: **1193574**

1193049	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		N/A — Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Yes	1F, 1B
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: SNICKERS @ 4.6 °C Therm. ID: D52
	N/A	Cooler ID: @ °C Therm. ID:
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		1 Sample TS39BBZ VOC broke when arrived to lab. Two samples remain left. The twoTS39BBZ VOS samples will be scheduled as limited volume.
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)? **Note: If times differ <1hr, record details & login per COC. ***Note: If sample information on containers differs from COC, SGS will default to COC information	Yes	
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
	N/A	***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	Samples TS39DD & FS39B VOCs have headspace bigger than 6mm. The samples will run as limited volume.
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	No	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	

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

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1193574001-A	No Preservative Required	OK			
1193574001-B	No Preservative Required	OK			
1193574001-C	HCL to pH < 2	OK			
1193574001-D	HCL to pH < 2	OK			
1193574001-E	HCL to pH < 2	OK			
1193574002-A	No Preservative Required	OK			
1193574002-B	No Preservative Required	OK			
1193574002-C	HCL to pH < 2	OK			
1193574002-D	HCL to pH < 2	OK			
1193574003-A	No Preservative Required	OK			
1193574003-B	No Preservative Required	OK			
1193574003-C	HCL to pH < 2	OK			
1193574003-D	HCL to pH < 2	OK			
1193574003-E	HCL to pH < 2	OK			
1193574004-A	No Preservative Required	OK			
1193574004-B	No Preservative Required	OK			
1193574004-C	HCL to pH < 2	OK			
1193574004-D	HCL to pH < 2	OK			
1193574004-E	HCL to pH < 2	OK			
1193574005-A	No Preservative Required	OK			
1193574005-B	No Preservative Required	OK			
1193574005-C	HCL to pH < 2	OK			
1193574005-D	HCL to pH < 2	OK			
1193574005-E	HCL to pH < 2	OK			
1193574006-A	No Preservative Required	OK			
1193574006-B	No Preservative Required	OK			
1193574006-C	HCL to pH < 2	OK			
1193574006-D	HCL to pH < 2	OK			
1193574006-E	HCL to pH < 2	OK			
1193574007-A	No Preservative Required	OK			
1193574007-B	No Preservative Required	OK			
1193574007-C	HCL to pH < 2	OK			
1193574007-D	HCL to pH < 2	OK			
1193574007-E	HCL to pH < 2	OK			
1193574008-A	HCL to pH < 2	OK			
1193574008-B	HCL to pH < 2	OK			
1193574008-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.
NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

Laboratory Report of Analysis

To: Hilcorp Alaska, LLC
3800 Centerpoint Dr. Suite 400
Anchorage, AK 99503
(907)277-7297

Report Number: **1193796**

Client Project: **SRF 39-T 2019 HAK CS GWM Prog**

Dear Kelly Carson,

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 Justin 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.

Alaska Division Technical Director

Stephen C. Ede
2019.07.25
13:53:20 -08'00'

Justin Nelson Date
Project Manager
Justin.Nelson@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

Member of SGS Group

Case Narrative

SGS Client: **Hilcorp Alaska, LLC**
SGS Project: **1193796**
Project Name/Site: **SRF 39-T 2019 HAK CS GWM Prog**
Project Contact: **Kelly Carson**

Refer to sample receipt form for information on sample condition.

SRF39-TS39CR-0719 (1193796003) PS

8270D SIM - PAH surrogate recovery for 2-Methylnaphthalene d10 does not meet QC criteria due to matrix interference.

1193799014MS (1519644) MS

8270D SIM - PAH MS recovery for Indeno[1,2,3-c,d]pyrene, Dibenzo[a,h]anthracene and Benzo[g,h,i]perylene do not meet QC criteria. Refer to the LCS for accuracy requirements.

1193799014MSD (1519645) MSD

8270D SIM - PAH MSD recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.
8270D SIM - PAH MS/MSD RPD for Indeno[1,2,3-c,d] pyrene, Dibenzo[a,h]anthracene and Benzo[g,h,i]perylene do not meet QC criteria. Results for this analyte are considered estimated in the parent sample.

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

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Laboratory Qualifiers

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

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry (DW Chemistry (Provisionally Certified as of 6/20/19 for Turbidity by SM 2130B, and Copper by EPA 200.8) & 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). SGS is only certified for the analytes listed on our Drinking Water Certification, and only those analytes will be reported to the State of Alaska for compliance. Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
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
SRF39-TS39F-0719	1193796001	07/12/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF39-TS39U-0719	1193796002	07/12/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF39-TS39CR-0719	1193796003	07/12/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF39-TS39T-0719	1193796004	07/12/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF39-TS39V-0719	1193796005	07/12/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF39-TS39VZ-0719	1193796006	07/12/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF39-TS39G-0719	1193796007	07/12/2019	07/15/2019	Water (Surface, Eff., Ground)
SRF39-TB02-0719	1193796008	07/12/2019	07/15/2019	Water (Surface, Eff., Ground)

Method	Method Description
SW8260C	8021B by 8260 (W)
8270D SIM LV (PAH)	8270 PAH SIM GC/MS Liq/Liq ext. LV

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Detectable Results Summary

Client Sample ID: **SRF39-TS39F-0719**
Lab Sample ID: 1193796001

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	24.2	ug/L
	2-Methylnaphthalene	24.0	ug/L
	Acenaphthene	0.210	ug/L
	Fluorene	0.804	ug/L
	Naphthalene	63.0	ug/L
	Phenanthrene	0.628	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	536	ug/L
	1,3,5-Trimethylbenzene	290	ug/L
	Benzene	13.7	ug/L
	Ethylbenzene	493	ug/L
	Isopropylbenzene (Cumene)	77.1	ug/L
	Naphthalene	89.7	ug/L
	o-Xylene	26.9	ug/L
	P & M -Xylene	1550	ug/L
	sec-Butylbenzene	3.82J	ug/L
	Xylenes (total)	1580	ug/L

Client Sample ID: **SRF39-TS39U-0719**
Lab Sample ID: 1193796002

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	Naphthalene	0.315	ug/L
	Pyrene	0.145	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	2.11	ug/L
	1,3,5-Trimethylbenzene	0.900J	ug/L
	Benzene	1.05	ug/L
	Ethylbenzene	1.73	ug/L
	Isopropylbenzene (Cumene)	0.345J	ug/L
	Naphthalene	0.913J	ug/L
	P & M -Xylene	3.37	ug/L
	Xylenes (total)	3.37	ug/L

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Detectable Results Summary

Client Sample ID: **SRF39-TS39CR-0719**
Lab Sample ID: 1193796003

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	5.02	ug/L
	2-Methylnaphthalene	4.14	ug/L
	Fluorene	0.385	ug/L
	Naphthalene	4.62	ug/L
	Phenanthrene	0.225	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	424	ug/L
	1,3,5-Trimethylbenzene	395	ug/L
	Benzene	8.55	ug/L
	Ethylbenzene	7.86	ug/L
	Isopropylbenzene (Cumene)	3.27J	ug/L
	Naphthalene	21.1	ug/L
	o-Xylene	571	ug/L
	P & M -Xylene	323	ug/L
	Xylenes (total)	894	ug/L

Client Sample ID: **SRF39-TS39T-0719**
Lab Sample ID: 1193796004

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	3.30	ug/L
	2-Methylnaphthalene	2.64	ug/L
	Fluorene	0.389	ug/L
	Naphthalene	2.00	ug/L
	Phenanthrene	0.325	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	7.76	ug/L
	1,3,5-Trimethylbenzene	9.31	ug/L
	Benzene	3.19	ug/L
	Ethylbenzene	31.7	ug/L
	Isopropylbenzene (Cumene)	19.3	ug/L
	Naphthalene	3.82	ug/L
	P & M -Xylene	2.55	ug/L
	sec-Butylbenzene	5.47	ug/L
	tert-Butylbenzene	1.49	ug/L
	Toluene	0.341J	ug/L
	Xylenes (total)	2.55J	ug/L

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Detectable Results Summary

Client Sample ID: **SRF39-TS39V-0719**
Lab Sample ID: 1193796005

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	2.46	ug/L
	2-Methylnaphthalene	2.01	ug/L
	Fluorene	0.164	ug/L
	Naphthalene	7.80	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	18.5	ug/L
	Benzene	17.5	ug/L
	Ethylbenzene	2.34	ug/L
	Isopropylbenzene (Cumene)	6.04	ug/L
	Naphthalene	17.1	ug/L
	n-Butylbenzene	0.694J	ug/L
	o-Xylene	0.542J	ug/L
	P & M -Xylene	15.4	ug/L
	sec-Butylbenzene	3.72	ug/L
	tert-Butylbenzene	0.684J	ug/L
	Xylenes (total)	15.9	ug/L

Client Sample ID: **SRF39-TS39VZ-0719**
Lab Sample ID: 1193796006

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	2.74	ug/L
	2-Methylnaphthalene	2.28	ug/L
	Fluorene	0.180	ug/L
	Naphthalene	8.65	ug/L
Volatile GC/MS	1,2,4-Trimethylbenzene	18.1	ug/L
	1,3,5-Trimethylbenzene	17.1	ug/L
	Benzene	17.2	ug/L
	Ethylbenzene	2.28	ug/L
	Isopropylbenzene (Cumene)	5.91	ug/L
	Naphthalene	17.8	ug/L
	n-Butylbenzene	0.667J	ug/L
	o-Xylene	0.445J	ug/L
	P & M -Xylene	14.9	ug/L
	sec-Butylbenzene	3.68	ug/L
	tert-Butylbenzene	0.672J	ug/L
	Xylenes (total)	15.3	ug/L

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Results of **SRF39-TS39F-0719**

Client Sample ID: **SRF39-TS39F-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796001
Lab Project ID: 1193796

Collection Date: 07/12/19 16:40
Received Date: 07/15/19 09:20
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	24.2		0.534	0.160	ug/L	10		07/23/19 18:56
2-Methylnaphthalene	24.0		0.534	0.160	ug/L	10		07/23/19 18:56
Acenaphthene	0.210		0.0534	0.0160	ug/L	1		07/21/19 15:31
Acenaphthylene	0.0267	U	0.0534	0.0160	ug/L	1		07/21/19 15:31
Anthracene	0.0267	U	0.0534	0.0160	ug/L	1		07/21/19 15:31
Benzo(a)Anthracene	0.0267	U	0.0534	0.0160	ug/L	1		07/21/19 15:31
Benzo[a]pyrene	0.0107	U	0.0214	0.00662	ug/L	1		07/21/19 15:31
Benzo[b]Fluoranthene	0.0267	U	0.0534	0.0160	ug/L	1		07/21/19 15:31
Benzo[g,h,i]perylene	0.0267	U	0.0534	0.0160	ug/L	1		07/21/19 15:31
Benzo[k]fluoranthene	0.0267	U	0.0534	0.0160	ug/L	1		07/21/19 15:31
Chrysene	0.0267	U	0.0534	0.0160	ug/L	1		07/21/19 15:31
Dibenzo[a,h]anthracene	0.0107	U	0.0214	0.00662	ug/L	1		07/21/19 15:31
Fluoranthene	0.0267	U	0.0534	0.0160	ug/L	1		07/21/19 15:31
Fluorene	0.804		0.0534	0.0160	ug/L	1		07/21/19 15:31
Indeno[1,2,3-c,d] pyrene	0.0267	U	0.0534	0.0160	ug/L	1		07/21/19 15:31
Naphthalene	63.0		1.07	0.331	ug/L	10		07/23/19 18:56
Phenanthrene	0.628		0.0534	0.0160	ug/L	1		07/21/19 15:31
Pyrene	0.0267	U	0.0534	0.0160	ug/L	1		07/21/19 15:31
Surrogates								
2-Methylnaphthalene-d10 (surr)	65.8		47-106		%	1		07/21/19 15:31
Fluoranthene-d10 (surr)	86.3		24-116		%	1		07/21/19 15:31

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/21/19 15:31
Container ID: 1193796001-A

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 07/18/19 11:43
Prep Initial Wt./Vol.: 234 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS11560
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/23/19 18:56
Container ID: 1193796001-A

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 07/18/19 11:43
Prep Initial Wt./Vol.: 234 mL
Prep Extract Vol: 1 mL

Print Date: 07/25/2019 10:25:58AM

J flagging is activated

Results of **SRF39-TS39F-0719**

Client Sample ID: **SRF39-TS39F-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796001
Lab Project ID: 1193796

Collection Date: 07/12/19 16:40
Received Date: 07/15/19 09:20
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	536		5.00	1.55	ug/L	5		07/19/19 20:48
1,3,5-Trimethylbenzene	290		5.00	1.55	ug/L	5		07/19/19 20:48
Benzene	13.7		2.00	0.600	ug/L	5		07/19/19 20:48
Ethylbenzene	493		5.00	1.55	ug/L	5		07/19/19 20:48
Isopropylbenzene (Cumene)	77.1		5.00	1.55	ug/L	5		07/19/19 20:48
Naphthalene	89.7		5.00	1.55	ug/L	5		07/19/19 20:48
n-Butylbenzene	2.50	U	5.00	1.55	ug/L	5		07/19/19 20:48
o-Xylene	26.9		5.00	1.55	ug/L	5		07/19/19 20:48
P & M -Xylene	1550		10.0	3.10	ug/L	5		07/19/19 20:48
sec-Butylbenzene	3.82	J	5.00	1.55	ug/L	5		07/19/19 20:48
tert-Butylbenzene	2.50	U	5.00	1.55	ug/L	5		07/19/19 20:48
Toluene	2.50	U	5.00	1.55	ug/L	5		07/19/19 20:48
Xylenes (total)	1580		15.0	5.00	ug/L	5		07/19/19 20:48
Surrogates								
1,2-Dichloroethane-D4 (surr)	97.4		81-118		%	5		07/19/19 20:48
4-Bromofluorobenzene (surr)	100		85-114		%	5		07/19/19 20:48
Toluene-d8 (surr)	103		89-112		%	5		07/19/19 20:48

Batch Information

Analytical Batch: VMS19187
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/19/19 20:48
Container ID: 1193796001-C

Prep Batch: VXX34471
Prep Method: SW5030B
Prep Date/Time: 07/19/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/25/2019 10:25:58AM

J flagging is activated

Results of **SRF39-TS39U-0719**

Client Sample ID: **SRF39-TS39U-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796002
Lab Project ID: 1193796

Collection Date: 07/12/19 14:40
Received Date: 07/15/19 09:20
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		07/21/19 15:51
2-Methylnaphthalene	0.0245	U	0.0490	0.0147	ug/L	1		07/21/19 15:51
Acenaphthene	0.0245	U	0.0490	0.0147	ug/L	1		07/21/19 15:51
Acenaphthylene	0.0245	U	0.0490	0.0147	ug/L	1		07/21/19 15:51
Anthracene	0.0245	U	0.0490	0.0147	ug/L	1		07/21/19 15:51
Benzo(a)Anthracene	0.0245	U	0.0490	0.0147	ug/L	1		07/21/19 15:51
Benzo[a]pyrene	0.00980	U	0.0196	0.00608	ug/L	1		07/21/19 15:51
Benzo[b]Fluoranthene	0.0245	U	0.0490	0.0147	ug/L	1		07/21/19 15:51
Benzo[g,h,i]perylene	0.0245	U	0.0490	0.0147	ug/L	1		07/21/19 15:51
Benzo[k]fluoranthene	0.0245	U	0.0490	0.0147	ug/L	1		07/21/19 15:51
Chrysene	0.0245	U	0.0490	0.0147	ug/L	1		07/21/19 15:51
Dibenzo[a,h]anthracene	0.00980	U	0.0196	0.00608	ug/L	1		07/21/19 15:51
Fluoranthene	0.0245	U	0.0490	0.0147	ug/L	1		07/21/19 15:51
Fluorene	0.0245	U	0.0490	0.0147	ug/L	1		07/21/19 15:51
Indeno[1,2,3-c,d] pyrene	0.0245	U	0.0490	0.0147	ug/L	1		07/21/19 15:51
Naphthalene	0.315		0.0980	0.0304	ug/L	1		07/21/19 15:51
Phenanthrene	0.0245	U	0.0490	0.0147	ug/L	1		07/21/19 15:51
Pyrene	0.145		0.0490	0.0147	ug/L	1		07/21/19 15:51
Surrogates								
2-Methylnaphthalene-d10 (surr)	71.7		47-106		%	1		07/21/19 15:51
Fluoranthene-d10 (surr)	56.5		24-116		%	1		07/21/19 15:51

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/21/19 15:51
Container ID: 1193796002-A

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 07/18/19 11:43
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Print Date: 07/25/2019 10:25:58AM

J flagging is activated

Results of **SRF39-TS39U-0719**

Client Sample ID: **SRF39-TS39U-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796002
Lab Project ID: 1193796

Collection Date: 07/12/19 14:40
Received Date: 07/15/19 09:20
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	2.11		1.00	0.310	ug/L	1		07/19/19 19:34
1,3,5-Trimethylbenzene	0.900	J	1.00	0.310	ug/L	1		07/19/19 19:34
Benzene	1.05		0.400	0.120	ug/L	1		07/19/19 19:34
Ethylbenzene	1.73		1.00	0.310	ug/L	1		07/19/19 19:34
Isopropylbenzene (Cumene)	0.345	J	1.00	0.310	ug/L	1		07/19/19 19:34
Naphthalene	0.913	J	1.00	0.310	ug/L	1		07/19/19 19:34
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 19:34
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/19/19 19:34
P & M -Xylene	3.37		2.00	0.620	ug/L	1		07/19/19 19:34
sec-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 19:34
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 19:34
Toluene	0.500	U	1.00	0.310	ug/L	1		07/19/19 19:34
Xylenes (total)	3.37		3.00	1.00	ug/L	1		07/19/19 19:34
Surrogates								
1,2-Dichloroethane-D4 (surr)	97.8		81-118		%	1		07/19/19 19:34
4-Bromofluorobenzene (surr)	103		85-114		%	1		07/19/19 19:34
Toluene-d8 (surr)	102		89-112		%	1		07/19/19 19:34

Batch Information

Analytical Batch: VMS19187
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/19/19 19:34
Container ID: 1193796002-C

Prep Batch: VXX34471
Prep Method: SW5030B
Prep Date/Time: 07/19/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF39-TS39CR-0719**

Client Sample ID: **SRF39-TS39CR-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796003
Lab Project ID: 1193796

Collection Date: 07/12/19 14:40
Received Date: 07/15/19 09:20
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	5.02		0.0563	0.0169	ug/L	1		07/21/19 16:12
2-Methylnaphthalene	4.14		0.0563	0.0169	ug/L	1		07/21/19 16:12
Acenaphthene	0.0282 U		0.0563	0.0169	ug/L	1		07/21/19 16:12
Acenaphthylene	0.0282 U		0.0563	0.0169	ug/L	1		07/21/19 16:12
Anthracene	0.0282 U		0.0563	0.0169	ug/L	1		07/21/19 16:12
Benzo(a)Anthracene	0.0282 U		0.0563	0.0169	ug/L	1		07/21/19 16:12
Benzo[a]pyrene	0.0113 U		0.0225	0.00698	ug/L	1		07/21/19 16:12
Benzo[b]Fluoranthene	0.0282 U		0.0563	0.0169	ug/L	1		07/21/19 16:12
Benzo[g,h,i]perylene	0.0282 U		0.0563	0.0169	ug/L	1		07/21/19 16:12
Benzo[k]fluoranthene	0.0282 U		0.0563	0.0169	ug/L	1		07/21/19 16:12
Chrysene	0.0282 U		0.0563	0.0169	ug/L	1		07/21/19 16:12
Dibenzo[a,h]anthracene	0.0113 U		0.0225	0.00698	ug/L	1		07/21/19 16:12
Fluoranthene	0.0282 U		0.0563	0.0169	ug/L	1		07/21/19 16:12
Fluorene	0.385		0.0563	0.0169	ug/L	1		07/21/19 16:12
Indeno[1,2,3-c,d] pyrene	0.0282 U		0.0563	0.0169	ug/L	1		07/21/19 16:12
Naphthalene	4.62		0.113	0.0349	ug/L	1		07/21/19 16:12
Phenanthrene	0.225		0.0563	0.0169	ug/L	1		07/21/19 16:12
Pyrene	0.0282 U		0.0563	0.0169	ug/L	1		07/21/19 16:12
Surrogates								
2-Methylnaphthalene-d10 (surr)	36.7	*	47-106		%	1		07/21/19 16:12
Fluoranthene-d10 (surr)	79.6		24-116		%	1		07/21/19 16:12

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/21/19 16:12
Container ID: 1193796003-A

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 07/18/19 11:43
Prep Initial Wt./Vol.: 222 mL
Prep Extract Vol: 1 mL

Print Date: 07/25/2019 10:25:58AM

J flagging is activated

Results of **SRF39-TS39CR-0719**

Client Sample ID: **SRF39-TS39CR-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796003
Lab Project ID: 1193796

Collection Date: 07/12/19 14:40
Received Date: 07/15/19 09:20
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	424		5.00	1.55	ug/L	5		07/19/19 21:03
1,3,5-Trimethylbenzene	395		5.00	1.55	ug/L	5		07/19/19 21:03
Benzene	8.55		2.00	0.600	ug/L	5		07/19/19 21:03
Ethylbenzene	7.86		5.00	1.55	ug/L	5		07/19/19 21:03
Isopropylbenzene (Cumene)	3.27	J	5.00	1.55	ug/L	5		07/19/19 21:03
Naphthalene	21.1		5.00	1.55	ug/L	5		07/19/19 21:03
n-Butylbenzene	2.50	U	5.00	1.55	ug/L	5		07/19/19 21:03
o-Xylene	571		5.00	1.55	ug/L	5		07/19/19 21:03
P & M -Xylene	323		10.0	3.10	ug/L	5		07/19/19 21:03
sec-Butylbenzene	2.50	U	5.00	1.55	ug/L	5		07/19/19 21:03
tert-Butylbenzene	2.50	U	5.00	1.55	ug/L	5		07/19/19 21:03
Toluene	2.50	U	5.00	1.55	ug/L	5		07/19/19 21:03
Xylenes (total)	894		15.0	5.00	ug/L	5		07/19/19 21:03
Surrogates								
1,2-Dichloroethane-D4 (surr)	97.8		81-118		%	5		07/19/19 21:03
4-Bromofluorobenzene (surr)	99.9		85-114		%	5		07/19/19 21:03
Toluene-d8 (surr)	103		89-112		%	5		07/19/19 21:03

Batch Information

Analytical Batch: VMS19187
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/19/19 21:03
Container ID: 1193796003-C

Prep Batch: VXX34471
Prep Method: SW5030B
Prep Date/Time: 07/19/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/25/2019 10:25:58AM

J flagging is activated

Results of **SRF39-TS39T-0719**

Client Sample ID: **SRF39-TS39T-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796004
Lab Project ID: 1193796

Collection Date: 07/12/19 11:50
Received Date: 07/15/19 09:20
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	3.30		0.0530	0.0159	ug/L	1		07/21/19 16:33
2-Methylnaphthalene	2.64		0.0530	0.0159	ug/L	1		07/21/19 16:33
Acenaphthene	0.0265 U		0.0530	0.0159	ug/L	1		07/21/19 16:33
Acenaphthylene	0.0265 U		0.0530	0.0159	ug/L	1		07/21/19 16:33
Anthracene	0.0265 U		0.0530	0.0159	ug/L	1		07/21/19 16:33
Benzo(a)Anthracene	0.0265 U		0.0530	0.0159	ug/L	1		07/21/19 16:33
Benzo[a]pyrene	0.0106 U		0.0212	0.00657	ug/L	1		07/21/19 16:33
Benzo[b]Fluoranthene	0.0265 U		0.0530	0.0159	ug/L	1		07/21/19 16:33
Benzo[g,h,i]perylene	0.0265 U		0.0530	0.0159	ug/L	1		07/21/19 16:33
Benzo[k]fluoranthene	0.0265 U		0.0530	0.0159	ug/L	1		07/21/19 16:33
Chrysene	0.0265 U		0.0530	0.0159	ug/L	1		07/21/19 16:33
Dibenzo[a,h]anthracene	0.0106 U		0.0212	0.00657	ug/L	1		07/21/19 16:33
Fluoranthene	0.0265 U		0.0530	0.0159	ug/L	1		07/21/19 16:33
Fluorene	0.389		0.0530	0.0159	ug/L	1		07/21/19 16:33
Indeno[1,2,3-c,d] pyrene	0.0265 U		0.0530	0.0159	ug/L	1		07/21/19 16:33
Naphthalene	2.00		0.106	0.0328	ug/L	1		07/21/19 16:33
Phenanthrene	0.325		0.0530	0.0159	ug/L	1		07/21/19 16:33
Pyrene	0.0265 U		0.0530	0.0159	ug/L	1		07/21/19 16:33
Surrogates								
2-Methylnaphthalene-d10 (surr)	70.8		47-106		%	1		07/21/19 16:33
Fluoranthene-d10 (surr)	90.5		24-116		%	1		07/21/19 16:33

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/21/19 16:33
Container ID: 1193796004-A

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 07/18/19 11:43
Prep Initial Wt./Vol.: 236 mL
Prep Extract Vol: 1 mL

Print Date: 07/25/2019 10:25:58AM

J flagging is activated

Results of **SRF39-TS39T-0719**

Client Sample ID: **SRF39-TS39T-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796004
Lab Project ID: 1193796

Collection Date: 07/12/19 11:50
Received Date: 07/15/19 09:20
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	7.76		1.00	0.310	ug/L	1		07/19/19 19:48
1,3,5-Trimethylbenzene	9.31		1.00	0.310	ug/L	1		07/19/19 19:48
Benzene	3.19		0.400	0.120	ug/L	1		07/19/19 19:48
Ethylbenzene	31.7		1.00	0.310	ug/L	1		07/19/19 19:48
Isopropylbenzene (Cumene)	19.3		1.00	0.310	ug/L	1		07/19/19 19:48
Naphthalene	3.82		1.00	0.310	ug/L	1		07/19/19 19:48
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 19:48
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/19/19 19:48
P & M -Xylene	2.55		2.00	0.620	ug/L	1		07/19/19 19:48
sec-Butylbenzene	5.47		1.00	0.310	ug/L	1		07/19/19 19:48
tert-Butylbenzene	1.49		1.00	0.310	ug/L	1		07/19/19 19:48
Toluene	0.341	J	1.00	0.310	ug/L	1		07/19/19 19:48
Xylenes (total)	2.55	J	3.00	1.00	ug/L	1		07/19/19 19:48
Surrogates								
1,2-Dichloroethane-D4 (surr)	94.8		81-118		%	1		07/19/19 19:48
4-Bromofluorobenzene (surr)	100		85-114		%	1		07/19/19 19:48
Toluene-d8 (surr)	103		89-112		%	1		07/19/19 19:48

Batch Information

Analytical Batch: VMS19187
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/19/19 19:48
Container ID: 1193796004-C

Prep Batch: VXX34471
Prep Method: SW5030B
Prep Date/Time: 07/19/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF39-TS39V-0719**

Client Sample ID: **SRF39-TS39V-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796005
Lab Project ID: 1193796

Collection Date: 07/12/19 12:50
Received Date: 07/15/19 09:20
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	2.46		0.0517	0.0155	ug/L	1		07/21/19 16:53
2-Methylnaphthalene	2.01		0.0517	0.0155	ug/L	1		07/21/19 16:53
Acenaphthene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 16:53
Acenaphthylene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 16:53
Anthracene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 16:53
Benzo(a)Anthracene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 16:53
Benzo[a]pyrene	0.0104 U		0.0207	0.00640	ug/L	1		07/21/19 16:53
Benzo[b]Fluoranthene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 16:53
Benzo[g,h,i]perylene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 16:53
Benzo[k]fluoranthene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 16:53
Chrysene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 16:53
Dibenzo[a,h]anthracene	0.0104 U		0.0207	0.00640	ug/L	1		07/21/19 16:53
Fluoranthene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 16:53
Fluorene	0.164		0.0517	0.0155	ug/L	1		07/21/19 16:53
Indeno[1,2,3-c,d] pyrene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 16:53
Naphthalene	7.80		0.103	0.0320	ug/L	1		07/21/19 16:53
Phenanthrene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 16:53
Pyrene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 16:53
Surrogates								
2-Methylnaphthalene-d10 (surr)	55.6		47-106		%	1		07/21/19 16:53
Fluoranthene-d10 (surr)	77		24-116		%	1		07/21/19 16:53

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/21/19 16:53
Container ID: 1193796005-A

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 07/18/19 11:43
Prep Initial Wt./Vol.: 242 mL
Prep Extract Vol: 1 mL

Print Date: 07/25/2019 10:25:58AM

J flagging is activated

Results of **SRF39-TS39V-0719**

Client Sample ID: **SRF39-TS39V-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796005
Lab Project ID: 1193796

Collection Date: 07/12/19 12:50
Received Date: 07/15/19 09:20
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	18.5		1.00	0.310	ug/L	1		07/19/19 21:18
1,3,5-Trimethylbenzene	0.500 U		1.00	0.310	ug/L	1		07/19/19 21:18
Benzene	17.5		0.400	0.120	ug/L	1		07/19/19 21:18
Ethylbenzene	2.34		1.00	0.310	ug/L	1		07/19/19 21:18
Isopropylbenzene (Cumene)	6.04		1.00	0.310	ug/L	1		07/19/19 21:18
Naphthalene	17.1		1.00	0.310	ug/L	1		07/19/19 21:18
n-Butylbenzene	0.694 J		1.00	0.310	ug/L	1		07/19/19 21:18
o-Xylene	0.542 J		1.00	0.310	ug/L	1		07/19/19 21:18
P & M -Xylene	15.4		2.00	0.620	ug/L	1		07/19/19 21:18
sec-Butylbenzene	3.72		1.00	0.310	ug/L	1		07/19/19 21:18
tert-Butylbenzene	0.684 J		1.00	0.310	ug/L	1		07/19/19 21:18
Toluene	0.500 U		1.00	0.310	ug/L	1		07/19/19 21:18
Xylenes (total)	15.9		3.00	1.00	ug/L	1		07/19/19 21:18
Surrogates								
1,2-Dichloroethane-D4 (surr)	98		81-118		%	1		07/19/19 21:18
4-Bromofluorobenzene (surr)	101		85-114		%	1		07/19/19 21:18
Toluene-d8 (surr)	101		89-112		%	1		07/19/19 21:18

Batch Information

Analytical Batch: VMS19187
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/19/19 21:18
Container ID: 1193796005-C

Prep Batch: VXX34471
Prep Method: SW5030B
Prep Date/Time: 07/19/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **SRF39-TS39VZ-0719**

Client Sample ID: **SRF39-TS39VZ-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796006
Lab Project ID: 1193796

Collection Date: 07/12/19 11:50
Received Date: 07/15/19 09:20
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	2.74		0.0517	0.0155	ug/L	1		07/21/19 17:13
2-Methylnaphthalene	2.28		0.0517	0.0155	ug/L	1		07/21/19 17:13
Acenaphthene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 17:13
Acenaphthylene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 17:13
Anthracene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 17:13
Benzo(a)Anthracene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 17:13
Benzo[a]pyrene	0.0104 U		0.0207	0.00640	ug/L	1		07/21/19 17:13
Benzo[b]Fluoranthene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 17:13
Benzo[g,h,i]perylene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 17:13
Benzo[k]fluoranthene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 17:13
Chrysene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 17:13
Dibenzo[a,h]anthracene	0.0104 U		0.0207	0.00640	ug/L	1		07/21/19 17:13
Fluoranthene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 17:13
Fluorene	0.180		0.0517	0.0155	ug/L	1		07/21/19 17:13
Indeno[1,2,3-c,d] pyrene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 17:13
Naphthalene	8.65		0.103	0.0320	ug/L	1		07/21/19 17:13
Phenanthrene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 17:13
Pyrene	0.0259 U		0.0517	0.0155	ug/L	1		07/21/19 17:13
Surrogates								
2-Methylnaphthalene-d10 (surr)	59.9		47-106		%	1		07/21/19 17:13
Fluoranthene-d10 (surr)	81.4		24-116		%	1		07/21/19 17:13

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/21/19 17:13
Container ID: 1193796006-A

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 07/18/19 11:43
Prep Initial Wt./Vol.: 242 mL
Prep Extract Vol: 1 mL

Print Date: 07/25/2019 10:25:58AM

J flagging is activated

Results of **SRF39-TS39VZ-0719**

Client Sample ID: **SRF39-TS39VZ-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796006
Lab Project ID: 1193796

Collection Date: 07/12/19 11:50
Received Date: 07/15/19 09:20
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	18.1		1.00	0.310	ug/L	1		07/19/19 21:33
1,3,5-Trimethylbenzene	17.1		1.00	0.310	ug/L	1		07/19/19 21:33
Benzene	17.2		0.400	0.120	ug/L	1		07/19/19 21:33
Ethylbenzene	2.28		1.00	0.310	ug/L	1		07/19/19 21:33
Isopropylbenzene (Cumene)	5.91		1.00	0.310	ug/L	1		07/19/19 21:33
Naphthalene	17.8		1.00	0.310	ug/L	1		07/19/19 21:33
n-Butylbenzene	0.667	J	1.00	0.310	ug/L	1		07/19/19 21:33
o-Xylene	0.445	J	1.00	0.310	ug/L	1		07/19/19 21:33
P & M -Xylene	14.9		2.00	0.620	ug/L	1		07/19/19 21:33
sec-Butylbenzene	3.68		1.00	0.310	ug/L	1		07/19/19 21:33
tert-Butylbenzene	0.672	J	1.00	0.310	ug/L	1		07/19/19 21:33
Toluene	0.500	U	1.00	0.310	ug/L	1		07/19/19 21:33
Xylenes (total)	15.3		3.00	1.00	ug/L	1		07/19/19 21:33
Surrogates								
1,2-Dichloroethane-D4 (surr)	97.6		81-118		%	1		07/19/19 21:33
4-Bromofluorobenzene (surr)	102		85-114		%	1		07/19/19 21:33
Toluene-d8 (surr)	101		89-112		%	1		07/19/19 21:33

Batch Information

Analytical Batch: VMS19187
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/19/19 21:33
Container ID: 1193796006-C

Prep Batch: VXX34471
Prep Method: SW5030B
Prep Date/Time: 07/19/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/25/2019 10:25:58AM

J flagging is activated

Results of **SRF39-TS39G-0719**

Client Sample ID: **SRF39-TS39G-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796007
Lab Project ID: 1193796

Collection Date: 07/12/19 11:10
Received Date: 07/15/19 09:20
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	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
2-Methylnaphthalene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Acenaphthene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Acenaphthylene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Anthracene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Benzo(a)Anthracene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Benzo[a]pyrene	0.0101	U	0.0202	0.00625	ug/L	1		07/21/19 17:34
Benzo[b]Fluoranthene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Benzo[g,h,i]perylene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Benzo[k]fluoranthene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Chrysene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Dibenzo[a,h]anthracene	0.0101	U	0.0202	0.00625	ug/L	1		07/21/19 17:34
Fluoranthene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Fluorene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Indeno[1,2,3-c,d] pyrene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Naphthalene	0.0505	U	0.101	0.0313	ug/L	1		07/21/19 17:34
Phenanthrene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Pyrene	0.0252	U	0.0504	0.0151	ug/L	1		07/21/19 17:34
Surrogates								
2-Methylnaphthalene-d10 (surr)	69.7		47-106		%	1		07/21/19 17:34
Fluoranthene-d10 (surr)	74.7		24-116		%	1		07/21/19 17:34

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Analyst: DSD
Analytical Date/Time: 07/21/19 17:34
Container ID: 1193796007-A

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 07/18/19 11:43
Prep Initial Wt./Vol.: 248 mL
Prep Extract Vol: 1 mL

Print Date: 07/25/2019 10:25:58AM

J flagging is activated

Results of **SRF39-TS39G-0719**

Client Sample ID: **SRF39-TS39G-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796007
Lab Project ID: 1193796

Collection Date: 07/12/19 11:10
Received Date: 07/15/19 09:20
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 20:03
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 20:03
Benzene	0.200	U	0.400	0.120	ug/L	1		07/19/19 20:03
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 20:03
Isopropylbenzene (Cumene)	0.500	U	1.00	0.310	ug/L	1		07/19/19 20:03
Naphthalene	0.500	U	1.00	0.310	ug/L	1		07/19/19 20:03
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 20:03
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/19/19 20:03
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		07/19/19 20:03
sec-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 20:03
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 20:03
Toluene	0.500	U	1.00	0.310	ug/L	1		07/19/19 20:03
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/19/19 20:03
Surrogates								
1,2-Dichloroethane-D4 (surr)	99.7		81-118		%	1		07/19/19 20:03
4-Bromofluorobenzene (surr)	102		85-114		%	1		07/19/19 20:03
Toluene-d8 (surr)	102		89-112		%	1		07/19/19 20:03

Batch Information

Analytical Batch: VMS19187
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/19/19 20:03
Container ID: 1193796007-C

Prep Batch: VXX34471
Prep Method: SW5030B
Prep Date/Time: 07/19/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/25/2019 10:25:58AM

J flagging is activated

Results of **SRF39-TB02-0719**

Client Sample ID: **SRF39-TB02-0719**
Client Project ID: **SRF 39-T 2019 HAK CS GWM Prog**
Lab Sample ID: 1193796008
Lab Project ID: 1193796

Collection Date: 07/12/19 08:00
Received Date: 07/15/19 09:20
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 15:29
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 15:29
Benzene	0.200	U	0.400	0.120	ug/L	1		07/19/19 15:29
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 15:29
Isopropylbenzene (Cumene)	0.500	U	1.00	0.310	ug/L	1		07/19/19 15:29
Naphthalene	0.500	U	1.00	0.310	ug/L	1		07/19/19 15:29
n-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 15:29
o-Xylene	0.500	U	1.00	0.310	ug/L	1		07/19/19 15:29
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		07/19/19 15:29
sec-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 15:29
tert-Butylbenzene	0.500	U	1.00	0.310	ug/L	1		07/19/19 15:29
Toluene	0.500	U	1.00	0.310	ug/L	1		07/19/19 15:29
Xylenes (total)	1.50	U	3.00	1.00	ug/L	1		07/19/19 15:29
Surrogates								
1,2-Dichloroethane-D4 (surr)	99.7		81-118		%	1		07/19/19 15:29
4-Bromofluorobenzene (surr)	103		85-114		%	1		07/19/19 15:29
Toluene-d8 (surr)	101		89-112		%	1		07/19/19 15:29

Batch Information

Analytical Batch: VMS19187
Analytical Method: SW8260C
Analyst: NRB
Analytical Date/Time: 07/19/19 15:29
Container ID: 1193796008-A

Prep Batch: VXX34471
Prep Method: SW5030B
Prep Date/Time: 07/19/19 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 07/25/2019 10:25:58AM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1796621 [VXX/34471]
Blank Lab ID: 1520035

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193796001, 1193796002, 1193796003, 1193796004, 1193796005, 1193796006, 1193796007, 1193796008

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	97.8	81-118		%
4-Bromofluorobenzene (surr)	101	85-114		%
Toluene-d8 (surr)	102	89-112		%

Batch Information

Analytical Batch: VMS19187
Analytical Method: SW8260C
Instrument: VPA 780/5975 GC/MS
Analyst: NRB
Analytical Date/Time: 7/19/2019 1:44:00PM

Prep Batch: VXX34471
Prep Method: SW5030B
Prep Date/Time: 7/19/2019 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193796 [VXX34471]
Blank Spike Lab ID: 1520036
Date Analyzed: 07/19/2019 13:59

Spike Duplicate ID: LCSD for HBN 1193796 [VXX34471]
Spike Duplicate Lab ID: 1520037
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193796001, 1193796002, 1193796003, 1193796004, 1193796005, 1193796006, 1193796007, 1193796008

Results by **SW8260C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	30.5	102	30	29.9	100	(79-124)	2.00	(< 20)
1,3,5-Trimethylbenzene	30	30.2	101	30	29.5	98	(75-124)	2.20	(< 20)
Benzene	30	27.9	93	30	27.6	92	(79-120)	0.98	(< 20)
Ethylbenzene	30	28.6	95	30	28.4	95	(79-121)	0.92	(< 20)
Isopropylbenzene (Cumene)	30	29.1	97	30	28.7	96	(72-131)	1.30	(< 20)
Naphthalene	30	28.2	94	30	30.5	102	(61-128)	7.70	(< 20)
n-Butylbenzene	30	30.2	101	30	30.2	101	(75-128)	0.27	(< 20)
o-Xylene	30	28.0	93	30	28.0	93	(78-122)	0.13	(< 20)
P & M -Xylene	60	57.7	96	60	57.2	95	(80-121)	0.90	(< 20)
sec-Butylbenzene	30	30.0	100	30	29.6	99	(77-126)	1.00	(< 20)
tert-Butylbenzene	30	30.3	101	30	29.6	99	(78-124)	2.30	(< 20)
Toluene	30	27.7	92	30	27.3	91	(80-121)	1.40	(< 20)
Xylenes (total)	90	85.7	95	90	85.1	95	(79-121)	0.65	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30	94.4	94	30	94.5	95	(81-118)	0.12	
4-Bromofluorobenzene (surr)	30	99.4	99	30	101	101	(85-114)	1.40	
Toluene-d8 (surr)	30	103	103	30	103	103	(89-112)	0.16	

Batch Information

Analytical Batch: **VMS19187**
Analytical Method: **SW8260C**
Instrument: **VPA 780/5975 GC/MS**
Analyst: **NRB**

Prep Batch: **VXX34471**
Prep Method: **SW5030B**
Prep Date/Time: **07/19/2019 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1796503 [XXX/41787]
Blank Lab ID: 1519521

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1193796001, 1193796002, 1193796003, 1193796004, 1193796005, 1193796006, 1193796007

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)	66.6	47-106		%
Fluoranthene-d10 (surr)	91.4	24-116		%

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/21/2019 2:50:00PM

Prep Batch: XXX41787
Prep Method: SW3520C
Prep Date/Time: 7/18/2019 11:43:13AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1193796 [XXX41787]
Blank Spike Lab ID: 1519522
Date Analyzed: 07/21/2019 15:10

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193796001, 1193796002, 1193796003, 1193796004, 1193796005, 1193796006, 1193796007

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

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	2	1.41	70	(41-115)
2-Methylnaphthalene	2	1.38	69	(39-114)
Acenaphthene	2	1.48	74	(48-114)
Acenaphthylene	2	1.57	78	(35-121)
Anthracene	2	1.65	83	(53-119)
Benzo(a)Anthracene	2	1.83	92	(59-120)
Benzo[a]pyrene	2	1.69	85	(53-120)
Benzo[b]Fluoranthene	2	1.77	89	(53-126)
Benzo[g,h,i]perylene	2	1.58	79	(44-128)
Benzo[k]fluoranthene	2	1.70	85	(54-125)
Chrysene	2	1.87	93	(57-120)
Dibenzo[a,h]anthracene	2	1.56	78	(44-131)
Fluoranthene	2	1.96	98	(58-120)
Fluorene	2	1.57	78	(50-118)
Indeno[1,2,3-c,d] pyrene	2	1.70	85	(48-130)
Naphthalene	2	1.38	69	(43-114)
Phenanthrene	2	1.53	77	(53-115)
Pyrene	2	2.02	101	(53-121)
Surrogates				
2-Methylnaphthalene-d10 (surr)	2	68.5	69	(47-106)
Fluoranthene-d10 (surr)	2	93.9	94	(24-116)

Batch Information

Analytical Batch: **XMS11549**
Analytical Method: **8270D SIM LV (PAH)**
Instrument: **Agilent GC 7890B/5977A SWA**
Analyst: **DSD**

Prep Batch: **XXX41787**
Prep Method: **SW3520C**
Prep Date/Time: **07/18/2019 11:43**
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: 1193799014
MS Sample ID: 1519644 MS
MSD Sample ID: 1519645 MSD

Analysis Date: 07/21/2019 17:55
Analysis Date: 07/21/2019 18:15
Analysis Date: 07/21/2019 18:36
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1193796001, 1193796002, 1193796003, 1193796004, 1193796005, 1193796006, 1193796007

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	0.0252U	2.17	1.51	69		2.00	1.39	69		41-115	8.10	(< 20)
2-Methylnaphthalene	0.0252U	2.17	1.47	67		2.00	1.35	67		39-114	8.40	(< 20)
Acenaphthene	0.0252U	2.17	1.56	72		2.00	1.39	70		48-114	11.60	(< 20)
Acenaphthylene	0.0252U	2.17	1.62	74		2.00	1.49	75		35-121	7.90	(< 20)
Anthracene	0.0252U	2.17	1.67	77		2.00	1.49	75		53-119	11.60	(< 20)
Benzo(a)Anthracene	0.0252U	2.17	1.59	73		2.00	1.39	70		59-120	13.30	(< 20)
Benzo[a]pyrene	0.0101U	2.17	1.25	57		2.00	1.06	53	*	53-120	16.60	(< 20)
Benzo[b]Fluoranthene	0.0252U	2.17	1.35	62		2.00	1.15	57		53-126	16.50	(< 20)
Benzo[g,h,i]perylene	0.0252U	2.17	.917	42	*	2.00	0.740	37	*	44-128	21.40	* (< 20)
Benzo[k]fluoranthene	0.0252U	2.17	1.32	61		2.00	1.12	56		54-125	16.20	(< 20)
Chrysene	0.0252U	2.17	1.63	75		2.00	1.42	71		57-120	13.40	(< 20)
Dibenzo[a,h]anthracene	0.0101U	2.17	.841	39	*	2.00	0.661	33	*	44-131	23.90	* (< 20)
Fluoranthene	0.0252U	2.17	1.91	88		2.00	1.69	84		58-120	12.30	(< 20)
Fluorene	0.0252U	2.17	1.66	77		2.00	1.50	75		50-118	10.20	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0252U	2.17	1.01	46	*	2.00	0.822	41	*	48-130	20.20	* (< 20)
Naphthalene	0.0505U	2.17	1.5	69		2.00	1.36	68		43-114	9.80	(< 20)
Phenanthrene	0.0252U	2.17	1.57	72		2.00	1.45	72		53-115	7.90	(< 20)
Pyrene	0.0252U	2.17	2	92		2.00	1.77	88		53-121	12.50	(< 20)
Surrogates												
2-Methylnaphthalene-d10 (surr)		2.17	1.53	71		2.00	1.39	70		47-106	9.70	
Fluoranthene-d10 (surr)		2.17	1.86	86		2.00	1.67	84		24-116	10.80	

Batch Information

Analytical Batch: XMS11549
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 7/21/2019 6:15:00PM

Prep Batch: XXX41787
Prep Method: 3520 Liq/Liq Ext for 8270 PAH SIM LV
Prep Date/Time: 7/18/2019 11:43:13AM
Prep Initial Wt./Vol.: 230.00mL
Prep Extract Vol: 1.00mL

Print Date: 07/25/2019 10:26:03AM

Nelson, Justin (Anchorage)

From: Kelly Carson <kcarson@briceenvironmental.com>
Sent: Monday, July 15, 2019 11:26 AM
To: Nelson, Justin (Anchorage)
Subject: Hilcorp GWM - SDG 1193796 - TB sample ID revision

Hi Justin,

Could you update the trip blank ID for SDG 1193796 from “SRF39-TB01-0719” to “SRF39-TB0**2**-0719”?

Thanks!
Kelly.

Kelly Carson
Senior Chemist
Brice Environmental Services Corporation | 3800 Centerpoint Drive, Suite 400, Anchorage, AK 99503 | 907.277.7297 Direct | 907.350.6472 Cell

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1193796

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Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Page ___ of ___

Section 1

CLIENT: BRICE ENVIRONMENTAL

CONTACT: KIMI LLOYD PHONE NO: 907-317-7999

PROJECT NAME: 2019 HAK CS GWM PROGRAM PROJECT/ PWSID/ PERMIT#:

REPORTS TO: KELLY CARSON E-MAIL: KCARSON@BRICEENVIRONMENTAL.COM

INVOICE TO: HILCORP AK QUOTE #: P.O. #: 1952573

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: HCL	HCL	HCL	HCL	HCL	—	—			REMARKS/ LOC ID
							AK101 (GRO)	AK102 (DRO)	AK103 (RRO)	SW8260C (AK PETRO LIST VOC)	SW8260C (BTEX only)	SW8270D SIM (PAH)	SW8015C (ETHYLENE GLYCOL)			
1A-E	SRF39-TS39F-0719	7/12/19	1640	GW	5		—	—	—	3	—	2	—			Strong POL odor Potential LNAPL presence
2A-E	SRF39-TS39U-0719	7/12/19	1440	GW	5		—	—	—	3	—	2	—			POL odor
3A-E	SRF39-TS39CR-0719	7/12/19	1440	GW	5		—	—	—	3	—	2	—			POL odor
4A-E	SRF39-TS39T-0719	7/12/19	1150	GW	5		—	—	—	3	—	2	—			Strong POL odor Potential LNAPL Presence
5A-E	SRF39-TS39V-0719	7/12/19	1250	GW	5		—	—	—	3	—	2	—			
6A-E	SRF39-TS39VZ-0719	7/12/19	1150	GW	5		—	—	—	3	—	2	—			
7A-E	SRF39-TS39G-0719	7/12/19	1110	GW	5		—	—	—	3	—	2	—			Strong POL odor Potential LNAPL Presence
8A-C	SRF39-TB01-0719	7/12/19	0800	GW	3		—	—	—	3	—	—	—			Trip Blank
MA 7-15-19																

Section 5

Relinquished By: (1)	Date	Time	Received By:
Relinquished By: (2)	~~Date~~	~~Time~~	~~Received By:~~
Relinquished By: (3)	~~Date~~	~~Time~~	~~Received By:~~
Relinquished By: (4)	Date 7-15-19	Time 09:20 am	Received For Laboratory By: MA

Section 4

DOD Project? Yes (No)

Cooler ID: _____

Data Deliverable Requirements: LEVEL II

Requested Turnaround Time and/or Special Instructions:

Profile # 341882 QM

Temp Blank °C: 0.0°C D30

or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)

INTACT BROKEN (ABSENT)

(See attached Sample Receipt Form)

e-Sample Receipt Form

SGS Workorder #: 1193796

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		Yes — Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	Absent
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
	N/A	**Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 0.0 °C Therm. ID: D30
	N/A	Cooler ID: @ °C Therm. ID:
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
	N/A	***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	Samples 5E, 6E and 8C have headspace bigger than 6mm. The samples 5E, 6E, and 8C will be set as limited volume.
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	No	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	

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

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1193796001-A	No Preservative Required	OK			
1193796001-B	No Preservative Required	OK			
1193796001-C	HCL to pH < 2	OK			
1193796001-D	HCL to pH < 2	OK			
1193796001-E	HCL to pH < 2	OK			
1193796002-A	No Preservative Required	OK			
1193796002-B	No Preservative Required	OK			
1193796002-C	HCL to pH < 2	OK			
1193796002-D	HCL to pH < 2	OK			
1193796002-E	HCL to pH < 2	OK			
1193796003-A	No Preservative Required	OK			
1193796003-B	No Preservative Required	OK			
1193796003-C	HCL to pH < 2	OK			
1193796003-D	HCL to pH < 2	OK			
1193796003-E	HCL to pH < 2	OK			
1193796004-A	No Preservative Required	OK			
1193796004-B	No Preservative Required	OK			
1193796004-C	HCL to pH < 2	OK			
1193796004-D	HCL to pH < 2	OK			
1193796004-E	HCL to pH < 2	OK			
1193796005-A	No Preservative Required	OK			
1193796005-B	No Preservative Required	OK			
1193796005-C	HCL to pH < 2	OK			
1193796005-D	HCL to pH < 2	OK			
1193796005-E	HCL to pH < 2	BU			
1193796006-A	No Preservative Required	OK			
1193796006-B	No Preservative Required	OK			
1193796006-C	HCL to pH < 2	OK			
1193796006-D	HCL to pH < 2	OK			
1193796006-E	HCL to pH < 2	BU			
1193796007-A	No Preservative Required	OK			
1193796007-B	No Preservative Required	OK			
1193796007-C	HCL to pH < 2	OK			
1193796007-D	HCL to pH < 2	OK			
1193796007-E	HCL to pH < 2	OK			
1193796008-A	HCL to pH < 2	OK			
1193796008-B	HCL to pH < 2	OK			
1193796008-C	HCL to pH < 2	BU			

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition

Container Condition Glossary

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

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