

SHIP ESCORT / RESPONSE VESSEL SYSTEM (SERVS)

SERVS Response Base Investigation Report

Prepared for:

Alyeska Pipeline Service Company

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SERVS Response Base Investigation Report

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This document has been prepared by SLR International Corporation (SLR). The material and data in this report were prepared under the supervision and direction of the undersigned.



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ACRONYMS

±	plus or minus
°C	degrees Celsius
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AK	Alaska Method
Alyeska	Alyeska Pipeline Service Company
AMSL	above mean sea level
ASTM	American Society for Testing and Materials
bgs	below ground surface
Discovery	Discovery Drilling, Incorporated
DRO	diesel range organics
ft	feet or foot
GRO	gasoline range organics
LOD	limit of detection
LOQ	limit of quantitation
mg/kg	milligrams per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NAVD	North American Vertical Datum
ND	non-detect
PAH	polynuclear aromatic hydrocarbon
PID	photoionization detector
ppm	parts per million
PVOC	petroleum-related volatile organic compound
QA	quality assurance
QAR	quality assurance review
QC	quality control
RPD	relative percent difference
RRO	residual range organics
SERVS	Ship Escort/Response Vessel System
SGS	SGS North America, Inc.
Site	VEOC Building/project area

SLR	SLR International Corporation
USEPA	United States Environmental Protection Agency
VEOC	Valdez Emergency Operations Center
VMT	Valdez Marine Terminal
Work Plan	<i>SERVS Response Base Well Installation Work Plan</i>

SUMMARY

SLR International Corporation (SLR) was contracted by Alyeska Pipeline Service Company (Alyeska) to investigate potential petroleum hydrocarbon impacts discovered during construction of the Valdez Emergency Operations Center (VEOC) Building at the Ship Escort/Response Vessel system facility (Site) in 1995. Field activities consisted of advancing two borings with a drill rig equipped with direct-push tooling, logging soil type, screening soil, and collecting soil samples at discrete depths. A total of five primary analytical samples were collected for analysis of petroleum hydrocarbons. Soil types encountered during drilling consisted of dry pad gravel overlying a thick silt aquitard. No sampleable groundwater was present above the silt aquitard, and no groundwater wells were installed.

Soil sample results did not indicate the presence of petroleum contamination exceeding cleanup levels in the vicinity of the VEOC Building except for a single exceedance of benzo(a)anthracene in primary sample SB2-7-11, which was not replicated in the corresponding duplicate. Petroleum hydrocarbon concentrations did not exceed their respective cleanup levels in other samples collected from either boring. Additionally, photoionization detector screening measurements were 0.0 parts per million at all measured locations, including at primary sample SB2-7-11.

Due to the absence of groundwater above the aquitard, and limited petroleum hydrocarbon impacts in soil samples as indicated by a single ADEC cleanup level exceedance of a single PAH compound not replicated in the duplicate sample, SLR recommends that no further work be completed at the Site and that the status of the site be changed to “closed” in the ADEC contaminated sites database.

1. INTRODUCTION

At the request of Alyeska Pipeline Service Company (Alyeska), SLR International Corporation (SLR) has prepared this report documenting soil sampling at the Ship Escort/Response Vessel System (SERVS) Valdez Emergency Operations Center (VEOC) Building (Site; Figure 1 and Figure 2). The investigation is in response to the Alaska Department of Environmental Conservation's (ADEC) request for soil and groundwater sampling to delineate potential petroleum hydrocarbon impacts documented south of the VEOC during construction in 1995. This site is managed by the ADEC Contaminated Sites Program under File Number 1200.38.052.

This report summarizes the site investigation activities conducted in May 2022, which consisted of advancing two soil borings and collecting soil samples. No groundwater wells were installed and no groundwater samples were collected due to a silt aquitard that was discovered in both borings. Activities described in this report were conducted according to the *SERVS Response Base Well Installation Work Plan* (Work Plan; SLR, 2022). Further discussion in this report includes sampling methodology and analytical results.

1.1 INVESTIGATION BACKGROUND

SERVS was created in 1989 to prevent oil spills and to provide oil spill response and preparedness capabilities for Alyeska and the marine shipping companies that operate the tankers that call at the Valdez Marine Terminal (VMT). From 1989 to 1995, SERVS operated on a leased property located at the corner of Fidalgo Drive and Breakwater Avenue in Valdez.

In 1993, Alyeska conducted a Phase II environmental site assessment of the property that now contains the current SERVS response base. Soil samples were collected from eight surface locations and from two borings. Diesel-range organic (DRO) concentrations were below 1,000 milligrams per kilogram (mg/kg) in all soil samples collected, but the exact concentrations are not known. According to ADEC's Contaminated Sites Database, neither Alyeska nor ADEC possess the 1993 Phase II report.

During excavation for the installation of a water line at the Site, discolored soil was observed and a single soil sample was collected and analyzed for DRO, metals, and halogenated organic compounds (Alyeska, 1995; Figure 2). DRO exceeded the ADEC Method Two cleanup level of 1,000 mg/kg applicable at the time. The excavation was backfilled, and no additional actions were taken. The property was owned by the City of Valdez when the impact was discovered.

Alyeska purchased the property in 1995. The SERVS response base has operated at its current location from 1995 to the present without any additional documented history of fuel spills or releases.

1.2 PHYSICAL SETTING

The SERVS response base is located on an isthmus comprised of imported fill and is separated from Valdez Arm by a seawall comprised of rip rap. The elevation of the SERVS response base is approximately 20 feet (ft) above sea level in the North American Vertical Datum (NAVD).

1.3 OBJECTIVES

The objectives of the SERVS investigation were as follows:

- Delineate the vertical and horizontal extent of potential residual petroleum hydrocarbon contamination at the Site related to a potential spill identified in 1995; and
- Evaluate groundwater for potential petroleum hydrocarbon impacts.

2. REGULATORY CRITERIA

The relevant ADEC regulatory criteria are found in Tables B1 and B2 of 18 of the Alaska Administrative Code (AAC), Chapter 75 (18 AAC 75), *Oil and Other Hazardous Substances Pollution Control* (ADEC, 2021). Valdez is in the Over 40-Inch Zone, for which the most stringent of the Human Health or Migration to Groundwater cleanup levels apply. Soil cleanup levels applicable to the Site are summarized below:

- Gasoline range organics (GRO), 260 mg/kg;
- DRO, 230 mg/kg;
- Residual range organics (RRO), 8,300 mg/kg;
- Polynuclear aromatic hydrocarbons (PAHs), as listed individually in Tables B1 and B2 of 18 AAC 75; and
- Petroleum-related volatile organic compounds (PVOCs), including:
 - Benzene, 0.022 mg/kg;
 - Toluene, 6.7 mg/kg;
 - Ethylbenzene, 0.13 mg/kg;
 - Xylenes (total), 1.5 mg/kg ;
 - 1,2,4-Trimethylbenzene, 0.61 mg/kg;
 - 1,3,5-Trimethylbenzene, 0.66 mg/kg;
 - Isopropylbenzene (Cumene), 5.6 mg/kg;
 - Methyl-t-butyl ether, 0.4 mg/kg;
 - Naphthalene, 0.038 mg/kg;
 - n-Butylbenzene, 23 mg/kg;
 - n-Propylbenzene, 9.1 mg/kg;
 - sec-Butylbenzene, 42 mg/kg;
 - Styrene, 10 mg/kg; and
 - tert-Butylbenzene, 11 mg/kg.

3. FIELD ACTIVITIES

Field activities performed in May 2022 included advancing and sampling two soil borings. Investigation activities were conducted in accordance with Alyeska's procedural requirements as outlined in the *Trans-Alaska Pipeline Maintenance Repair Manual, MR-48* (Alyeska, 2020), SLR's Work Plan, and consistent with ADEC's *Field Sampling Guidance* (ADEC, 2022), unless otherwise specified in Section 3.6. Field activities were documented in a photograph log (Appendix A) and the field logbook/field forms (Appendix B). Boring lithology is presented in boring logs (Appendix C). Field activities are summarized in the following sections.

3.1 DRILLING AND SOIL SAMPLING

The following sections describe drilling of borings and soil sample collection from drill cores. Appropriate information, including the physical location of each soil boring and observed lithology, was documented in the field logbook and in boring logs presented in Appendices B and C, respectively.

3.1.1 SITE PREPARATION

Drilling and soil sampling were conducted on May 27, 2021. Prior to any earthwork, underground utilities owned by Alyeska were located within and around the project area by Alyeska's survey contractor. Utilities were also cleared with General Communications, Inc., Copper Valley Electric Association, and Copper Valley Telephone Cooperative. A drilling standoff distance of 5 ft from any marked utility was established in consultation with Alyeska and adhered to while drilling.

The initial 5 ft of each borehole was advanced using a mud dog. Drill core advanced by Discovery Drilling, Incorporated (Discovery) began at 5 ft below ground surface (bgs) in both boreholes.

3.1.2 DRILLING ACTIVITIES

Discovery advanced soil borings using a GeoProbe® Model 7822DT drill rig equipped with direct push tooling. Drilling activities included advancing two soil borings within the project area.

Borings were advanced using the direct push method, using MC5 (2.25-inch core) tooling. Direct push MC5 tooling allowed for the recovery of a continuous soil core from the surface to the base of each boring. Soil cores were screened in situ with a photoionization detector (PID) at 1 ft increments. Soil from recovered direct push cores was logged in accordance with the *Standard Practice for Classification of Soils* (ASTM International, 2018) using the Unified Soil Classification System. Geological data observed in soil cores or inferred from drilling action was recorded on field logs and used to generate digital boring logs, included as Appendix C.

Both borings were advanced from a ground surface elevation of approximately 20 ft above mean sea level (AMSL). While drilling SB01, water was initially encountered at 19.25 ft bgs at approximately 12:30 PM after penetrating an 11.25-ft thick aquitard consisting primarily of gravelly silt. After the water level was allowed to stabilize, depth to water was measured at approximately 7.5 ft bgs or approximately 12.5 ft

AMSL. According to NOAA tide predictions, the high tide on May 27, 2022 occurred at 12:41 PM at an elevation of 9.56 ft AMSL. Given the lack of water above the silt aquitard and water upwelling into the borehole to approximately the same elevation as the high tide level, the upwelling water encountered at SB01 was interpreted to be seawater. Because the borehole was dry above the aquitard and the water encountered below the aquitard was seawater, no monitoring well was installed.

A second boring, SB02, was advanced and logged to confirm the occurrence of the same soil types and lack of water above the aquitard. After confirming the same soil types at approximately the same depths, and lack of water above the aquitard in both boreholes, starch-coated bentonite pellets were poured into each borehole to re-seal the aquitard. The final 2 ft of boring was backfilled with cuttings.

3.1.3 SOIL BORING SAMPLING

Soil samples were collected directly from the soil core liners into laboratory-supplied containers using new stainless-steel spoons from intervals identified by in situ PID screening. All in situ PID readings throughout each boring were non-detect (ND), therefore the sample intervals were chosen at the discretion of the field sampler. Each analytical sample interval was also screened using the heated headspace PID screening method.

A total of five primary soil samples and one duplicate sample were collected from soil cores for laboratory analysis. Three soil samples were collected from the first soil boring SB01 and two soil samples (one upper and one lower) were collected from the second soil boring SB02. While the Work Plan called for the collection of two soil samples from each boring, an additional soil sample was collected from SB01 at 25 ft bgs to characterize saturated soil encountered beneath the silt aquitard. Due to an abundance of gravel too large to include in the sample material submitted to the laboratory in boring SB02, sample intervals were larger in boring SB02 than in SB01. A duplicate sample was also collected in the deeper sample collected from SB02, requiring a 4-ft long sample interval from 7 to 11 ft bgs.

3.1.4 ANALYTICAL METHODS

Soil samples were analyzed by the following methods:

- GRO by Alaska Method (AK) 101;
- DRO by AK102;
- RRO by AK103;
- PAH by United States Environmental Protection Agency (USEPA) Method 8270D-selective ion monitoring; and
- PVOCs by USEPA Method SW8260D.

3.2 SAMPLE HANDLING, DOCUMENTATION, AND CHAIN OF CUSTODY

Soil samples were collected directly into laboratory-supplied containers appropriate for the required analyses. New nitrile gloves were donned before collecting each sample. The samples were labeled and placed into a pre-chilled cooler with gel ice as soon as possible following collection. Sample and cooler

temperatures were maintained at approximately 4 degrees Celsius (°C), plus or minus (\pm) 2°C, throughout transport to the laboratory. Each sample and any accompanying trip blank(s) were documented on the project chain of custody form.

The samples were shipped directly to SGS North America, Incorporated (SGS) in Anchorage, Alaska, an ADEC-approved laboratory, while maintaining proper sample custody. Samples were analyzed within the respective laboratory hold times for each analysis requested.

3.3 QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance (QA) and quality control (QC) procedures were maintained throughout the sampling activities. QA procedures included the analysis of field duplicates and trip blanks and a laboratory data QA review (QAR) by qualified SLR staff. The QAR included the completion of an ADEC Laboratory Data Review Checklist for each analytical report. QC procedures included adherence to appropriate sample collection methodology as described in the Work Plan (SLR, 2022). The QAR and the completed ADEC Laboratory Data Review Checklists are presented in Appendix D.

3.4 EQUIPMENT DECONTAMINATION

All non-disposable or dedicated sampling equipment that contacted potentially contaminated soil was decontaminated. Sampling equipment was decontaminated using a stiff brush and a solution of a non-ionic detergent (e.g., Alconox[®] or Liquinox[®]) followed by rinses using potable water and distilled water.

3.5 WASTE MANAGEMENT

Waste generated during project activities included soil cuttings and disposable field equipment. Disposal of wastes was coordinated with the Alyeska VMT environmental leads. No hazardous waste was generated during this project.

Soil cuttings generated during drilling were placed back into the boring of origin in the portion of the boring generated by the mud dog (i.e., the upper 5 ft of each boring). Disposable sampling equipment was used for the collection of all samples. All disposable sampling equipment was placed in Alyeska-approved garbage bags and disposed of in a construction debris dumpster.

3.6 WORK PLAN DEVIATIONS

Work Plan deviations during site activities in 2022 were as follows:

- A silt layer was encountered at 8 ft bgs in SB01 and at 11.5 ft bgs in SB02. This silt layer was overlain by dry gravel, and no water was present above the silt layer. Because the purpose of well installation and groundwater sampling was to evaluate possible petroleum hydrocarbon impacts to groundwater from stained soil observed near the ground surface, installing wells with screens below the silt layer would not have been consistent with the goals of the investigation. There was insufficient water to install well screens above the silt layer. Penetration of the aquitard resulted

in inundation by seawater to a depth of 7.5 ft bgs. The soil encountered beneath the silt aquitard was interpreted to be intermittently saturated by tides and not representative of groundwater recharged from the ground surface at SERVS. Therefore, no wells were installed, and no groundwater samples were collected.

- Section 4.1.4 of the Work Plan indicates that two soil samples would be collected from each boring. To adequately characterize near-surface soils at the Site, three soil samples were collected from boring SB01 and two soil samples were collected from SB02.

4. RESULTS

The following sections discuss analytical data quality and sample results. Field screening and analytical results did not indicate substantial petroleum hydrocarbon impacts, with exceedances limited to a single PAH analyte in a primary sample in one borehole which was not replicated in the corresponding duplicate.

4.1 ANALYTICAL DATA QUALITY

The project analytical data were deemed acceptable for use with minor issues as summarized below and presented in detail in the QAR. The QAR, ADEC Laboratory Data Review Checklists, and complete laboratory analytical reports are included in Appendix D.

- **Reporting Limits:** Limits of detection (LODs) were compared to 18 AAC 75, Tables B1 and B2, Method Two cleanup levels for the Over 40-Inch Zone and Migration to Groundwater. For fuels, the lowest of ingestion or inhalation for the Over 40-Inch Zone, and the Migration to Groundwater for the Over 40-Inch Zone cleanup levels were used (ADEC, 2021). Results of ND with the LOD not meeting applicable cleanup levels were limited to those noted below.
 - For all samples and the trip blank, the LOD for 1,2-dibromoethane by Method SW8260D ranged from 0.000575 mg/kg to 0.00108 mg/kg, above the Migration to Groundwater cleanup level of 0.00024 mg/kg. This was due to typical laboratory methodology limitations. It is not possible to state with certainty the absence of 1,2-dibromoethane below the reported LOD, but above the Migration to Groundwater cleanup level. This data is limited in usability for that purpose. Data usability was considered minimally impacted, and all data were considered usable without qualification.
- **Surrogate Recovery Results:** Surrogate recoveries outside analytical methods and SGS acceptable limits were limited to those discussed below. Surrogate analysis was performed at the required frequencies. Surrogates were not evaluated when samples were analyzed at dilutions greater than five-fold because the quantitation was not considered accurate.
 - The case narrative noted a surrogate recovery exceedance for SW8270D 2-methylnaphthalene-d10. This was likely due to a ten-fold dilution and matrix interference. The parent sample was not associated with this project. No project data were affected.
- **Matrix Spike and Matrix Spike Duplicate Samples:** Matrix spike (MS) and matrix spike duplicate (MSD) recovery and relative percent difference (RPD) exceedances are limited to those discussed below. MS/MSDs were analyzed at the appropriate frequencies. MS/MSDs were not evaluated when samples were analyzed at dilutions of greater than five-fold because the quantitation was not considered accurate.
 - For Method SW870D, MS/MSD recoveries and RPDs for several analytes did not meet laboratory criteria. The parent sample was not associated with this project, and the exceedances were likely due to analysis at a ten-fold dilution. Since the laboratory control

sample recovered within acceptable limits for all analytes establishing batch accuracy, no project data was affected. It should be noted that for the analytes with RPD exceedances (fluoranthene, phenanthrene, and pyrene), there was no acceptable measure of laboratory precision for the batch. Refer to the Field Duplicates bullet point below for further discussion.

- **Field Duplicates:** The RPDs for the field duplicate pair SB2-7-11/SB92-7-11 exceeded the recommended ADEC limit of 50 percent for soils. Chronologically associated samples are considered impacted. Parent samples and field duplicates were qualified, and impacted analytes for chronologically associated samples were qualified "Q" in the data tables to indicate an estimated values with unknown bias. Data already "J" flagged as estimated with indeterminate bias (i.e., below the LOQ) were not additionally qualified. In addition, ND results were considered not impacted by field precision error and were not qualified because precision would impact the quantity of analyte detected, not the presence or absence.

For all analytes except fluoranthene, phenanthrene, and pyrene, laboratory batch precision was established by an MS/MSD pair with RPDs within acceptable limits; therefore, the impact to data was considered minimal. All impacted fluoranthene, phenanthrene, and pyrene results were over 100-fold below the applicable regulatory criteria; therefore, data usability was not impacted.

In all cases, the higher of the primary sample/duplicate value should be used for reporting purposes. Except for benzo(a)anthracene in primary sample SB2-7-11, all impacted data were well below cleanup levels; therefore, data usability was not affected. For benzo(a)anthracene, data for duplicate pair SB2-7-11/SB92-7-11 should be considered an exceedance of ADEC criteria and data is usable. All data are usable as qualified.

Additionally, "J" flags were applied to multiple soil analytes and were considered "tentatively identified" or "presumptive" laboratory detections at estimated concentrations with indeterminate bias. These detections were above the laboratory LOD but below the laboratory limit of quantitation (LOQ).

4.2 SCREENING AND ANALYTICAL RESULTS

Soil analytical results are included in Table 1 and discussed below.

PID screening measurements, both in situ and heated headspace, indicated no petroleum hydrocarbon impacts in either boring. All in situ and heated headspace PID screening measurements were 0.0 parts per million (ppm).

Analytical results from both borings do not indicate petroleum hydrocarbon impacts except for an exceedance of benzo(a)anthracene in a primary sample that was not replicated in the duplicate sample. Benzo(a)anthracene was detected at a concentration of 0.981 mg/kg in sample SB2-7-11, which was collected as a composite from 7 to 11 ft bgs in boring SB02. The benzo(a)anthracene concentration of 0.981 mg/kg in sample SB2-7-11 exceeds the ADEC Migration to Groundwater cleanup level of 0.7 mg/kg. However, the benzo(a)anthracene concentration of 0.11 mg/kg in the duplicate sample SB92-7-11 did not exceed the ADEC Migration to Groundwater cleanup level. All other petroleum hydrocarbon constituents

analyzed in all other soil samples were ND, detected at J-flagged (low level, estimated) concentrations below the LOQ, or detected at concentrations well below the most stringent ADEC cleanup levels.

5. CONCLUSIONS

Analytical results from samples collected in 2022 do not indicate petroleum hydrocarbon impacts to soil at the Site with the exception of a single exceedance of benzo(a)anthracene in a primary sample, that was not replicated in the corresponding duplicate sample. All other petroleum hydrocarbons were either detected at low-level, estimated concentrations well below the laboratory LOQ or were ND for all other analytes. All borings terminated in soil that was visually clean and was screened using a PID at 0.0 ppm at all measurement locations.

The presence of a thick silt aquitard overlain by dry pad gravel indicated conditions un conducive to the installation and sampling of groundwater wells. Groundwater at the site exists only in a soil zone consisting of tidally inundated native beach sand and gravel that is overlain by an aquitard consisting of silty fill. No wells were installed, and no groundwater samples were collected.

Due to the absence of groundwater above the aquitard, and limited petroleum hydrocarbon impacts in soil samples as indicated by a single ADEC cleanup level exceedance of a single PAH compound not replicated in the duplicate sample, SLR recommends that no further work be completed at the Site and that the status of the site be changed to “closed” in the ADEC contaminated sites database.

6. REFERENCES

Alaska Department of Environmental Conservation (ADEC). 2022. Field Sampling Guidance. January.

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Alyeska Pipeline Service Company (Alyeska). 2020. Trans-Alaska Pipeline Maintenance and Repair Manual, MR-48. March.

----- . 1995. Soil Characterization During Construction, SERVS VEOC Facility, Valdez, Alaska. May.

ASTM International. 2018. ASTM D2487 – 17, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

SLR International Corporation (SLR). 2022. SERVS Response Base Well Installation Work Plan, Valdez Marine Terminal. March.

LIMITATIONS

The services described in this work product were performed in accordance with generally accepted professional consulting principles and practices. No other representations or warranties, expressed or implied, are made. These services were performed consistent with our agreement with our client. This work product is intended solely for the use and information of our client unless otherwise noted. Any reliance on this work product by a third party is at such party's sole risk.

Opinions and recommendations contained in this work product are based on conditions that existed at the time the services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. The data reported and the findings, observations, and conclusions expressed are limited by the scope of work. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this work product.

The purpose of an environmental assessment is to reasonably evaluate the potential for, or actual impact of, past practices on a given site area. In performing an environmental assessment, it is understood that a balance must be struck between a reasonable inquiry into the environmental issues and an appropriate level of analysis for each conceivable issue of potential concern. The following paragraphs discuss the assumptions and parameters under which such an opinion is rendered.

No investigation can be thorough enough to exclude the presence of hazardous materials at a given site. If hazardous conditions have not been identified during the assessment, such a finding should not therefore be construed as a guarantee of the absence of such materials on the Site, but rather as the result of the services performed within the scope, practical limitations, and cost of the work performed.

Environmental conditions that are not apparent may exist at the Site. Our professional opinions are based in part on interpretation of data from a limited number of discrete sampling locations and therefore may not be representative of the actual overall Site environmental conditions.

The passage of time, manifestation of latent conditions, or occurrence of future events may require further study at the Site, analysis of the data, and/or reevaluation of the findings, observations, and conclusions in the work product.

This work product presents professional opinions and findings of a scientific and technical nature. The work product shall not be construed to offer legal opinion or representations as to the requirements of, nor the compliance with, environmental laws rules, regulations, or policies of federal, state or local governmental agencies.

FIGURES

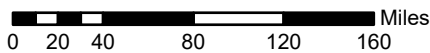
Figure 1 Site Location Map

Figure 2 Soil Boring Locations and Analytical Soil Sample Results



Legend

- City
- Pump Station
- Trans-Alaska Pipeline System (TAPS)



THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY.
ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.



Site
 ALYESKA PIPELINE SERVICE COMPANY
 SERVS RESPONSE BASE
 VALDEZ, ALASKA

Report
 SERVS RESPONSE BASE INVESTIGATION REPORT

Drawing
 SITE LOCATION MAP

Date November 2022
 File Name F1 APSC_SERVS_RB_MW_RPT_22.aprx



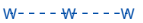



Scale As Shown
 Project No. 105.01288.22015

Fig. No. 1



Base Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, 9/4/2018

Legend

-  Soil Boring Location
-  Area Where Material Was Sampled
-  Approximate Buried Water Line
-  Approximate Buried Electric Line
-  Property Boundary
-  Elevation Contour (Feet NAVD 88)

Notes

1. Analytes are only shown if either the primary or duplicate exceeded the most stringent ADEC cleanup level. Exceedances are shown in **bold**.
2. Results shown in milligrams per kilogram (mg/kg).
3. "Q" indicates estimated value with unknown bias due to one or more QC exceedances.



SB2 / SB92	
Sampled 5/27/2022	
SB2-5-7: No detections above cleanup level in the soil sample collected between 5 and 7 ft bgs.	
SB2-7-11/ SB92-7-11	
Analyte:	Result:
Benzo(a)anthracene:	0.981 Q / 0.11

SB1	
Sampled 5/27/2022	
No detections above cleanup in soil samples collected at 5, 8, and 20 ft bgs.	

Site
**ALYESKA PIPELINE SERVICE COMPANY
 SERVS RESPONSE BASE
 VALDEZ, ALASKA**

Report
SERVS RESPONSE BASE INVESTIGATION REPORT

Drawing
**SOIL BORING LOCATIONS AND
 ANALYTICAL SOIL SAMPLE RESULTS**

Date November 2022
 File Name F2 APSC_SERVS_RB_MW_RPT_22.aprx

Scale 1" = 75 feet
 Project No. 105.01288.22015

Fig. No. **2**

TABLES

Table 1 Soil Analytical Results

Table 1 - Soil Analytical Results
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Compound in milligrams per kilogram (mg/kg)	Screening Criteria		Sample Location ^{3,4}						Trip Blank
	18 AAC 75, Over 40 Inch Zone ¹	18 AAC 75, Migration to Groundwater ²	S81-5 27-May-22 1222655003	S81-8 27-May-22 1222655001	S81-20 27-May-22 1222655002	S82-5-7 27-May-22 1222655004	Primary: S82-7-11 27-May-22 1222655005	Duplicate: S82-7-11 27-May-22 1222655006	Trip Blank 27-May-22 1222655007
Fuels (AK101, 102, and 103)									
Gasoline Range Organics	1400	260	1.14 J	1.26 J	1.77 J	1.62 J	1.14 J	1.3 J	1.33 J
Diesel Range Organics	8250	230	11.3 J	13.5 J	13.5 J	11.7 J	13.3 J	13.1 J	--
Residual Range Organics	8300	9700	[51.5] ND	[51] ND	[61] ND	[51.5] ND	[51.5] ND	[51.5] ND	--
PVOCs (SW8260D)									
1,2,4-Trimethylbenzene	43	0.61	[0.0422] ND	[0.0385] ND	[0.0715] ND	[0.063] ND	[0.0463] ND	[0.0535] ND	[0.0505] ND
1,2-Dibromoethane	0.31	0.00024	[0.000635] ND	[0.000575] ND	[0.00108] ND	[0.000945] ND	[0.000695] ND	[0.0008] ND	[0.000755] ND
1,2-Dichloroethane	3.9	0.0055	[0.000845] ND	[0.00077] ND	[0.00143] ND	[0.00126] ND	[0.000925] ND	[0.00107] ND	[0.00101] ND
1,3,5-Trimethylbenzene	37	0.66	[0.0106] ND	[0.0096] ND	[0.0179] ND	[0.0157] ND	[0.0116] ND	[0.0134] ND	[0.0126] ND
Benzene	8.1	0.022	[0.00525] ND	[0.0048] ND	[0.00895] ND	[0.00785] ND	[0.0058] ND	[0.0067] ND	[0.0063] ND
Ethylbenzene	35	0.13	[0.0106] ND	[0.0096] ND	[0.0179] ND	[0.0157] ND	[0.0116] ND	[0.0134] ND	[0.0126] ND
Isopropylbenzene (Cumene)	54	5.6	[0.0106] ND	[0.0096] ND	[0.0179] ND	[0.0157] ND	[0.0116] ND	[0.0134] ND	[0.0126] ND
Methyl-t-butyl ether	480	0.4	[0.0422] ND	[0.0385] ND	[0.0715] ND	[0.063] ND	[0.0463] ND	[0.0535] ND	[0.0505] ND
Naphthalene	20	0.038	0.0109 J	0.0122 J	[0.0179] ND	0.0114 J	[0.0116] ND	0.0199 J	[0.0126] ND
n-Butylbenzene	20	23	[0.0106] ND	[0.0096] ND	[0.0179] ND	[0.0157] ND	[0.0116] ND	[0.0134] ND	[0.0126] ND
o-Xylene	--	--	[0.0106] ND	[0.0096] ND	[0.0179] ND	[0.0157] ND	[0.0116] ND	[0.0134] ND	[0.0126] ND
p & m -Xylene	--	--	[0.0211] ND	[0.0192] ND	[0.0358] ND	[0.0314] ND	[0.0231] ND	[0.0268] ND	[0.0252] ND
sec-Butylbenzene	28	42	[0.0106] ND	[0.0096] ND	[0.0179] ND	[0.0157] ND	[0.0116] ND	[0.0134] ND	[0.0126] ND
tert-Butylbenzene	36	11	[0.0106] ND	[0.0096] ND	[0.0179] ND	[0.0157] ND	[0.0116] ND	[0.0134] ND	[0.0126] ND
Toluene	200	6.7	[0.0106] ND	[0.0096] ND	[0.0179] ND	[0.0157] ND	[0.0116] ND	[0.0134] ND	[0.0126] ND
Xylenes (total)	57	1.5	[0.0211] ND	[0.0192] ND	[0.0358] ND	[0.0314] ND	[0.0231] ND	[0.0268] ND	[0.0252] ND
PAH SIM (SW8270D)									
1-Methylnaphthalene	68	0.41	[0.0129] ND	[0.0129] ND	[0.0153] ND	[0.0129] ND	[0.258] ND	[0.0129] ND	--
2-Methylnaphthalene	250	1.3	0.0085 J	[0.0129] ND	[0.0153] ND	[0.0129] ND	[0.258] ND	[0.0129] ND	--
Acenaphthene	3800	37	[0.0129] ND	[0.0129] ND	[0.0153] ND	[0.0129] ND	[0.258] ND	[0.0129] ND	--
Acenaphthylene	1900	18	0.00945 J	0.00687 J	[0.0153] ND	0.015 J	[0.258] ND	0.0257 J	--
Anthracene	19000	390	0.052 Q	0.0123 J	[0.0153] ND	0.0342 Q	3.02 Q	0.0485 Q	--
Benzo(a)Anthracene	12	0.7	0.174 Q	0.0345 Q	[0.0153] ND	0.0896 Q	0.981 Q	0.11 Q	--
Benzo(a)pyrene	1.2	1.9	0.073	0.034	[0.0153] ND	0.0827	0.485 J	0.124	--
Benzo(b)Fluoranthene	12	20	0.136 Q	0.0787 Q	[0.0153] ND	0.165 Q	0.881 Q	0.236 Q	--
Benzo(g,h,i)perylene	1900	15000	0.0227 J	0.0148 J	[0.0153] ND	0.0374	0.164 J	0.0549	--
Benzo(k)fluoranthene	120	190	0.051	0.0185 J	[0.0153] ND	0.0424	0.295 J	0.0683	--
Chrysene	1200	600	0.232 Q	0.0449 Q	[0.0153] ND	0.117 Q	2.96 Q	0.177 Q	--
Dibenzo(a,h)anthracene	1.2	6.3	0.00694 J	[0.0129] ND	[0.0153] ND	0.0107 J	[0.258] ND	0.0147 J	--
Fluoranthene	2500	590	0.0614 Q	0.0535 Q	[0.0153] ND	0.0882 Q	1.03 Q	0.254 Q	--
Fluorene	2500	36	0.0195 J	[0.0129] ND	[0.0153] ND	0.00913 J	0.203 J	0.0102 J	--
Indeno(1,2,3-c,d) pyrene	12	65	0.0245 J	0.0162 J	[0.0153] ND	0.0398	0.183 J	0.0579	--
Naphthalene	20	0.038	0.00829 J	[0.0103] ND	[0.0123] ND	[0.0104] ND	[0.207] ND	[0.0103] ND	--
Phenanthrene	1900	39	0.082 Q	0.0226 J	[0.0153] ND	0.054 Q	0.571 Q	0.0659 Q	--
Pyrene	1900	87	0.0329 Q	0.0273 Q	[0.0153] ND	0.0588 Q	0.749 Q	0.174 Q	--
Percent Solids (SM21 2540G)									
Total Solids	--	--	96.4	97.2	80.6	96.6	96.2	96.1	--

Bold indicates sample result exceeding the ADEC Over 40-Inch Zone criteria.
Shaded indicates sample result exceeding the ADEC Migration to Groundwater criteria.
 The LOD did not meet project cleanup levels.

Notes:

- The cleanup levels correspond to those listed in 18 AAC 75.341, Method Two, Tables B1 and B2, for the Over 40 Inch Zone (ADEC, November 18, 2021). For fuels, applicable cleanup levels are the lowest of ingestion or inhalation for the Over 40-Inch Zone.
- The cleanup levels correspond to those listed in 18 AAC 75.341, Method Two, Tables B1 and B2, Migration to Groundwater (ADEC, November 18, 2021). For fuels, applicable cleanup levels listed are Migration to Groundwater for the Over 40-Inch Zone.
- The sample type, field sample identification number, date collected, and laboratory sample identification number are provided.
- For detected results, the sample result is listed in this column. For undetectable results, the Limit of Detection (LOD) is listed in brackets in this column. Associated flag(s) are shown to the right.
- Total values were the summation of detected compounds only. If compounds were not detected, then the highest LOD was listed.

Data Flags:

J Estimated concentration between the LOQ and DL.
 ND Nondetect, LOD is shown in brackets.
 Q Estimated value with unknown bias due to one or more QC exceedances.

Abbreviations

--	Not applicable or screening criteria does not exist for this compound	LOQ	limit of quantitation
AAC	Alaska Administrative Code	mg/kg	milligrams per kilogram
ADEC	Alaska Department of Environmental Conservation	PAH	polycyclic aromatic hydrocarbons
AK	Alaska Method	PVOCs	petroleum volatile organic compounds
DL	detection limit	SIM	selective ion monitoring
LOD	limit of detection	SM	Standard Method

APPENDIX A

PHOTOGRAPH LOG

SERVS Response Base Investigation Report

Alyeska Pipeline Service Company

P.O. Box 196660

3700 Centerpoint Drive

Anchorage, Alaska 99519-6660

November 2022



Photo 1: Advancing borehole SB1 south of the Valdez Emergency Operations Center (VEOC) Building using direct push tooling. View to the north (5/27/2022).



Photo 2: Direct push soil cores from SB1. A dry sandy gravel overlies over 10 ft of silt with intermixed gravel interpreted to be dredged backfill from the harbor. Wet gravelly sand was present at the bottom of the borehole interpreted to be native beach material (5/27/2022).



	SERVS Investigation Valdez Marine Terminal
SITE PHOTOGRAPHS May 27, 2022	Job No: 105.01288.22015



Photo 3: Ziplock bags containing soil collected for heated headspace measurements. Heated headspace measurements were collected at each analytical sample location (5/27/2022).



Photo 4: View from the SERVS VEOC Building pad towards Port Valdez at high tide. View to the south (5/27/2022).

	SERVS Investigation Valdez Marine Terminal
SITE PHOTOGRAPHS May 27, 2022	Job No: 105.01288.22015

APPENDIX B

FIELD LOGBOOK AND FIELD FORMS

SERVS Response Base Investigation Report

Alyeska Pipeline Service Company

P.O. Box 196660

3700 Centerpoint Drive

Anchorage, Alaska 99519-6660

November 2022

- 0600 Depart Valdez
- 0620 Arrive VMT. Pick up coolers for ETF and Pressure Transmitter. ~~and~~
- 0630 Depart VMT.
- 0650 Arrive airport. Ship coolers.
- 0745 Arrive SERVS. Site walkdown. Obtain permit. Review HSE paperwork. Cal PID.
- 1000 First rod in the ground at SB1.
- 1230 Collect sample SB1-8.
- 1235 Collect sample SB1-20.
- 1345 Redrill 5'-10' interval to collect sample SB1-5. Sample SB1-5 was collected to complete characterization of soil in boring. No water present above silt layer. After drilling through silt layer from ~~9.25~~ BW 8 ft to 19.25 ft bgs, water welled into the borehole up to 8 ft. Borehole was completed approximately at high tide (1240). Due to lack of saturated conditions above the silt aquitard, no well was installed.
- 1345 Pack up drill rig and equipments

- 1400 First rod in the ground at SB2.
- 1415 Collect sample SB2-7-11. Dup SB2-7-11 at 1800.
- 1430 Collect sample SB2-5-7. No well installed. Both wells backfilled with bentonite (SB2 16 → 5, SB2 15 → 5) then the final 5 feet with drill cuttings and traction sand. Final foot of abandonment done with pad gravel.
- 1515 Close permit.
- 1530 Depart SERVS.
- 1600 Arrive VDZ to pick up soil test kit.
- 1630 Arrive VMT. QC samples.
- 1715 Depart VMT.
- 1735 Arrive Valdez. End field day.

BH-Wdt
5/27/2022



PID Calibration Log

Calibration Date:	Calibration Time:	Calibration By:		
Instrument <i>MiniRAE 3000</i>	Serial # <i>0607</i>	Zero Gas	Span Gas 1	Calibration with Acceptable Range?
Meter Response		ambient air	isobutylene (100 ppm)	
Notes		<i>Pre-Cal = 0.0 No Cal</i>	<i>Pre-Cal = 100.0 No Cal</i>	<input checked="" type="checkbox"/> yes no

Calibration Date:	Calibration Time:	Calibration By:		
Instrument	Serial #	Zero Gas	Span Gas 1	Calibration with Acceptable Range?
Meter Response		ambient air	isobutylene (100 ppm)	
Notes				yes no

Calibration Date:	Calibration Time:	Calibration By:		
Instrument	Serial #	Zero Gas	Span Gas 1	Calibration with Acceptable Range?
Meter Response		ambient air	isobutylene (100 ppm)	
Notes				yes no

Calibration Date:	Calibration Time:	Calibration By:		
Instrument	Serial #	Zero Gas	Span Gas 1	Calibration with Acceptable Range?
Meter Response		ambient air	isobutylene (100 ppm)	
Notes				yes no

Calibration Date:	Calibration Time:	Calibration By:		
Instrument	Serial #	Zero Gas	Span Gas 1	Calibration with Acceptable Range?
Meter Response		ambient air	isobutylene (100 ppm)	
Notes				yes no

Calibration Date:	Calibration Time:	Calibration By:		
Instrument	Serial #	Zero Gas	Span Gas 1	Calibration with Acceptable Range?
Meter Response		ambient air	isobutylene (100 ppm)	
Notes				yes no

Calibration Date:	Calibration Time:	Calibration By:		
Instrument	Serial #	Zero Gas	Span Gas 1	Calibration with Acceptable Range?
Meter Response		ambient air	isobutylene (100 ppm)	
Notes				yes no

APPENDIX C

BORING LOGS

SERVS Response Base Investigation Report

Alyeska Pipeline Service Company

P.O. Box 196660

3700 Centerpoint Drive

Anchorage, Alaska 99519-6660

November 2022



2700 Gambell St, Suite 200
Anchorage, Alaska 99507
Telephone: (907) 227-8387

BORING NUMBER SB01

CLIENT Alyeska Pipeline Service Company **PROJECT NAME** Ship Escort Response Vessel (SERVS) Investigation
PROJECT NUMBER 105.01288.22015 **PROJECT LOCATION** Valdez, Alaska
DATE STARTED 5/27/22 **COMPLETED** 5/27/22 **GROUND ELEVATION** 2€ feet AMSL
DRILLING CONTRACTOR Discovery Drilling, Inc. **GROUND WATER LEVELS:**
DRILLING METHOD Direct Push/ ODEX **▽ AT TIME OF DRILLING** 19.25 feet bgs
LOGGED BY B. Woelber **CHECKED BY** E. Tyler **▼ AFTER DRILLING** 7.5 feet bgs
NOTES

DEPTH (ft)	SAMPLE NUMBER AND INTERVAL	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0					
5				Soil absent due to mud-dog removal of first 5 feet. Soil present within the pothole is visually similar to the soil logged in the interval below.	
5.0	SB1-5	GW		Sandy Gravel with Silt , dark brown, dry, sand is coarse, gravel is angular.	15.0
8.0	SB1-8			Silt with Gravel , gray, damp to wet, gravel is angular. Silt and gravel mix is a dredged fill.	12.0
10		ML			0
15					0
20	SB1-20	SW		Gravelly Sand , dark gray, wet, sand is coarse, gravel is angular.	0.7
25				Bottom of hole at 25.0 feet.	0

GENERAL BH / TP / WELL SERVS GINT LOG.GPJ GINT US.GDT 6/9/22



2700 Gambell St, Suite 200
 Anchorage, Alaska 99507
 Telephone: (907) 227-8387

BORING NUMBER SB02

CLIENT Alyeska Pipeline Service Company **PROJECT NAME** Ship Escort Response Vessel (SERVS) Investigation
PROJECT NUMBER 105.01288.22015 **PROJECT LOCATION** Valdez, Alaska
DATE STARTED 5/27/22 **COMPLETED** 5/27/22 **GROUND ELEVATION** 20 feet AMSL
DRILLING CONTRACTOR Discovery Drilling, Inc. **GROUND WATER LEVELS:**
DRILLING METHOD Direct Push/ ODEX **AT TIME OF DRILLING** NM
LOGGED BY B. Woelber **CHECKED BY** E. Tyler **AFTER DRILLING** NM
NOTES _____

DEPTH (ft)	SAMPLE NUMBER AND INTERVAL	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0					
				Soil absent due to mud-dog removal of first 5 feet. Soil present within the pothole is visually similar to the soil logged in the interval below.	
5					15.0
	SB2-5-7			Sandy Gravel with Silt , dark brown, dry, sand is coarse, gravel is angular.	0
		GW			0
	SB2-7-11				0
10					10.0
				Silt with Gravel , gray, damp, gravel is angular. Silt and gravel mix is a dredged fill. Borehole discontinued at 15 ft bgs to ensure that silt aquitard is not perforated by the drill rig.	0
		ML			0
15					0
				Bottom of hole at 15.0 feet.	5.0

GENERAL BH / TP / WELL SERVS GINT LOG.GPJ GINT US.GDT 6/9/22

APPENDIX D

QUALITY ASSURANCE REVIEW, ADEC LABORATORY DATA REVIEW CHECKLISTS, AND LABORATORY ANALYTICAL RESULTS

SERVS Response Base Investigation Report

Alyeska Pipeline Service Company

P.O. Box 196660

3700 Centerpoint Drive

Anchorage, Alaska 99519-6660

November 2022

REPORT

LABORATORY DATA QUALITY ASSURANCE REVIEW

SHIP ESCORT/RESPONSE VESSEL SYSTEM SOIL SAMPLING VALDEZ MARINE TERMINAL

ALYESKA PIPELINE SERVICE COMPANY

July 2022

Prepared by: Jennifer McLean

Reviewed by: Brett Woelber, P.G.

SLR International Corporation
2700 Gambell Street, Suite 200
Anchorage, AK 99503

SLR Project Number: 105.01288.22015

ACRONYMS AND ABBREVIATIONS

%	percent
°C	degrees Celsius
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AK	Alaska
CCV	continuing calibration verification
COC	chain of custody
DL	detection limit
DRO	diesel range organics
EDD	electronic data deliverable
GRO	gasoline range organics
ID	identifier
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOD	limit of detection
LOQ	limit of quantitation
mg/kg	milligrams per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
NFG	National Functional Guidelines
PAH	polynuclear aromatic hydrocarbons
PARCS	precision, accuracy, representativeness, comparability, and sensitivity
PVOCs	petroleum volatile organic compounds
QA	quality assurance
QAR	quality assurance review
QC	quality control
RPD	relative percent difference
RRO	residual range organics
SDG	sample delivery group
SERVS	Ship Escort/Response Vessel System
SGS	SGS North America, Inc.
SIM	selective ion monitoring
SLR	SLR International Corporation
SM	standard method
USEPA	United States Environmental Protection Agency

Introduction

This report summarizes a review of analytical data for soil samples collected on May 27, 2022, at the Valdez Marine Terminal (VMT) Ship Escort/Response Vessel System (SERVS). Samples were collected by SLR International Corporation (SLR) and submitted to SGS North America, Inc. (SGS) in Anchorage. SGS maintains a current Alaska Department of Environmental Conservation (ADEC) Contaminated Sites approval number 17-021 for the applicable analytical methods. Table 1 provides a summary of work orders, sample receipt, analytical methods, and analytes.

Table 1 Sample Receipt and Matrix Summary

SDG	Date Collected	Date Received by Laboratory	Temperature Blank	Matrix	Method	Analyte
1222655	5/27/2022	6/1/2022	4.0°C	Soil	AK101 ¹	GRO ¹
					AK102/103	DRO/RRO
					SW8260D ¹	PVOCs ^{1,2}
					SW8270D SIM	PAH
					SM21 2540G	Percent Solids

Note:

1 – A trip blank was required and analyzed for this method and associated analytes.

2 – PVOC analytes are: benzene, toluene, ethylbenzene, total xylenes (p & m –xylene and o-xylene), 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, isopropylbenzene (cumene), 1,2-dibromoethane, 1,2-dichloroethane, methyl-t-butyl ether, naphthalene, n-butylbenzene, sec-butylbenzene, and tert-butylbenzene.

Acronyms:

°C – degrees Celsius

DRO – diesel range organics

PAH – polynuclear aromatic hydrocarbons

RRO – residual range organics

SIM – selective ion monitoring

AK – Alaska

GRO – gasoline range organics

PVOCs – petroleum volatile organic compounds

SDG – sample delivery group

SM – standard methods

The laboratory final report was provided as a Level II deliverable and included documentation of the delivery group chain of custody (COC) and sample receipt condition. A Microsoft Access compatible electronic data deliverable (EDD) for the report was also provided. The laboratory report was provided electronically as Attachment 2.

Quality Assurance Program

A quality assurance (QA) program was followed for this project that addressed project administration, sampling, quality control (QC), and data review. SLR adhered to required and established sampling and COC protocols. The select laboratory maintains an internal quality assurance program and standard operating procedures.

The analytical data was reviewed for consistency with any project specific requirements, ADEC Technical Memorandum, *Minimum Quality Assurance Requirements for Sample Handling, Reports, and Laboratory Data* (ADEC, 2019) requirements, *National Functional Guidelines for Organic Superfund Methods Data Review* (NFG, United States Environmental Protection Agency [USEPA], 2020), analytical method criteria, and laboratory criteria. An ADEC Laboratory Data Review Checklist was completed for the SDG and was included as Attachment 1 to this Quality Assurance Review (QAR). A review for any anomalies to the project requirements for precision, accuracy, representativeness, comparability, and sensitivity (PARCS) are noted in this QAR, and any data qualifications discussed.

The data review included the following, as applicable:

- Reviewing COC records for completeness, signatures, and dates;
- Identifying any sample receipt or preservation anomalies that could impact data quality;
- Verifying that QC blanks (e. g., field blanks, equipment blanks, trip blanks, method blanks, etc.) were properly prepared, identified, and analyzed;
- Evaluating whether laboratory reporting limits met project goals;
- Reviewing calibration verification recoveries, to include confirming that the laboratory did not identify any Continuing Calibration Verification (CCV) recoveries or other calibration related criteria as being outside applicable acceptance limits;
- Reviewing the case narratives for any discussion of any internal standard recoveries outside of acceptance limits. Internal standard performance was not otherwise presented in the report or in the electronic data deliverables and was reviewed only from the case narratives;
- Verifying that surrogate analyses were within recovery acceptance limits;
- Verifying that Laboratory Control Samples (LCS), Laboratory Control Sample Duplicates (LCSD), Matrix Spike (MS), and Matrix Spike Duplicates (MSD) recoveries were within acceptance limits;
- Evaluating the result relative percent difference (RPD) between primary and duplicate field samples, LCS/LCSDs, MS/MSDs, and laboratory duplicates; and
- Providing an overall assessment of laboratory data quality and qualifying sample results as necessary.

Data Qualifications

As part of the quality assurance review, qualifiers (i.e. data flags) were applied to data as determined necessary based on specified criteria, or professional judgement. In all cases, the basis for qualification and the applied data flag are discussed in this QAR. Table 2 provides a list of potential qualifiers (i.e., flags). These data flags were appended to the data as appropriate.

Table 2 Data Qualifiers

Lab Qualifier (Flag)	NFG Qualifier (Flag)	Equivalent Project Qualifier (Flag) ^{1,2,3}	Definition
U	U	ND	The analyte was analyzed for, but was not detected above the detection limit (DL).
J	NJ	J	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value is the estimated concentration in the sample between the limit of quantitation (LOQ) and the DL. This qualifier is appended by the laboratory.
--	J	Q	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample, due to one or more laboratory quality control criteria (e.g., LCS recovery, surrogate spike recovery) failed or matrix effect. Where applicable, a “+” or “-” was appended to indicate a high bias, or a low bias respectively.
--	UJ	UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
--	R	R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
--	--	B	Blank contamination: The result is an estimated quantity with potential high bias. The analyte was positively identified in the blank (e.g., trip blank and/or method blank) associated with the sample and the concentration reported for the sample was less than five times that of the blank (ten times for metals and common laboratory contaminants methylene chloride and acetone). Where applicable, “U” was appended prior to the “B” to indicate the blank detection was greater than the sample detection or both the blank detection and sample detection were below the limit of detection (LOD), and the result is likely a false positive. The greater of the sample detection or LOD was reported as non-detect in brackets.

Notes:

- 1 – Flags were appended to the data where applicable. The table presents laboratory, NFG and project equivalent qualifiers.
- 2 – Only flags in **bold** were applicable and appended to data for this project.
- 3 – For historical purposes, ND was used in place of “U.”

A discussion of the project data quality relative to PARCS goals and summary of any anomalies or failures requiring data qualifiers follows.

Data Validation

Data Packages

The data package was checked for transcription errors, omissions, or other anomalies. Issues with regards to the data package were limited to those noted below.

- The case narrative noted LCS recoveries for DRO and RRO outside acceptable limits. All LCS's recovered within acceptable limits for these analytes as reviewed in the PDF laboratory report and EDD. Data were not impacted.

Sample Receipt

The sample receipt documentation was checked for anomalies. No issues were noted with regards to the receipt of samples.

Preservation (Chemical and Temperature)

Samples were appropriately preserved and were submitted to SGS. No issues were noted with regards to sample preservation.

Holding Times

All sample analysis was conducted within holding time criteria.

Laboratory Method Blanks

Laboratory method blanks were analyzed at the appropriate frequencies. Except as shown in Table 3, all method blanks had results of non-detect (ND) below the LOD and DL. Sample detections within five times that of the associated blank and above the LOQ were considered affected and were appropriately qualified. Data already "J" flagged as estimated due to the low level of detection were not additionally qualified, as further qualification of already estimated values was considered unnecessary. This data was not shown in the table. All associated samples had results that were already estimated values below the LOQ; therefore, all data were usable without additional qualification.

Table 3 Method Blank and Trip Blank Detections and Affected Data

Sample ID	Lab ID	Preparatory Batch	Method/Analyte	Result (mg/kg)	LOD (mg/kg)	Flag
Method Blank	1667638	VXX38686	AK101/GRO	1.46 J	1.25	NA
	1667994	VXX38696	AK101/GRO	1.31 J	1.25	NA
Trip Blank	1222655007	VXX38686	AK101/GRO	1.33 J	1.26	NA
All associated samples had results that were already estimated values below the LOQ. No additional qualification was necessary.						

Acronyms:

ID - identifier

Trip Blanks

One trip blank was submitted with the SDG and was analyzed for volatile methods (GRO by AK101 and PVOCs by Method SW8260D). Except as shown in Table 3, the trip blank had results of ND below the LOD and DL. All associated samples had results that were already estimated values below the LOQ. No additional qualification of data was necessary.

Reporting Limits

Results of non-detect with LODs not meeting applicable cleanup levels were limited to those noted below. LODs were compared to Title 18 of the Alaska Administrative Code (AAC) Chapter 75, Tables B1 and B2, Method Two cleanup levels for the Over 40-Inch Zone and Migration to Groundwater. For fuels, the lowest of ingestion or inhalation for the Over 40-Inch Zone, and the Migration to Groundwater for the Over 40-Inch Zone cleanup levels were used (ADEC, 2021). Results of non-detect with LODs not meeting applicable cleanup levels were limited to those noted below.

- For all samples and the trip blank, the LOD for 1,2-dibromoethane by Method SW8260D ranged from 0.000575 milligrams per kilogram (mg/kg) to 0.00108 mg/kg, above the Migration to Groundwater cleanup level of 0.00024 mg/kg. This was due to typical laboratory methodology limitations. It is not possible to state with certainty the absence of 1,2-dibromoethane below the reported LOD, but above the Migration to Groundwater cleanup level. This data is limited in usability for that purpose. Data usability was considered minimally impacted, and all data was considered usable without qualification.

Continuous Calibration Verifications (CCVs)

All CCV recoveries were within acceptable limits, as reviewed in the EDD. CCV data were included only in the EDD, not in the case narrative. CCVs were analyzed at the appropriate frequencies.

Internal Standards

Internal standard performance criteria were considered met. No internal standards were noted in the case narrative as outside of acceptance limits.

Surrogate Recovery Results

Surrogate recoveries outside analytical methods and SGS acceptable limits were limited to those discussed below. Surrogate analysis was performed at the required frequencies. Surrogates were not evaluated when samples were analyzed at dilutions of greater than five-fold because the quantitation was not considered accurate.

- The case narrative noted an SW8270D 2-methylnaphthalene-d10 surrogate recovery exceedance. This was likely due to a ten-fold dilution and matrix interference. The parent sample was not associated with this project. No project data was affected.

Laboratory Control Samples and Laboratory Control Sample Duplicates

All LCS and LCSD recoveries and RPDs were within analytical method and SGS percent recovery acceptance limits. LCS and LCSDs were analyzed at the appropriate frequencies.

Matrix Spike and Matrix Spike Duplicate Samples

MS and MSD recovery and RPD exceedances are limited to those discussed below. MS and MSDs were analyzed at the appropriate frequencies. MS/MSDs were not evaluated when samples were analyzed at dilutions of greater than five-fold because the quantitation was not considered accurate.

- For Method SW870D, MS/MSD recoveries and RPDs for several analytes did not meet laboratory criteria. The parent sample was not associated with this project and the exceedances were likely due to analysis at a ten-fold dilution. Since the LCS recovered within acceptable limits for all analytes establishing batch accuracy, no project data was affected. It should be noted that for the analytes with RPD exceedances (fluoranthene, phenanthrene, and pyrene) there was no

acceptable measure of laboratory precision for the batch. Refer to the Field Duplicates section of this QAR for further discussion.

Field Duplicates

The field duplicate sample frequency is presented in Table 4. The parent sample and field duplicate pair is presented in Table 5. Field duplicate RPD exceedances are listed in Table 6 and discussed below.

The RPDs for the field duplicate pair SB2-7-11/SB92-7-11 exceeded the recommended ADEC limit of 50% for soils, as shown in Table 6. Chronologically associated samples are considered impacted and are listed in the table footnotes. Parent samples and field duplicates were qualified as shown in the table, and impacted analytes for chronologically associated samples were qualified “Q” for to indicate an estimated values with unknown bias. Data already "J" flagged as estimated with indeterminate bias (i.e. below the LOQ) were not additionally qualified. In addition, non-detect results were considered not impacted by field precision error and were not qualified since precision would impact the quantity of analyte detected, not the presence or absence.

For all analytes except fluoranthene, phenanthrene, and pyrene, laboratory batch precision was established by an MS/MSD pair with RPDs within acceptable limits; therefore, the impact to data was considered minimal. All impacted fluoranthene, phenanthrene, and pyrene results were over 100-fold below the applicable regulatory criteria; therefore, data usability was not impacted.

In all cases, the higher of the primary sample/duplicate value should be used for reporting purposes. Except for benzo(a)anthracene in primary sample SB2-7-11, all impacted data, were well below cleanup levels; therefore, data usability was not affected. For benzo(a)anthracene, data for duplicate pair SB2-7-11/SB92-7-11 should be considered an exceedance of ADEC criteria and data is usable. All data were usable as qualified.

The frequency satisfied the requirement of one per 10 samples or less per matrix and analyte, and field duplicates were submitted blind to the laboratory. Samples with both results below the LOQ (J flagged or non-detect) were considered acceptable without qualification.

Table 4 Field Duplicate Frequency, Methods, and Analyses

Matrix	Analytical Method	Analyte	Number of Primary Samples	Number of Field Duplicates
Soil	AK101	GRO	5	1
	AK102/103	DRO/RRO	5	1
	SW8260D	PVOCs	5	1
	SW8270D SIM	PAH	5	1
	SM21 2540G	Percent Solids	5	1

Table 5 Field Duplicate Identification

Parent Sample ID	Duplicate Sample ID	All RPDs acceptable (Yes/No)
SB2-7-11	SB92-7-11	No

Table 6 Field Duplicate Precision Exceedances

Method SW8270D	Parent Sample Result (mg/kg) ²	Field Duplicate Result (mg/kg) ²	RPD (%)	Flag (Parent/ Duplicate) ³	Cleanup Level (mg/kg) ¹
Analyte	SB2-7-11	SB92-7-11			
	Dilution = 20x	Dilution = 1x			
Anthracene	3.02	0.0485	197	Q/Q	390
Benzo(a)Anthracene	0.981	0.11	160	Q/Q	0.7
Benzo[a]pyrene ⁴	0.485 J	0.124	119	NA/NA	1.9
Benzo[b]Fluoranthene	0.881	0.236	115	Q/Q	12
Benzo[g,h,i]perylene ⁴	0.164 J	0.0549	100	NA/NA	1900
Benzo[k]fluoranthene ⁴	0.295 J	0.0683	125	NA/NA	120
Chrysene	2.96	0.177	177	Q/Q	600
Fluoranthene	1.03	0.254	121	Q/Q	590
Indeno[1,2,3-c,d] pyrene ⁴	0.183 J	0.0579	104	NA/NA	12
Phenanthrene	0.571	0.0659	159	Q/Q	39
Pyrene	0.749	0.174	125	Q/Q	87

Notes:

Bold indicated an exceedance of the applicable cleanup level.

1 – Lowest of Ingestion, Inhalation, or Migration to Groundwater for the Over 40-Inch Zone is shown.

2 - Samples chronologically associated with this parent sample/duplicate pair are SB1-5, SB1-8, SB1-20, and SB2-5-7.

3 - Impacted analytes with results above the LOQ for the parent/duplicate pair and all associated samples were flagged with a 'Q' to indicate estimated values with unknown bias. Flags were not applicable for non-detects since precision would impact the quantity of analyte detected, not the presence or absence. Results already "J" flagged as estimated with unknown bias due to the low level of detection were not additionally qualified.

4 – Due to sample dilution, the estimated value below the LOQ was greater than the detected value above the LOQ. In this instance the RPD calculation is considered inaccurate. For the impacted analytes there is no measure of field precision. As laboratory precision was acceptable, data were not qualified due to the absence of measured field precision.

Acronyms:

NA – not applicable

Laboratory Duplicate Samples

Laboratory duplicates were analyzed at the appropriate frequency for percent solids. All duplicate RPDs were within acceptable method and SGS limits.

Overall Assessment

Precision, Accuracy, Representativeness, Comparability, and Sensitivity Summary

- Precision: Precision goals were met, except as noted in the MS/MSD and Field Duplicates sections.
- Accuracy: Accuracy goals were met, except as noted in the Surrogate Recovery Results and MS/MSD sections.
- Representativeness: Representativeness goals were met. The samples were collected from planned locations in accordance with applicable requirements and guidance documents.
- Comparability: Comparability goals were met. SGS laboratory in Anchorage provided analytical support for all methods.
- Sensitivity: Sensitivity goals were met except as noted in the Method Blanks, Trip Blanks, and Reporting Limits sections.

This data were considered of good quality and acceptable for use with the limitations and qualifications noted in this QAR. The data were 100% complete with respect to analysis. No data were rejected.

References

Alaska Department of Environmental Conservation (ADEC), 2021. 18 Alaska Administrative Code (AAC) 75, *Oil and Other Hazardous Substances Pollution Control*. November 18.

-----, 2019. ADEC Technical Memorandum, *Minimum Quality Assurance Requirements for Sample Handling, Reports, and Laboratory Data*. October.

United States Environmental Protection Agency (USEPA), 2020. *National Functional Guidelines for Organic Superfund Methods Data Review*. November.

Attachments

Attachment 1 – ADEC Laboratory Data Review Checklist

Attachment 2 – Laboratory Deliverable

Attachment 1

ADEC Laboratory Data Review Checklist

Laboratory Data Review Checklist

Completed By:

Jennifer McLean

Title:

Associate Scientist

Date:

July 14, 2022

Consultant Firm:

SLR International Corporation

Laboratory Name:

SGS North America Inc., Anchorage

Laboratory Report Number:

1222655

Laboratory Report Date:

June 30, 2022

CS Site Name:

Valdez Marine Terminal Ship Escort/Response Vessel System

ADEC File Number:

NA

Hazard Identification Number:

NA

1222655

Laboratory Report Date:

June 30, 2022

CS Site Name:

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

1. Laboratory

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

Yes No N/A Comments:

All samples were submitted to, and all analyses were conducted at SGS North America, Inc. (SGS) in Anchorage. SGS maintains a current Alaska Department of Environmental Conservation (ADEC) Contaminated Sites approval number 17-021 for the applicable analytical methods

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

Yes No N/A Comments:

No samples were transferred.

2. Chain of Custody (CoC)

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

Yes No N/A Comments:

b. Correct analyses requested?

Yes No N/A Comments:

3. Laboratory Sample Receipt Documentation

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

Yes No N/A Comments:

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

Yes No N/A Comments:

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

Yes No N/A Comments:

No issues were 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 N/A Comments:

None were noted.

e. Data quality or usability affected?

Comments:

No affect.

4. Case Narrative

a. Present and understandable?

Yes No N/A Comments:

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

Yes No N/A Comments:

The case narrative noted LCS recoveries for DRO and RRO outside acceptable limits. All LCS's recovered within acceptable limits for these analytes as reviewed in the PDF laboratory report and EDD.

c. Were all corrective actions documented?

Yes No N/A Comments:

No corrective actions were necessary.

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

Comments:

No impact.

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5. Samples Results

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

Yes No N/A Comments:

b. All applicable holding times met?

Yes No N/A Comments:

c. All soils reported on a dry weight basis?

Yes No N/A Comments:

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

Yes No N/A Comments:

Results of non-detect with LODs not meeting applicable cleanup levels were limited to those noted below. LODs were compared to Title 18 of the AAC Chapter 75, Tables B1 and B2, Method Two cleanup levels for the Over 40-Inch Zone and Migration to Groundwater. For fuels, the lowest of ingestion or inhalation for the Over 40-Inch Zone, and the Migration to Groundwater for the Over 40-Inch Zone cleanup levels were used.

For all samples and the trip blank, the LOD for 1,2-dibromoethane by Method SW8260D ranged from 0.000575 milligrams per kilogram (mg/kg) to 0.00108 mg/kg, above the Migration to Groundwater cleanup level of 0.00024 mg/kg. This was due to typical laboratory methodology limitations.

e. Data quality or usability affected?

Where LODs were above cleanup levels due to methodology limitations, it is not possible to state with certainty the absence of 1,2-dibromoethane below the reported LOD, but above the Migration to Groundwater cleanup level. This data is limited in usability for that purpose. Data usability was considered minimally impacted, and all data was considered usable without qualification.

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6. QC Samples

a. Method Blank

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

Yes No N/A Comments:

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

Yes No N/A Comments:

There were two GRO method blank detections between the LOD and LOQ.

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

Comments:

Sample detections within five times that of the associated blank and above the LOQ were considered affected. All associated samples had results that were already estimated values below the LOQ, therefore, no data was affected.

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

Yes No N/A Comments:

No data was affected. All associated samples had results that were already estimated values below the LOQ. No additional qualification was necessary.

v. Data quality or usability affected?

Comments:

No impact.

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

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

Yes No N/A Comments:

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

Yes No N/A Comments:

No inorganics were analyzed.

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

Yes No N/A Comments:

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

Yes No N/A Comments:

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

Comments:

NA

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

Yes No N/A Comments:

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

Comments:

No impact.

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

Note: Leave blank if not required for project

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

Yes No N/A Comments:

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

Yes No N/A Comments:

No inorganics were analyzed.

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

Yes No N/A Comments:

MS/MSDs were not evaluated when samples were analyzed at dilutions of greater than five-fold because the quantitation was not considered accurate.

For Method SW870D, MS/MSD recoveries for several analytes did not meet laboratory criteria. The parent sample was not associated with this project and the exceedances were likely due to analysis at a ten-fold dilution.

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

Yes No N/A Comments:

For Method SW870D, MS/MSD RPDs for fluoranthene, phenanthrene, and pyrene did not meet laboratory criteria. The parent sample was not associated with this project and the exceedances were likely due to analysis at a ten-fold dilution.

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

Comments:

Since the LCS recovered within acceptable limits for all analytes establishing batch accuracy, no project data was affected by the recovery exceedances. It should be noted that for the analytes with RPD exceedances (fluoranthene, phenanthrene, and pyrene) there was no acceptable measure of laboratory precision for the batch. Refer to the 6.f.iii and 6.f.iv for further discussion.

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

Yes No N/A Comments:

As a result of recovery exceedances, no project data were affected.
As a result of RPD exceedances, refer to the 6.f.iii and 6.f.iv for further discussion.

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

Comments:

All data were usable as qualified. Refer to the 6.f.iii and 6.f.iv for further discussion.

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

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

Yes No N/A Comments:

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

Yes No N/A Comments:

All surrogate recoveries analyzed at dilutions of five-fold or less were within acceptable limits. Surrogates were not evaluated when samples were analyzed at dilutions of greater than five-fold because the quantitation was not considered accurate.

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

Yes No N/A Comments:

All surrogate recoveries were acceptable.

iv. Data quality or usability affected?

Comments:

No impact.

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e. Trip Blanks

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

Yes No N/A Comments:

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

Yes No N/A Comments:

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

Yes No N/A Comments:

There was one GRO detection in the trip blank between the LOD and LOQ.

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

Comments:

All associated samples had results that were already estimated values below the LOQ. No additional qualification was necessary. No data was affected

v. Data quality or usability affected?

Comments:

No data was affected.

f. Field Duplicate

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

Yes No N/A Comments:

SB2-7-11 was a duplicate of SB2-7-11.

ii. Submitted blind to lab?

Yes No N/A Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

Yes No N/A Comments:

Primary/duplicate RPDs for the following SW8270D analytes were greater than 50%.

Method SW8270D	Parent Sample Result (mg/kg) ²	Field Duplicate Result (mg/kg) ²	RPD (%)	Flag (Parent/ Duplicate) ³	Cleanup Level (mg/kg) ¹
Analyte	SB2-7-11	SB92-7-11			
	Dilution = 20x	Dilution = 1x			
Anthracene	3.02	0.0485	197	Q/Q	390
Benzo(a)Anthracene	0.981	0.11	160	Q/Q	0.7
Benzo[a]pyrene ⁴	0.485 J	0.124	119	NA/NA	1.9
Benzo[b]Fluoranthene	0.881	0.236	115	Q/Q	12
Benzo[g,h,i]perylene ⁴	0.164 J	0.0549	100	NA/NA	1900
Benzo[k]fluoranthene ⁴	0.295 J	0.0683	125	NA/NA	120
Chrysene	2.96	0.177	177	Q/Q	600
Fluoranthene	1.03	0.254	121	Q/Q	590
Indeno[1,2,3-c,d] pyrene ⁴	0.183 J	0.0579	104	NA/NA	12
Phenanthrene	0.571	0.0659	159	Q/Q	39
Pyrene	0.749	0.174	125	Q/Q	87

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

Comments:

Samples chronologically associated with this parent sample/duplicate pair are SB1-5, SB1-8, SB1-20, and SB2-5-7. Impacted analytes with results above the LOQ for the parent/duplicate pair and all associated samples were flagged with a 'Q' to indicate estimated values with unknown bias. Flags were not applicable for non-detects since precision would impact the quantity of analyte detected, not the presence or absence. Results already 'J' flagged as estimated with unknown bias due to the low level of detection were not additionally qualified.

For benzo[a]pyrene, benzo[g,h,i]perylene, benzo[k]fluoranthene, and indeno[1,2,3-c,d] pyrene due to sample dilution, the estimated value below the LOQ was greater than the detected value above the LOQ. In this instance the RPD calculation is considered inaccurate. For the impacted analytes there is no measure of field precision. As laboratory precision was acceptable, data were not qualified due to the absence of measured field precision.

For all impacted analytes except fluoranthene, phenanthrene, and pyrene, laboratory batch precision was established by an MS/MSD pair with RPDs within acceptable limits; therefore, the impact to data was considered minimal. All impacted fluoranthene, phenanthrene, and pyrene results were over 100-fold below the applicable regulatory criteria; therefore, data usability was not impacted.

In all cases, the higher of the primary sample/duplicate value should be used for reporting purposes. Except for benzo(a)anthracene in primary sample SB2-7-11, all impacted data, were well below cleanup levels; therefore, data usability was not affected. For benzo(a)anthracene, data for duplicate pair SB2-7-11/SB92-7-11 should be considered an exceedance of ADEC criteria and data is usable. All data were usable as qualified.

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

Yes No N/A Comments:

Dedicated or disposable equipment was used for the collection of all samples.

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

Yes No N/A Comments:

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

Comments:

NA

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iii. Data quality or usability affected?

Comments:

No impact.

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

a. Defined and appropriate?

Yes No N/A

Comments:

Attachment 2

Laboratory Deliverable

(Data package and electronic files)

Laboratory Report of Analysis

To: Alyeska Pipeline Srv Co.
543 3rd Ave Suite 235
Fairbanks, AK 99701
(907)452-2252

Report Number: **1222655**

Client Project: **Alyeska SERVS**

Dear Carl Benson,

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
2022.06.30
15:01:42 -08'00'

Justin Nelson
Project Manager
Justin.Nelson@sgs.com

Date

Case Narrative

SGS Client: **Alyeska Pipeline Srv Co.**

SGS Project: **1222655**

Project Name/Site: **Alyeska SERVS**

Project Contact: **Carl Benson**

Refer to sample receipt form for information on sample condition.

LCS for HBN 1837431 [XXX/46388 (1667337) LCS

AK102/103 - LCS recoveries for DRO and RRO do not meet QC criteria. These analytes were not reported above the LOQ in the associated samples.

1222615019MS (1667450) MS

8270D SIM - PAH MS recoveries for several analytes do not meet QC criteria. See LCS for accuracy requirements.

8270D SIM - PAH surrogate recovery for 2-methylnaphthalene-d10 does not meet QC criteria due to matrix interference.

1222615019MSD (1667451) MSD

8270D SIM - PAH MSD recoveries for several analytes do not meet QC criteria. See LCS for accuracy requirements.

8270D SIM - PAH MS/MSD RPDs for several analytes do not meet QC criteria. These analytes were not reported above the LOQ 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.

Print Date: 06/30/2022 2:42:06PM

Report of Manual Integrations

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Analytical Batch</u>	<u>Analyte</u>	<u>Reason</u>
8270D SIM (PAH)				
1222655001	SB1-8	XMS13201	Benzo[b]Fluoranthene	SP
1222655001	SB1-8	XMS13201	Benzo[k]fluoranthene	RP
1222655003	SB1-5	XMS13201	Benzo[b]Fluoranthene	SP
1222655003	SB1-5	XMS13201	Benzo[k]fluoranthene	RP
1222655004	SB2-5-7	XMS13201	Benzo[b]Fluoranthene	SP
1222655004	SB2-5-7	XMS13201	Benzo[k]fluoranthene	RP
1222655005	SB2-7-11	XMS13201	Benzo[b]Fluoranthene	SP
1222655005	SB2-7-11	XMS13201	Benzo[k]fluoranthene	RP
1222655006	SB92-7-11	XMS13201	Benzo[b]Fluoranthene	SP
1222655006	SB92-7-11	XMS13201	Benzo[k]fluoranthene	RP

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, indemnification 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 (Provisionally Certified as of 05/31/2022 for Nitrate as N by SM 4500NO3-F) & Microbiology & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020B, 7470A, 7471B, 8015C, 8021B, 8082A, 8260D, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). SGS is only certified for the analytes listed on our Drinking Water Certification (DW methods: 200.8, 2130B, 2320B, 2510B, 300.0, 4500-CN-C,E, 4500-H-B, 4500-NO3-F, 4500-P-E and 524.2) and only those analytes will be reported to the State of Alaska for compliance. Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

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

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

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
SB1-8	1222655001	05/27/2022	06/01/2022	Soil/Solid (dry weight)
SB1-20	1222655002	05/27/2022	06/01/2022	Soil/Solid (dry weight)
SB1-5	1222655003	05/27/2022	06/01/2022	Soil/Solid (dry weight)
SB2-5-7	1222655004	05/27/2022	06/01/2022	Soil/Solid (dry weight)
SB2-7-11	1222655005	05/27/2022	06/01/2022	Soil/Solid (dry weight)
SB92-7-11	1222655006	05/27/2022	06/01/2022	Soil/Solid (dry weight)
Trip Blank	1222655007	05/27/2022	06/01/2022	Soil/Solid (dry weight)

<u>Method</u>	<u>Method Description</u>
8270D SIM (PAH)	8270 PAH SIM Semi-Volatiles GC/MS
AK102	Diesel/Residual Range Organics
AK103	Diesel/Residual Range Organics
AK101	Gasoline Range Organics (S)
SM21 2540G	Percent Solids SM2540G
SW8260D	VOC 8260 (S) Field Extracted

Print Date: 06/30/2022 2:42:10PM

Detectable Results Summary

Client Sample ID: **SB1-8**
 Lab Sample ID: 1222655001

Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Acenaphthylene	6.87J	ug/kg
Anthracene	12.3J	ug/kg
Benzo(a)Anthracene	34.5	ug/kg
Benzo[a]pyrene	34.0	ug/kg
Benzo[b]Fluoranthene	78.7	ug/kg
Benzo[g,h,i]perylene	14.8J	ug/kg
Benzo[k]fluoranthene	18.5J	ug/kg
Chrysene	44.9	ug/kg
Fluoranthene	53.5	ug/kg
Indeno[1,2,3-c,d] pyrene	16.2J	ug/kg
Phenanthrene	22.6J	ug/kg
Pyrene	27.3	ug/kg
Diesel Range Organics	13.5J	mg/kg
Gasoline Range Organics	1.26J	mg/kg
Naphthalene	12.2J	ug/kg

Semivolatile Organic Fuels

Volatile Fuels

Volatile GC/MS- Petroleum VOC Group

Client Sample ID: **SB1-20**
 Lab Sample ID: 1222655002

Semivolatile Organic Fuels

Volatile Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	13.5J	mg/kg
Gasoline Range Organics	1.77J	mg/kg

Client Sample ID: **SB1-5**
 Lab Sample ID: 1222655003

Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
2-Methylnaphthalene	8.50J	ug/kg
Acenaphthylene	9.45J	ug/kg
Anthracene	52.0	ug/kg
Benzo(a)Anthracene	174	ug/kg
Benzo[a]pyrene	73.0	ug/kg
Benzo[b]Fluoranthene	136	ug/kg
Benzo[g,h,i]perylene	22.7J	ug/kg
Benzo[k]fluoranthene	51.0	ug/kg
Chrysene	232	ug/kg
Dibenzo[a,h]anthracene	6.94J	ug/kg
Fluoranthene	61.4	ug/kg
Fluorene	19.5J	ug/kg
Indeno[1,2,3-c,d] pyrene	24.5J	ug/kg
Naphthalene	8.29J	ug/kg
Phenanthrene	82.0	ug/kg
Pyrene	32.9	ug/kg
Diesel Range Organics	11.3J	mg/kg
Gasoline Range Organics	1.14J	mg/kg
Naphthalene	10.9J	ug/kg

Semivolatile Organic Fuels

Volatile Fuels

Volatile GC/MS- Petroleum VOC Group

Detectable Results Summary

Client Sample ID: **SB2-5-7**

Lab Sample ID: 1222655004

Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Acenaphthylene	15.0J	ug/kg
Anthracene	34.2	ug/kg
Benzo(a)Anthracene	89.6	ug/kg
Benzo[a]pyrene	82.7	ug/kg
Benzo[b]Fluoranthene	165	ug/kg
Benzo[g,h,i]perylene	37.4	ug/kg
Benzo[k]fluoranthene	42.4	ug/kg
Chrysene	117	ug/kg
Dibenzo[a,h]anthracene	10.7J	ug/kg
Fluoranthene	88.2	ug/kg
Fluorene	9.13J	ug/kg
Indeno[1,2,3-c,d] pyrene	39.8	ug/kg
Phenanthrene	54.0	ug/kg
Pyrene	58.8	ug/kg
Diesel Range Organics	11.7J	mg/kg
Gasoline Range Organics	1.62J	mg/kg
Naphthalene	11.4J	ug/kg

Semivolatile Organic Fuels

Volatile Fuels

Volatile GC/MS- Petroleum VOC Group

Client Sample ID: **SB2-7-11**

Lab Sample ID: 1222655005

Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Anthracene	3020	ug/kg
Benzo(a)Anthracene	981	ug/kg
Benzo[a]pyrene	485J	ug/kg
Benzo[b]Fluoranthene	881	ug/kg
Benzo[g,h,i]perylene	164J	ug/kg
Benzo[k]fluoranthene	295J	ug/kg
Chrysene	2960	ug/kg
Fluoranthene	1030	ug/kg
Fluorene	203J	ug/kg
Indeno[1,2,3-c,d] pyrene	183J	ug/kg
Phenanthrene	571	ug/kg
Pyrene	749	ug/kg
Diesel Range Organics	13.3J	mg/kg
Gasoline Range Organics	1.14J	mg/kg

Semivolatile Organic Fuels

Volatile Fuels

Detectable Results Summary

Client Sample ID: **SB92-7-11**

Lab Sample ID: 1222655006

Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Acenaphthylene	25.7J	ug/kg
Anthracene	48.5	ug/kg
Benzo(a)Anthracene	110	ug/kg
Benzo[a]pyrene	124	ug/kg
Benzo[b]Fluoranthene	236	ug/kg
Benzo[g,h,i]perylene	54.9	ug/kg
Benzo[k]fluoranthene	68.3	ug/kg
Chrysene	177	ug/kg
Dibenzo[a,h]anthracene	14.7J	ug/kg
Fluoranthene	254	ug/kg
Fluorene	10.2J	ug/kg
Indeno[1,2,3-c,d] pyrene	57.9	ug/kg
Phenanthrene	65.9	ug/kg
Pyrene	174	ug/kg
Diesel Range Organics	13.1J	mg/kg
Gasoline Range Organics	1.30J	mg/kg
Naphthalene	19.9J	ug/kg

Semivolatile Organic Fuels

Volatile Fuels

Volatile GC/MS- Petroleum VOC Group

Client Sample ID: **Trip Blank**

Lab Sample ID: 1222655007

Volatile Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	1.33J	mg/kg



Results of SB1-8

Client Sample ID: **SB1-8**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655001
 Lab Project ID: 1222655

Collection Date: 05/27/22 12:30
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):97.2
 Location:

Results by Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1-Methylnaphthalene	12.9 U	25.7	6.42	ug/kg	1		06/27/22 16:29
2-Methylnaphthalene	12.9 U	25.7	6.42	ug/kg	1		06/27/22 16:29
Acenaphthene	12.9 U	25.7	6.42	ug/kg	1		06/27/22 16:29
Acenaphthylene	6.87 J	25.7	6.42	ug/kg	1		06/27/22 16:29
Anthracene	12.3 J	25.7	6.42	ug/kg	1		06/27/22 16:29
Benzo(a)Anthracene	34.5	25.7	6.42	ug/kg	1		06/27/22 16:29
Benzo[a]pyrene	34.0	25.7	6.42	ug/kg	1		06/27/22 16:29
Benzo[b]Fluoranthene	78.7	25.7	6.42	ug/kg	1		06/27/22 16:29
Benzo[g,h,i]perylene	14.8 J	25.7	6.42	ug/kg	1		06/27/22 16:29
Benzo[k]fluoranthene	18.5 J	25.7	6.42	ug/kg	1		06/27/22 16:29
Chrysene	44.9	25.7	6.42	ug/kg	1		06/27/22 16:29
Dibenzo[a,h]anthracene	12.9 U	25.7	6.42	ug/kg	1		06/27/22 16:29
Fluoranthene	53.5	25.7	6.42	ug/kg	1		06/27/22 16:29
Fluorene	12.9 U	25.7	6.42	ug/kg	1		06/27/22 16:29
Indeno[1,2,3-c,d] pyrene	16.2 J	25.7	6.42	ug/kg	1		06/27/22 16:29
Naphthalene	10.3 U	20.5	5.14	ug/kg	1		06/27/22 16:29
Phenanthrene	22.6 J	25.7	6.42	ug/kg	1		06/27/22 16:29
Pyrene	27.3	25.7	6.42	ug/kg	1		06/27/22 16:29
Surrogates							
2-Methylnaphthalene-d10 (surr)	78.5	58-103		%	1		06/27/22 16:29
Fluoranthene-d10 (surr)	81.7	54-113		%	1		06/27/22 16:29

Batch Information

Analytical Batch: XMS13201
 Analytical Method: 8270D SIM (PAH)
 Analyst: NRB
 Analytical Date/Time: 06/27/22 16:29
 Container ID: 1222655001-A

Prep Batch: XXX46394
 Prep Method: SW3550C
 Prep Date/Time: 06/10/22 12:06
 Prep Initial Wt./Vol.: 22.536 g
 Prep Extract Vol: 5 mL

Results of SB1-8

Client Sample ID: **SB1-8**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655001
 Lab Project ID: 1222655

Collection Date: 05/27/22 12:30
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):97.2
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	13.5 J	20.3	9.15	mg/kg	1		06/23/22 22:55

Surrogates

5a Androstane (surr)	94.8	50-150		%	1		06/23/22 22:55
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Batch Information

Analytical Batch: XFC16267
 Analytical Method: AK102
 Analyst: MDT
 Analytical Date/Time: 06/23/22 22:55
 Container ID: 1222655001-A

Prep Batch: XXX46388
 Prep Method: SW3550C
 Prep Date/Time: 06/09/22 15:19
 Prep Initial Wt./Vol.: 30.366 g
 Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Residual Range Organics	51.0 U	102	43.7	mg/kg	1		06/23/22 22:55

Surrogates

n-Triacontane-d62 (surr)	90.8	50-150		%	1		06/23/22 22:55
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Batch Information

Analytical Batch: XFC16267
 Analytical Method: AK103
 Analyst: MDT
 Analytical Date/Time: 06/23/22 22:55
 Container ID: 1222655001-A

Prep Batch: XXX46388
 Prep Method: SW3550C
 Prep Date/Time: 06/09/22 15:19
 Prep Initial Wt./Vol.: 30.366 g
 Prep Extract Vol: 5 mL

Results of SB1-8

Client Sample ID: **SB1-8**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655001
 Lab Project ID: 1222655

Collection Date: 05/27/22 12:30
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):97.2
 Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	1.26 J	1.92	0.576	mg/kg	1		06/10/22 20:09
Surrogates							
4-Bromofluorobenzene (surr)	81.4	50-150		%	1		06/10/22 20:09

Batch Information

Analytical Batch: VFC16123
 Analytical Method: AK101
 Analyst: PHK
 Analytical Date/Time: 06/10/22 20:09
 Container ID: 1222655001-B

Prep Batch: VXX38686
 Prep Method: SW5035A
 Prep Date/Time: 05/27/22 12:30
 Prep Initial Wt./Vol.: 72.404 g
 Prep Extract Vol: 27.0385 mL



Results of SB1-8

Client Sample ID: **SB1-8**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655001
 Lab Project ID: 1222655

Collection Date: 05/27/22 12:30
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):97.2
 Location:

Results by Volatile GC/MS- Petroleum VOC Group

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2,4-Trimethylbenzene	38.5 U	76.9	23.1	ug/kg	1		06/03/22 16:08
1,2-Dibromoethane	0.575 U	1.15	0.576	ug/kg	1		06/03/22 16:08
1,2-Dichloroethane	0.770 U	1.54	0.538	ug/kg	1		06/03/22 16:08
1,3,5-Trimethylbenzene	9.60 U	19.2	5.99	ug/kg	1		06/03/22 16:08
Benzene	4.80 U	9.61	3.00	ug/kg	1		06/03/22 16:08
Ethylbenzene	9.60 U	19.2	5.99	ug/kg	1		06/03/22 16:08
Isopropylbenzene (Cumene)	9.60 U	19.2	5.99	ug/kg	1		06/03/22 16:08
Methyl-t-butyl ether	38.5 U	76.9	23.8	ug/kg	1		06/03/22 16:08
Naphthalene	12.2 J	19.2	5.99	ug/kg	1		06/03/22 16:08
n-Butylbenzene	9.60 U	19.2	5.99	ug/kg	1		06/03/22 16:08
o-Xylene	9.60 U	19.2	5.99	ug/kg	1		06/03/22 16:08
P & M -Xylene	19.2 U	38.4	11.5	ug/kg	1		06/03/22 16:08
sec-Butylbenzene	9.60 U	19.2	5.99	ug/kg	1		06/03/22 16:08
tert-Butylbenzene	9.60 U	19.2	5.99	ug/kg	1		06/03/22 16:08
Toluene	9.60 U	19.2	5.99	ug/kg	1		06/03/22 16:08
Xylenes (total)	28.8 U	57.6	17.5	ug/kg	1		06/03/22 16:08
Surrogates							
1,2-Dichloroethane-D4 (surr)	106	71-136		%	1		06/03/22 16:08
4-Bromofluorobenzene (surr)	81.6	55-151		%	1		06/03/22 16:08
Toluene-d8 (surr)	99.1	85-116		%	1		06/03/22 16:08

Batch Information

Analytical Batch: VMS21667
 Analytical Method: SW8260D
 Analyst: S.S
 Analytical Date/Time: 06/03/22 16:08
 Container ID: 1222655001-B

Prep Batch: VXX38653
 Prep Method: SW5035A
 Prep Date/Time: 05/27/22 12:30
 Prep Initial Wt./Vol.: 72.404 g
 Prep Extract Vol: 27.0385 mL

Results of SB1-20

Client Sample ID: **SB1-20**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655002
 Lab Project ID: 1222655

Collection Date: 05/27/22 12:35
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):80.6
 Location:

Results by Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1-Methylnaphthalene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
2-Methylnaphthalene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Acenaphthene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Acenaphthylene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Anthracene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Benzo(a)Anthracene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Benzo[a]pyrene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Benzo[b]Fluoranthene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Benzo[g,h,i]perylene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Benzo[k]fluoranthene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Chrysene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Dibenzo[a,h]anthracene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Fluoranthene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Fluorene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Indeno[1,2,3-c,d] pyrene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Naphthalene	12.3 U	24.5	6.13	ug/kg	1		06/27/22 16:50
Phenanthrene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Pyrene	15.3 U	30.6	7.66	ug/kg	1		06/27/22 16:50
Surrogates							
2-Methylnaphthalene-d10 (surr)	76.5	58-103		%	1		06/27/22 16:50
Fluoranthene-d10 (surr)	78.1	54-113		%	1		06/27/22 16:50

Batch Information

Analytical Batch: XMS13201
 Analytical Method: 8270D SIM (PAH)
 Analyst: NRB
 Analytical Date/Time: 06/27/22 16:50
 Container ID: 1222655002-A

Prep Batch: XXX46394
 Prep Method: SW3550C
 Prep Date/Time: 06/10/22 12:06
 Prep Initial Wt./Vol.: 22.775 g
 Prep Extract Vol: 5 mL

Results of SB1-20

Client Sample ID: **SB1-20**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655002
 Lab Project ID: 1222655

Collection Date: 05/27/22 12:35
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):80.6
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	13.5 J	24.4	11.0	mg/kg	1		06/23/22 23:05

Surrogates

5a Androstane (surr)	102	50-150		%	1		06/23/22 23:05
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Batch Information

Analytical Batch: XFC16267
 Analytical Method: AK102
 Analyst: MDT
 Analytical Date/Time: 06/23/22 23:05
 Container ID: 1222655002-A

Prep Batch: XXX46388
 Prep Method: SW3550C
 Prep Date/Time: 06/09/22 15:19
 Prep Initial Wt./Vol.: 30.461 g
 Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Residual Range Organics	61.0 U	122	52.5	mg/kg	1		06/23/22 23:05

Surrogates

n-Triacontane-d62 (surr)	98	50-150		%	1		06/23/22 23:05
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Batch Information

Analytical Batch: XFC16267
 Analytical Method: AK103
 Analyst: MDT
 Analytical Date/Time: 06/23/22 23:05
 Container ID: 1222655002-A

Prep Batch: XXX46388
 Prep Method: SW3550C
 Prep Date/Time: 06/09/22 15:19
 Prep Initial Wt./Vol.: 30.461 g
 Prep Extract Vol: 5 mL



Results of **SB1-20**

Client Sample ID: **SB1-20**
Client Project ID: **Alyeska SERVS**
Lab Sample ID: 1222655002
Lab Project ID: 1222655

Collection Date: 05/27/22 12:35
Received Date: 06/01/22 14:00
Matrix: Soil/Solid (dry weight)
Solids (%):80.6
Location:

Results by **Volatile Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	1.77 J	3.58	1.07	mg/kg	1		06/10/22 20:28
Surrogates							
4-Bromofluorobenzene (surr)	61	50-150		%	1		06/10/22 20:28

Batch Information

Analytical Batch: VFC16123
Analytical Method: AK101
Analyst: PHK
Analytical Date/Time: 06/10/22 20:28
Container ID: 1222655002-B

Prep Batch: VXX38686
Prep Method: SW5035A
Prep Date/Time: 05/27/22 12:35
Prep Initial Wt./Vol.: 65.224 g
Prep Extract Vol: 37.6265 mL



Results of SB1-20

Client Sample ID: **SB1-20**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655002
 Lab Project ID: 1222655

Collection Date: 05/27/22 12:35
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):80.6
 Location:

Results by Volatile GC/MS- Petroleum VOC Group

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2,4-Trimethylbenzene	71.5 U	143	42.9	ug/kg	1		06/03/22 18:44
1,2-Dibromoethane	1.08 U	2.15	1.07	ug/kg	1		06/03/22 18:44
1,2-Dichloroethane	1.43 U	2.86	1.00	ug/kg	1		06/03/22 18:44
1,3,5-Trimethylbenzene	17.9 U	35.8	11.2	ug/kg	1		06/03/22 18:44
Benzene	8.95 U	17.9	5.58	ug/kg	1		06/03/22 18:44
Ethylbenzene	17.9 U	35.8	11.2	ug/kg	1		06/03/22 18:44
Isopropylbenzene (Cumene)	17.9 U	35.8	11.2	ug/kg	1		06/03/22 18:44
Methyl-t-butyl ether	71.5 U	143	44.4	ug/kg	1		06/03/22 18:44
Naphthalene	17.9 U	35.8	11.2	ug/kg	1		06/03/22 18:44
n-Butylbenzene	17.9 U	35.8	11.2	ug/kg	1		06/03/22 18:44
o-Xylene	17.9 U	35.8	11.2	ug/kg	1		06/03/22 18:44
P & M -Xylene	35.8 U	71.5	21.5	ug/kg	1		06/03/22 18:44
sec-Butylbenzene	17.9 U	35.8	11.2	ug/kg	1		06/03/22 18:44
tert-Butylbenzene	17.9 U	35.8	11.2	ug/kg	1		06/03/22 18:44
Toluene	17.9 U	35.8	11.2	ug/kg	1		06/03/22 18:44
Xylenes (total)	53.5 U	107	32.6	ug/kg	1		06/03/22 18:44
Surrogates							
1,2-Dichloroethane-D4 (surr)	105	71-136		%	1		06/03/22 18:44
4-Bromofluorobenzene (surr)	64	55-151		%	1		06/03/22 18:44
Toluene-d8 (surr)	99.5	85-116		%	1		06/03/22 18:44

Batch Information

Analytical Batch: VMS21667
 Analytical Method: SW8260D
 Analyst: S.S
 Analytical Date/Time: 06/03/22 18:44
 Container ID: 1222655002-B

Prep Batch: VXX38653
 Prep Method: SW5035A
 Prep Date/Time: 05/27/22 12:35
 Prep Initial Wt./Vol.: 65.224 g
 Prep Extract Vol: 37.6265 mL

Results of SB1-5

Client Sample ID: **SB1-5**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655003
 Lab Project ID: 1222655

Collection Date: 05/27/22 13:45
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.4
 Location:

Results by Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1-Methylnaphthalene	12.9 U	25.8	6.46	ug/kg	1		06/27/22 17:10
2-Methylnaphthalene	8.50 J	25.8	6.46	ug/kg	1		06/27/22 17:10
Acenaphthene	12.9 U	25.8	6.46	ug/kg	1		06/27/22 17:10
Acenaphthylene	9.45 J	25.8	6.46	ug/kg	1		06/27/22 17:10
Anthracene	52.0	25.8	6.46	ug/kg	1		06/27/22 17:10
Benzo(a)Anthracene	174	25.8	6.46	ug/kg	1		06/27/22 17:10
Benzo[a]pyrene	73.0	25.8	6.46	ug/kg	1		06/27/22 17:10
Benzo[b]Fluoranthene	136	25.8	6.46	ug/kg	1		06/27/22 17:10
Benzo[g,h,i]perylene	22.7 J	25.8	6.46	ug/kg	1		06/27/22 17:10
Benzo[k]fluoranthene	51.0	25.8	6.46	ug/kg	1		06/27/22 17:10
Chrysene	232	25.8	6.46	ug/kg	1		06/27/22 17:10
Dibenzo[a,h]anthracene	6.94 J	25.8	6.46	ug/kg	1		06/27/22 17:10
Fluoranthene	61.4	25.8	6.46	ug/kg	1		06/27/22 17:10
Fluorene	19.5 J	25.8	6.46	ug/kg	1		06/27/22 17:10
Indeno[1,2,3-c,d] pyrene	24.5 J	25.8	6.46	ug/kg	1		06/27/22 17:10
Naphthalene	8.29 J	20.7	5.16	ug/kg	1		06/27/22 17:10
Phenanthrene	82.0	25.8	6.46	ug/kg	1		06/27/22 17:10
Pyrene	32.9	25.8	6.46	ug/kg	1		06/27/22 17:10
Surrogates							
2-Methylnaphthalene-d10 (surr)	81	58-103		%	1		06/27/22 17:10
Fluoranthene-d10 (surr)	80.1	54-113		%	1		06/27/22 17:10

Batch Information

Analytical Batch: XMS13201
 Analytical Method: 8270D SIM (PAH)
 Analyst: NRB
 Analytical Date/Time: 06/27/22 17:10
 Container ID: 1222655003-A

Prep Batch: XXX46394
 Prep Method: SW3550C
 Prep Date/Time: 06/10/22 12:06
 Prep Initial Wt./Vol.: 22.593 g
 Prep Extract Vol: 5 mL



Results of **SB1-5**

Client Sample ID: **SB1-5**
Client Project ID: **Alyeska SERVS**
Lab Sample ID: 1222655003
Lab Project ID: 1222655

Collection Date: 05/27/22 13:45
Received Date: 06/01/22 14:00
Matrix: Soil/Solid (dry weight)
Solids (%):96.4
Location:

Results by **Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	11.3 J	20.5	9.23	mg/kg	1		06/23/22 23:15

Surrogates

5a Androstane (surr)	77.7	50-150		%	1		06/23/22 23:15
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Batch Information

Analytical Batch: XFC16267
Analytical Method: AK102
Analyst: MDT
Analytical Date/Time: 06/23/22 23:15
Container ID: 1222655003-A

Prep Batch: XXX46388
Prep Method: SW3550C
Prep Date/Time: 06/09/22 15:19
Prep Initial Wt./Vol.: 30.341 g
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Residual Range Organics	51.5 U	103	44.1	mg/kg	1		06/23/22 23:15

Surrogates

n-Triacontane-d62 (surr)	73.2	50-150		%	1		06/23/22 23:15
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Batch Information

Analytical Batch: XFC16267
Analytical Method: AK103
Analyst: MDT
Analytical Date/Time: 06/23/22 23:15
Container ID: 1222655003-A

Prep Batch: XXX46388
Prep Method: SW3550C
Prep Date/Time: 06/09/22 15:19
Prep Initial Wt./Vol.: 30.341 g
Prep Extract Vol: 5 mL

Results of SB1-5

Client Sample ID: **SB1-5**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655003
 Lab Project ID: 1222655

Collection Date: 05/27/22 13:45
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.4
 Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	1.14 J	2.11	0.633	mg/kg	1		06/10/22 20:46
Surrogates							
4-Bromofluorobenzene (surr)	83.9	50-150		%	1		06/10/22 20:46

Batch Information

Analytical Batch: VFC16123
 Analytical Method: AK101
 Analyst: PHK
 Analytical Date/Time: 06/10/22 20:46
 Container ID: 1222655003-B

Prep Batch: VXX38686
 Prep Method: SW5035A
 Prep Date/Time: 05/27/22 13:45
 Prep Initial Wt./Vol.: 67.407 g
 Prep Extract Vol: 27.4187 mL



Results of SB1-5

Client Sample ID: **SB1-5**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655003
 Lab Project ID: 1222655

Collection Date: 05/27/22 13:45
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.4
 Location:

Results by Volatile GC/MS- Petroleum VOC Group

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2,4-Trimethylbenzene	42.2 U	84.4	25.3	ug/kg	1		06/03/22 19:02
1,2-Dibromoethane	0.635 U	1.27	0.633	ug/kg	1		06/03/22 19:02
1,2-Dichloroethane	0.845 U	1.69	0.591	ug/kg	1		06/03/22 19:02
1,3,5-Trimethylbenzene	10.6 U	21.1	6.58	ug/kg	1		06/03/22 19:02
Benzene	5.25 U	10.5	3.29	ug/kg	1		06/03/22 19:02
Ethylbenzene	10.6 U	21.1	6.58	ug/kg	1		06/03/22 19:02
Isopropylbenzene (Cumene)	10.6 U	21.1	6.58	ug/kg	1		06/03/22 19:02
Methyl-t-butyl ether	42.2 U	84.4	26.2	ug/kg	1		06/03/22 19:02
Naphthalene	10.9 J	21.1	6.58	ug/kg	1		06/03/22 19:02
n-Butylbenzene	10.6 U	21.1	6.58	ug/kg	1		06/03/22 19:02
o-Xylene	10.6 U	21.1	6.58	ug/kg	1		06/03/22 19:02
P & M -Xylene	21.1 U	42.2	12.7	ug/kg	1		06/03/22 19:02
sec-Butylbenzene	10.6 U	21.1	6.58	ug/kg	1		06/03/22 19:02
tert-Butylbenzene	10.6 U	21.1	6.58	ug/kg	1		06/03/22 19:02
Toluene	10.6 U	21.1	6.58	ug/kg	1		06/03/22 19:02
Xylenes (total)	31.6 U	63.3	19.2	ug/kg	1		06/03/22 19:02
Surrogates							
1,2-Dichloroethane-D4 (surr)	106	71-136		%	1		06/03/22 19:02
4-Bromofluorobenzene (surr)	83.5	55-151		%	1		06/03/22 19:02
Toluene-d8 (surr)	100	85-116		%	1		06/03/22 19:02

Batch Information

Analytical Batch: VMS21667
 Analytical Method: SW8260D
 Analyst: S.S
 Analytical Date/Time: 06/03/22 19:02
 Container ID: 1222655003-B

Prep Batch: VXX38653
 Prep Method: SW5035A
 Prep Date/Time: 05/27/22 13:45
 Prep Initial Wt./Vol.: 67.407 g
 Prep Extract Vol: 27.4187 mL



Results of SB2-5-7

Client Sample ID: **SB2-5-7**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655004
 Lab Project ID: 1222655

Collection Date: 05/27/22 14:30
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.6
 Location:

Results by Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1-Methylnaphthalene	12.9 U	25.8	6.46	ug/kg	1		06/27/22 17:31
2-Methylnaphthalene	12.9 U	25.8	6.46	ug/kg	1		06/27/22 17:31
Acenaphthene	12.9 U	25.8	6.46	ug/kg	1		06/27/22 17:31
Acenaphthylene	15.0 J	25.8	6.46	ug/kg	1		06/27/22 17:31
Anthracene	34.2	25.8	6.46	ug/kg	1		06/27/22 17:31
Benzo(a)Anthracene	89.6	25.8	6.46	ug/kg	1		06/27/22 17:31
Benzo[a]pyrene	82.7	25.8	6.46	ug/kg	1		06/27/22 17:31
Benzo[b]Fluoranthene	165	25.8	6.46	ug/kg	1		06/27/22 17:31
Benzo[g,h,i]perylene	37.4	25.8	6.46	ug/kg	1		06/27/22 17:31
Benzo[k]fluoranthene	42.4	25.8	6.46	ug/kg	1		06/27/22 17:31
Chrysene	117	25.8	6.46	ug/kg	1		06/27/22 17:31
Dibenzo[a,h]anthracene	10.7 J	25.8	6.46	ug/kg	1		06/27/22 17:31
Fluoranthene	88.2	25.8	6.46	ug/kg	1		06/27/22 17:31
Fluorene	9.13 J	25.8	6.46	ug/kg	1		06/27/22 17:31
Indeno[1,2,3-c,d] pyrene	39.8	25.8	6.46	ug/kg	1		06/27/22 17:31
Naphthalene	10.4 U	20.7	5.17	ug/kg	1		06/27/22 17:31
Phenanthrene	54.0	25.8	6.46	ug/kg	1		06/27/22 17:31
Pyrene	58.8	25.8	6.46	ug/kg	1		06/27/22 17:31
Surrogates							
2-Methylnaphthalene-d10 (surr)	81.8	58-103		%	1		06/27/22 17:31
Fluoranthene-d10 (surr)	85.7	54-113		%	1		06/27/22 17:31

Batch Information

Analytical Batch: XMS13201
 Analytical Method: 8270D SIM (PAH)
 Analyst: NRB
 Analytical Date/Time: 06/27/22 17:31
 Container ID: 1222655004-A

Prep Batch: XXX46394
 Prep Method: SW3550C
 Prep Date/Time: 06/10/22 12:06
 Prep Initial Wt./Vol.: 22.548 g
 Prep Extract Vol: 5 mL



Results of **SB2-5-7**

Client Sample ID: **SB2-5-7**
Client Project ID: **Alyeska SERVS**
Lab Sample ID: 1222655004
Lab Project ID: 1222655

Collection Date: 05/27/22 14:30
Received Date: 06/01/22 14:00
Matrix: Soil/Solid (dry weight)
Solids (%):96.6
Location:

Results by **Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	11.7 J	20.6	9.26	mg/kg	1		06/23/22 23:25

Surrogates

5a Androstane (surr)	83.7	50-150		%	1		06/23/22 23:25
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Batch Information

Analytical Batch: XFC16267
Analytical Method: AK102
Analyst: MDT
Analytical Date/Time: 06/23/22 23:25
Container ID: 1222655004-A

Prep Batch: XXX46388
Prep Method: SW3550C
Prep Date/Time: 06/09/22 15:19
Prep Initial Wt./Vol.: 30.176 g
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Residual Range Organics	51.5 U	103	44.3	mg/kg	1		06/23/22 23:25

Surrogates

n-Triacontane-d62 (surr)	78.1	50-150		%	1		06/23/22 23:25
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Batch Information

Analytical Batch: XFC16267
Analytical Method: AK103
Analyst: MDT
Analytical Date/Time: 06/23/22 23:25
Container ID: 1222655004-A

Prep Batch: XXX46388
Prep Method: SW3550C
Prep Date/Time: 06/09/22 15:19
Prep Initial Wt./Vol.: 30.176 g
Prep Extract Vol: 5 mL

Results of SB2-5-7

Client Sample ID: **SB2-5-7**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655004
 Lab Project ID: 1222655

Collection Date: 05/27/22 14:30
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.6
 Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	1.62 J	3.14	0.943	mg/kg	1		06/13/22 21:53
Surrogates							
4-Bromofluorobenzene (surr)	84.8	50-150		%	1		06/13/22 21:53

Batch Information

Analytical Batch: VFC16125
 Analytical Method: AK101
 Analyst: PHK
 Analytical Date/Time: 06/13/22 21:53
 Container ID: 1222655004-B

Prep Batch: VXX38696
 Prep Method: SW5035A
 Prep Date/Time: 05/27/22 14:30
 Prep Initial Wt./Vol.: 43.602 g
 Prep Extract Vol: 26.4868 mL



Results of **SB2-5-7**

Client Sample ID: **SB2-5-7**
Client Project ID: **Alyeska SERVS**
Lab Sample ID: 1222655004
Lab Project ID: 1222655

Collection Date: 05/27/22 14:30
Received Date: 06/01/22 14:00
Matrix: Soil/Solid (dry weight)
Solids (%):96.6
Location:

Results by **Volatile GC/MS- Petroleum VOC Group**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2,4-Trimethylbenzene	63.0 U	126	37.7	ug/kg	1		06/03/22 19:19
1,2-Dibromoethane	0.945 U	1.89	0.943	ug/kg	1		06/03/22 19:19
1,2-Dichloroethane	1.26 U	2.52	0.880	ug/kg	1		06/03/22 19:19
1,3,5-Trimethylbenzene	15.7 U	31.4	9.81	ug/kg	1		06/03/22 19:19
Benzene	7.85 U	15.7	4.91	ug/kg	1		06/03/22 19:19
Ethylbenzene	15.7 U	31.4	9.81	ug/kg	1		06/03/22 19:19
Isopropylbenzene (Cumene)	15.7 U	31.4	9.81	ug/kg	1		06/03/22 19:19
Methyl-t-butyl ether	63.0 U	126	39.0	ug/kg	1		06/03/22 19:19
Naphthalene	11.4 J	31.4	9.81	ug/kg	1		06/03/22 19:19
n-Butylbenzene	15.7 U	31.4	9.81	ug/kg	1		06/03/22 19:19
o-Xylene	15.7 U	31.4	9.81	ug/kg	1		06/03/22 19:19
P & M -Xylene	31.4 U	62.9	18.9	ug/kg	1		06/03/22 19:19
sec-Butylbenzene	15.7 U	31.4	9.81	ug/kg	1		06/03/22 19:19
tert-Butylbenzene	15.7 U	31.4	9.81	ug/kg	1		06/03/22 19:19
Toluene	15.7 U	31.4	9.81	ug/kg	1		06/03/22 19:19
Xylenes (total)	47.1 U	94.3	28.7	ug/kg	1		06/03/22 19:19
Surrogates							
1,2-Dichloroethane-D4 (surr)	106	71-136		%	1		06/03/22 19:19
4-Bromofluorobenzene (surr)	84.3	55-151		%	1		06/03/22 19:19
Toluene-d8 (surr)	100	85-116		%	1		06/03/22 19:19

Batch Information

Analytical Batch: VMS21667
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 06/03/22 19:19
Container ID: 1222655004-B

Prep Batch: VXX38653
Prep Method: SW5035A
Prep Date/Time: 05/27/22 14:30
Prep Initial Wt./Vol.: 43.602 g
Prep Extract Vol: 26.4868 mL



Results of **SB2-7-11**

Client Sample ID: **SB2-7-11**
Client Project ID: **Alyeska SERVS**
Lab Sample ID: 1222655005
Lab Project ID: 1222655

Collection Date: 05/27/22 14:15
Received Date: 06/01/22 14:00
Matrix: Soil/Solid (dry weight)
Solids (%):96.2
Location:

Results by **Polynuclear Aromatics GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1-Methylnaphthalene	258 U	516	129	ug/kg	20		06/27/22 21:17
2-Methylnaphthalene	258 U	516	129	ug/kg	20		06/27/22 21:17
Acenaphthene	258 U	516	129	ug/kg	20		06/27/22 21:17
Acenaphthylene	258 U	516	129	ug/kg	20		06/27/22 21:17
Anthracene	3020	516	129	ug/kg	20		06/27/22 21:17
Benzo(a)Anthracene	981	516	129	ug/kg	20		06/27/22 21:17
Benzo[a]pyrene	485 J	516	129	ug/kg	20		06/27/22 21:17
Benzo[b]Fluoranthene	881	516	129	ug/kg	20		06/27/22 21:17
Benzo[g,h,i]perylene	164 J	516	129	ug/kg	20		06/27/22 21:17
Benzo[k]fluoranthene	295 J	516	129	ug/kg	20		06/27/22 21:17
Chrysene	2960	516	129	ug/kg	20		06/27/22 21:17
Dibenzo[a,h]anthracene	258 U	516	129	ug/kg	20		06/27/22 21:17
Fluoranthene	1030	516	129	ug/kg	20		06/27/22 21:17
Fluorene	203 J	516	129	ug/kg	20		06/27/22 21:17
Indeno[1,2,3-c,d] pyrene	183 J	516	129	ug/kg	20		06/27/22 21:17
Naphthalene	207 U	413	103	ug/kg	20		06/27/22 21:17
Phenanthrene	571	516	129	ug/kg	20		06/27/22 21:17
Pyrene	749	516	129	ug/kg	20		06/27/22 21:17
Surrogates							
2-Methylnaphthalene-d10 (surr)	69.6	58-103		%	20		06/27/22 21:17
Fluoranthene-d10 (surr)	79.7	54-113		%	20		06/27/22 21:17

Batch Information

Analytical Batch: XMS13201
Analytical Method: 8270D SIM (PAH)
Analyst: NRB
Analytical Date/Time: 06/27/22 21:17
Container ID: 1222655005-A

Prep Batch: XXX46394
Prep Method: SW3550C
Prep Date/Time: 06/10/22 12:06
Prep Initial Wt./Vol.: 22.661 g
Prep Extract Vol: 5 mL

Results of SB2-7-11

Client Sample ID: **SB2-7-11**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655005
 Lab Project ID: 1222655

Collection Date: 05/27/22 14:15
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.2
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	13.3 J	20.6	9.27	mg/kg	1		06/23/22 23:36
Surrogates							
5a Androstane (surr)	75.8	50-150		%	1		06/23/22 23:36

Batch Information

Analytical Batch: XFC16267
 Analytical Method: AK102
 Analyst: MDT
 Analytical Date/Time: 06/23/22 23:36
 Container ID: 1222655005-A

Prep Batch: XXX46388
 Prep Method: SW3550C
 Prep Date/Time: 06/09/22 15:19
 Prep Initial Wt./Vol.: 30.284 g
 Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Residual Range Organics	51.5 U	103	44.3	mg/kg	1		06/23/22 23:36
Surrogates							
n-Triacontane-d62 (surr)	71.5	50-150		%	1		06/23/22 23:36

Batch Information

Analytical Batch: XFC16267
 Analytical Method: AK103
 Analyst: MDT
 Analytical Date/Time: 06/23/22 23:36
 Container ID: 1222655005-A

Prep Batch: XXX46388
 Prep Method: SW3550C
 Prep Date/Time: 06/09/22 15:19
 Prep Initial Wt./Vol.: 30.284 g
 Prep Extract Vol: 5 mL

Results of SB2-7-11

Client Sample ID: **SB2-7-11**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655005
 Lab Project ID: 1222655

Collection Date: 05/27/22 14:15
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.2
 Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	1.14 J	2.31	0.694	mg/kg	1		06/13/22 22:11
Surrogates							
4-Bromofluorobenzene (surr)	86.9	50-150		%	1		06/13/22 22:11

Batch Information

Analytical Batch: VFC16125
 Analytical Method: AK101
 Analyst: PHK
 Analytical Date/Time: 06/13/22 22:11
 Container ID: 1222655005-B

Prep Batch: VXX38696
 Prep Method: SW5035A
 Prep Date/Time: 05/27/22 14:15
 Prep Initial Wt./Vol.: 61.477 g
 Prep Extract Vol: 27.3469 mL

Results of SB2-7-11

Client Sample ID: **SB2-7-11**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655005
 Lab Project ID: 1222655

Collection Date: 05/27/22 14:15
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.2
 Location:

Results by Volatile GC/MS- Petroleum VOC Group

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2,4-Trimethylbenzene	46.3 U	92.5	27.7	ug/kg	1		06/03/22 19:36
1,2-Dibromoethane	0.695 U	1.39	0.694	ug/kg	1		06/03/22 19:36
1,2-Dichloroethane	0.925 U	1.85	0.647	ug/kg	1		06/03/22 19:36
1,3,5-Trimethylbenzene	11.6 U	23.1	7.21	ug/kg	1		06/03/22 19:36
Benzene	5.80 U	11.6	3.61	ug/kg	1		06/03/22 19:36
Ethylbenzene	11.6 U	23.1	7.21	ug/kg	1		06/03/22 19:36
Isopropylbenzene (Cumene)	11.6 U	23.1	7.21	ug/kg	1		06/03/22 19:36
Methyl-t-butyl ether	46.3 U	92.5	28.7	ug/kg	1		06/03/22 19:36
Naphthalene	11.6 U	23.1	7.21	ug/kg	1		06/03/22 19:36
n-Butylbenzene	11.6 U	23.1	7.21	ug/kg	1		06/03/22 19:36
o-Xylene	11.6 U	23.1	7.21	ug/kg	1		06/03/22 19:36
P & M -Xylene	23.1 U	46.2	13.9	ug/kg	1		06/03/22 19:36
sec-Butylbenzene	11.6 U	23.1	7.21	ug/kg	1		06/03/22 19:36
tert-Butylbenzene	11.6 U	23.1	7.21	ug/kg	1		06/03/22 19:36
Toluene	11.6 U	23.1	7.21	ug/kg	1		06/03/22 19:36
Xylenes (total)	34.7 U	69.4	21.1	ug/kg	1		06/03/22 19:36
Surrogates							
1,2-Dichloroethane-D4 (surr)	106	71-136		%	1		06/03/22 19:36
4-Bromofluorobenzene (surr)	80.5	55-151		%	1		06/03/22 19:36
Toluene-d8 (surr)	99.2	85-116		%	1		06/03/22 19:36

Batch Information

Analytical Batch: VMS21667
 Analytical Method: SW8260D
 Analyst: S.S
 Analytical Date/Time: 06/03/22 19:36
 Container ID: 1222655005-B

Prep Batch: VXX38653
 Prep Method: SW5035A
 Prep Date/Time: 05/27/22 14:15
 Prep Initial Wt./Vol.: 61.477 g
 Prep Extract Vol: 27.3469 mL



Results of **SB92-7-11**

Client Sample ID: **SB92-7-11**
Client Project ID: **Alyeska SERVS**
Lab Sample ID: 1222655006
Lab Project ID: 1222655

Collection Date: 05/27/22 18:00
Received Date: 06/01/22 14:00
Matrix: Soil/Solid (dry weight)
Solids (%):96.1
Location:

Results by **Polynuclear Aromatics GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1-Methylnaphthalene	12.9 U	25.8	6.45	ug/kg	1		06/27/22 18:12
2-Methylnaphthalene	12.9 U	25.8	6.45	ug/kg	1		06/27/22 18:12
Acenaphthene	12.9 U	25.8	6.45	ug/kg	1		06/27/22 18:12
Acenaphthylene	25.7 J	25.8	6.45	ug/kg	1		06/27/22 18:12
Anthracene	48.5	25.8	6.45	ug/kg	1		06/27/22 18:12
Benzo(a)Anthracene	110	25.8	6.45	ug/kg	1		06/27/22 18:12
Benzo[a]pyrene	124	25.8	6.45	ug/kg	1		06/27/22 18:12
Benzo[b]Fluoranthene	236	25.8	6.45	ug/kg	1		06/27/22 18:12
Benzo[g,h,i]perylene	54.9	25.8	6.45	ug/kg	1		06/27/22 18:12
Benzo[k]fluoranthene	68.3	25.8	6.45	ug/kg	1		06/27/22 18:12
Chrysene	177	25.8	6.45	ug/kg	1		06/27/22 18:12
Dibenzo[a,h]anthracene	14.7 J	25.8	6.45	ug/kg	1		06/27/22 18:12
Fluoranthene	254	25.8	6.45	ug/kg	1		06/27/22 18:12
Fluorene	10.2 J	25.8	6.45	ug/kg	1		06/27/22 18:12
Indeno[1,2,3-c,d] pyrene	57.9	25.8	6.45	ug/kg	1		06/27/22 18:12
Naphthalene	10.3 U	20.6	5.16	ug/kg	1		06/27/22 18:12
Phenanthrene	65.9	25.8	6.45	ug/kg	1		06/27/22 18:12
Pyrene	174	25.8	6.45	ug/kg	1		06/27/22 18:12
Surrogates							
2-Methylnaphthalene-d10 (surr)	76	58-103		%	1		06/27/22 18:12
Fluoranthene-d10 (surr)	79.2	54-113		%	1		06/27/22 18:12

Batch Information

Analytical Batch: XMS13201
Analytical Method: 8270D SIM (PAH)
Analyst: NRB
Analytical Date/Time: 06/27/22 18:12
Container ID: 1222655006-A

Prep Batch: XXX46394
Prep Method: SW3550C
Prep Date/Time: 06/10/22 12:06
Prep Initial Wt./Vol.: 22.689 g
Prep Extract Vol: 5 mL



Results of **SB92-7-11**

Client Sample ID: **SB92-7-11**
Client Project ID: **Alyeska SERVS**
Lab Sample ID: 1222655006
Lab Project ID: 1222655

Collection Date: 05/27/22 18:00
Received Date: 06/01/22 14:00
Matrix: Soil/Solid (dry weight)
Solids (%):96.1
Location:

Results by **Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	13.1 J	20.7	9.30	mg/kg	1		06/23/22 23:46

Surrogates

5a Androstane (surr)	84.9	50-150		%	1		06/23/22 23:46
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Batch Information

Analytical Batch: XFC16267
Analytical Method: AK102
Analyst: MDT
Analytical Date/Time: 06/23/22 23:46
Container ID: 1222655006-A

Prep Batch: XXX46388
Prep Method: SW3550C
Prep Date/Time: 06/09/22 15:19
Prep Initial Wt./Vol.: 30.196 g
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Residual Range Organics	51.5 U	103	44.4	mg/kg	1		06/23/22 23:46

Surrogates

n-Triacontane-d62 (surr)	78.6	50-150		%	1		06/23/22 23:46
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Batch Information

Analytical Batch: XFC16267
Analytical Method: AK103
Analyst: MDT
Analytical Date/Time: 06/23/22 23:46
Container ID: 1222655006-A

Prep Batch: XXX46388
Prep Method: SW3550C
Prep Date/Time: 06/09/22 15:19
Prep Initial Wt./Vol.: 30.196 g
Prep Extract Vol: 5 mL



Results of **SB92-7-11**

Client Sample ID: **SB92-7-11**
Client Project ID: **Alyeska SERVS**
Lab Sample ID: 1222655006
Lab Project ID: 1222655

Collection Date: 05/27/22 18:00
Received Date: 06/01/22 14:00
Matrix: Soil/Solid (dry weight)
Solids (%):96.1
Location:

Results by **Volatile Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	1.30 J	2.67	0.802	mg/kg	1		06/13/22 22:29
Surrogates							
4-Bromofluorobenzene (surr)	82.9	50-150		%	1		06/13/22 22:29

Batch Information

Analytical Batch: VFC16125
Analytical Method: AK101
Analyst: PHK
Analytical Date/Time: 06/13/22 22:29
Container ID: 1222655006-B

Prep Batch: VXX38696
Prep Method: SW5035A
Prep Date/Time: 05/27/22 18:00
Prep Initial Wt./Vol.: 52.594 g
Prep Extract Vol: 27.0287 mL

Results of SB92-7-11

Client Sample ID: **SB92-7-11**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655006
 Lab Project ID: 1222655

Collection Date: 05/27/22 18:00
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):96.1
 Location:

Results by Volatile GC/MS- Petroleum VOC Group

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2,4-Trimethylbenzene	53.5 U	107	32.1	ug/kg	1		06/03/22 19:54
1,2-Dibromoethane	0.800 U	1.60	0.802	ug/kg	1		06/03/22 19:54
1,2-Dichloroethane	1.07 U	2.14	0.748	ug/kg	1		06/03/22 19:54
1,3,5-Trimethylbenzene	13.4 U	26.7	8.34	ug/kg	1		06/03/22 19:54
Benzene	6.70 U	13.4	4.17	ug/kg	1		06/03/22 19:54
Ethylbenzene	13.4 U	26.7	8.34	ug/kg	1		06/03/22 19:54
Isopropylbenzene (Cumene)	13.4 U	26.7	8.34	ug/kg	1		06/03/22 19:54
Methyl-t-butyl ether	53.5 U	107	33.1	ug/kg	1		06/03/22 19:54
Naphthalene	19.9 J	26.7	8.34	ug/kg	1		06/03/22 19:54
n-Butylbenzene	13.4 U	26.7	8.34	ug/kg	1		06/03/22 19:54
o-Xylene	13.4 U	26.7	8.34	ug/kg	1		06/03/22 19:54
P & M -Xylene	26.8 U	53.5	16.0	ug/kg	1		06/03/22 19:54
sec-Butylbenzene	13.4 U	26.7	8.34	ug/kg	1		06/03/22 19:54
tert-Butylbenzene	13.4 U	26.7	8.34	ug/kg	1		06/03/22 19:54
Toluene	13.4 U	26.7	8.34	ug/kg	1		06/03/22 19:54
Xylenes (total)	40.1 U	80.2	24.4	ug/kg	1		06/03/22 19:54
Surrogates							
1,2-Dichloroethane-D4 (surr)	106	71-136		%	1		06/03/22 19:54
4-Bromofluorobenzene (surr)	83	55-151		%	1		06/03/22 19:54
Toluene-d8 (surr)	98.4	85-116		%	1		06/03/22 19:54

Batch Information

Analytical Batch: VMS21667
 Analytical Method: SW8260D
 Analyst: S.S
 Analytical Date/Time: 06/03/22 19:54
 Container ID: 1222655006-B

Prep Batch: VXX38653
 Prep Method: SW5035A
 Prep Date/Time: 05/27/22 18:00
 Prep Initial Wt./Vol.: 52.594 g
 Prep Extract Vol: 27.0287 mL

Results of Trip Blank

Client Sample ID: **Trip Blank**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655007
 Lab Project ID: 1222655

Collection Date: 05/27/22 06:00
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):
 Location:

Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	1.33 J	2.52	0.756	mg/kg	1		06/10/22 15:47
Surrogates							
4-Bromofluorobenzene (surr)	82.1	50-150		%	1		06/10/22 15:47

Batch Information

Analytical Batch: VFC16123
 Analytical Method: AK101
 Analyst: PHK
 Analytical Date/Time: 06/10/22 15:47
 Container ID: 1222655007-A

Prep Batch: VXX38686
 Prep Method: SW5035A
 Prep Date/Time: 05/27/22 06:00
 Prep Initial Wt./Vol.: 49.589 g
 Prep Extract Vol: 25 mL



Results of Trip Blank

Client Sample ID: **Trip Blank**
 Client Project ID: **Alyeska SERVS**
 Lab Sample ID: 1222655007
 Lab Project ID: 1222655

Collection Date: 05/27/22 06:00
 Received Date: 06/01/22 14:00
 Matrix: Soil/Solid (dry weight)
 Solids (%):
 Location:

Results by Volatile GC/MS- Petroleum VOC Group

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1,2,4-Trimethylbenzene	50.5 U	101	30.2	ug/kg	1		06/03/22 15:17
1,2-Dibromoethane	0.755 U	1.51	0.756	ug/kg	1		06/03/22 15:17
1,2-Dichloroethane	1.01 U	2.02	0.706	ug/kg	1		06/03/22 15:17
1,3,5-Trimethylbenzene	12.6 U	25.2	7.86	ug/kg	1		06/03/22 15:17
Benzene	6.30 U	12.6	3.93	ug/kg	1		06/03/22 15:17
Ethylbenzene	12.6 U	25.2	7.86	ug/kg	1		06/03/22 15:17
Isopropylbenzene (Cumene)	12.6 U	25.2	7.86	ug/kg	1		06/03/22 15:17
Methyl-t-butyl ether	50.5 U	101	31.3	ug/kg	1		06/03/22 15:17
Naphthalene	12.6 U	25.2	7.86	ug/kg	1		06/03/22 15:17
n-Butylbenzene	12.6 U	25.2	7.86	ug/kg	1		06/03/22 15:17
o-Xylene	12.6 U	25.2	7.86	ug/kg	1		06/03/22 15:17
P & M -Xylene	25.2 U	50.4	15.1	ug/kg	1		06/03/22 15:17
sec-Butylbenzene	12.6 U	25.2	7.86	ug/kg	1		06/03/22 15:17
tert-Butylbenzene	12.6 U	25.2	7.86	ug/kg	1		06/03/22 15:17
Toluene	12.6 U	25.2	7.86	ug/kg	1		06/03/22 15:17
Xylenes (total)	37.8 U	75.6	23.0	ug/kg	1		06/03/22 15:17
Surrogates							
1,2-Dichloroethane-D4 (surr)	105	71-136		%	1		06/03/22 15:17
4-Bromofluorobenzene (surr)	82.1	55-151		%	1		06/03/22 15:17
Toluene-d8 (surr)	98.8	85-116		%	1		06/03/22 15:17

Batch Information

Analytical Batch: VMS21667
 Analytical Method: SW8260D
 Analyst: S.S
 Analytical Date/Time: 06/03/22 15:17
 Container ID: 1222655007-A

Prep Batch: VXX38653
 Prep Method: SW5035A
 Prep Date/Time: 05/27/22 06:00
 Prep Initial Wt./Vol.: 49.589 g
 Prep Extract Vol: 25 mL



Method Blank

Blank ID: MB for HBN 1837135 [SPT/11535]
Blank Lab ID: 1666714

Matrix: Soil/Solid (dry weight)

QC for Samples:
1222655001, 1222655002, 1222655003, 1222655004, 1222655005, 1222655006

Results by SM21 2540G

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Total Solids	100			%

Batch Information

Analytical Batch: SPT11535
Analytical Method: SM21 2540G
Instrument:
Analyst: BRP
Analytical Date/Time: 6/4/2022 1:04:00PM

Print Date: 06/30/2022 2:42:15PM

Duplicate Sample Summary

Original Sample ID: 1222616003

Duplicate Sample ID: 1666718

QC for Samples:

Analysis Date: 06/04/2022 13:04

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	89.1	88.3	%	0.88	(< 15)

Batch Information

Analytical Batch: SPT11535

Analytical Method: SM21 2540G

Instrument:

Analyst: BRP

Print Date: 06/30/2022 2:42:16PM

Duplicate Sample Summary

Original Sample ID: 1222616006

Duplicate Sample ID: 1666719

QC for Samples:

1222655001, 1222655002

Analysis Date: 06/04/2022 13:04

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	91.0	89.2	%	2.00	(< 15)

Batch Information

Analytical Batch: SPT11535

Analytical Method: SM21 2540G

Instrument:

Analyst: BRP

Print Date: 06/30/2022 2:42:16PM

Duplicate Sample Summary

Original Sample ID: 1222655002

Duplicate Sample ID: 1666720

QC for Samples:

1222655001, 1222655002, 1222655003, 1222655004, 1222655005, 1222655006

Analysis Date: 06/04/2022 13:04

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	80.6	83.8	%	3.80	(< 15)

Batch Information

Analytical Batch: SPT11535

Analytical Method: SM21 2540G

Instrument:

Analyst: BRP

Print Date: 06/30/2022 2:42:16PM

Duplicate Sample Summary

Original Sample ID: 1222662007

Duplicate Sample ID: 1666721

QC for Samples:

1222655003, 1222655004, 1222655005, 1222655006

Analysis Date: 06/04/2022 13:04

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	76.5	77.8	%	1.60	(< 15)

Batch Information

Analytical Batch: SPT11535

Analytical Method: SM21 2540G

Instrument:

Analyst: BRP

Print Date: 06/30/2022 2:42:16PM

Method Blank

Blank ID: MB for HBN 1837037 [VXX/38653]
 Blank Lab ID: 1666677

Matrix: Soil/Solid (dry weight)

QC for Samples:

1222655001, 1222655002, 1222655003, 1222655004, 1222655005, 1222655006, 1222655007

Results by SW8260D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,2,4-Trimethylbenzene	50.0U	100	30.0	ug/kg
1,2-Dibromoethane	0.750U	1.50	0.750	ug/kg
1,2-Dichloroethane	1.00U	2.00	0.700	ug/kg
1,3,5-Trimethylbenzene	12.5U	25.0	7.80	ug/kg
Benzene	6.25U	12.5	3.90	ug/kg
Ethylbenzene	12.5U	25.0	7.80	ug/kg
Isopropylbenzene (Cumene)	12.5U	25.0	7.80	ug/kg
Methyl-t-butyl ether	50.0U	100	31.0	ug/kg
Naphthalene	12.5U	25.0	7.80	ug/kg
n-Butylbenzene	12.5U	25.0	7.80	ug/kg
o-Xylene	12.5U	25.0	7.80	ug/kg
P & M -Xylene	25.0U	50.0	15.0	ug/kg
sec-Butylbenzene	12.5U	25.0	7.80	ug/kg
tert-Butylbenzene	12.5U	25.0	7.80	ug/kg
Toluene	12.5U	25.0	7.80	ug/kg
Xylenes (total)	37.5U	75.0	22.8	ug/kg
Surrogates				
1,2-Dichloroethane-D4 (surr)	107	71-136		%
4-Bromofluorobenzene (surr)	89.5	55-151		%
Toluene-d8 (surr)	100	85-116		%

Batch Information

Analytical Batch: VMS21667
 Analytical Method: SW8260D
 Instrument: VQA 7890/5975 GC/MS
 Analyst: S.S
 Analytical Date/Time: 6/3/2022 12:07:00PM

Prep Batch: VXX38653
 Prep Method: SW5035A
 Prep Date/Time: 6/3/2022 6:00:00AM
 Prep Initial Wt./Vol.: 50 g
 Prep Extract Vol: 25 mL

Print Date: 06/30/2022 2:42:20PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1222655 [VXX38653]

Blank Spike Lab ID: 1666678

Date Analyzed: 06/03/2022 12:24

Matrix: Soil/Solid (dry weight)

QC for Samples: 1222655001, 1222655002, 1222655003, 1222655004, 1222655005, 1222655006, 1222655007

Results by SW8260D

Blank Spike (ug/kg)

Parameter	Spike	Result	Rec (%)	CL
1,2,4-Trimethylbenzene	750	700	93	(75-123)
1,2-Dibromoethane	750	773	103	(78-122)
1,2-Dichloroethane	750	728	97	(73-128)
1,3,5-Trimethylbenzene	750	697	93	(73-124)
Benzene	750	751	100	(77-121)
Ethylbenzene	750	737	98	(76-122)
Isopropylbenzene (Cumene)	750	765	102	(68-134)
Methyl-t-butyl ether	1130	1180	104	(73-125)
Naphthalene	750	789	105	(62-129)
n-Butylbenzene	750	745	99	(70-128)
o-Xylene	750	767	102	(77-123)
P & M -Xylene	1500	1510	101	(77-124)
sec-Butylbenzene	750	734	98	(73-126)
tert-Butylbenzene	750	756	101	(73-125)
Toluene	750	709	95	(77-121)
Xylenes (total)	2250	2280	101	(78-124)

Surrogates

1,2-Dichloroethane-D4 (surr)	750	95	(71-136)
4-Bromofluorobenzene (surr)	750	90	(55-151)
Toluene-d8 (surr)	750	100	(85-116)

Batch Information

Analytical Batch: **VMS21667**
 Analytical Method: **SW8260D**
 Instrument: **VQA 7890/5975 GC/MS**
 Analyst: **S.S**

Prep Batch: **VXX38653**
 Prep Method: **SW5035A**
 Prep Date/Time: **06/03/2022 06:00**
 Spike Init Wt./Vol.: 750 ug/kg Extract Vol: 25 mL
 Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1666679
 MS Sample ID: 1666680 MS
 MSD Sample ID: 1666681 MSD

Analysis Date: 06/03/2022 16:08
 Analysis Date: 06/03/2022 13:52
 Analysis Date: 06/03/2022 14:09
 Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1222655001, 1222655002, 1222655003, 1222655004, 1222655005, 1222655006, 1222655007

Results by SW8260D

Parameter	Sample	Matrix Spike (ug/kg)			Spike Duplicate (ug/kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2,4-Trimethylbenzene	34.5U	518	498	96	518	506	98	75-123	1.70	(< 20)
1,2-Dibromoethane	0.520U	518	551	106	518	558	108	78-122	1.40	(< 20)
1,2-Dichloroethane	0.690U	518	505	98	518	508	98	73-128	0.57	(< 20)
1,3,5-Trimethylbenzene	8.65U	518	499	96	518	511	99	73-124	2.50	(< 20)
Benzene	4.32U	518	542	105	518	541	104	77-121	0.32	(< 20)
Ethylbenzene	8.65U	518	542	105	518	541	104	76-122	0.18	(< 20)
Isopropylbenzene (Cumene)	8.65U	518	559	108	518	567	109	68-134	1.50	(< 20)
Methyl-t-butyl ether	34.5U	777	837	108	777	840	108	73-125	0.36	(< 20)
Naphthalene	11.0J	518	564	107	518	602	114	62-129	6.50	(< 20)
n-Butylbenzene	8.65U	518	533	103	518	548	106	70-128	2.80	(< 20)
o-Xylene	8.65U	518	558	108	518	561	108	77-123	0.69	(< 20)
P & M -Xylene	17.3U	1040	1110	107	1040	1110	108	77-124	0.52	(< 20)
sec-Butylbenzene	8.65U	518	528	102	518	538	104	73-126	1.80	(< 20)
tert-Butylbenzene	8.65U	518	535	103	518	545	105	73-125	1.90	(< 20)
Toluene	8.65U	518	514	99	518	514	99	77-121	0.01	(< 20)
Xylenes (total)	25.9U	1550	1670	107	1550	1680	108	78-124	0.57	(< 20)

Surrogates

1,2-Dichloroethane-D4 (surr)	518	490	95	518	493	95	71-136	0.64
4-Bromofluorobenzene (surr)	863	588	68	863	599	69	55-151	2.00
Toluene-d8 (surr)	518	523	101	518	523	101	85-116	0.12

Batch Information

Analytical Batch: VMS21667
 Analytical Method: SW8260D
 Instrument: VQA 7890/5975 GC/MS
 Analyst: S.S
 Analytical Date/Time: 6/3/2022 1:52:00PM

Prep Batch: VXX38653
 Prep Method: Vol. Extraction SW8260 Field Extracted L
 Prep Date/Time: 6/3/2022 6:00:00AM
 Prep Initial Wt./Vol.: 72.40g
 Prep Extract Vol: 25.00mL



Method Blank

Blank ID: MB for HBN 1837755 [VXX/38686]
Blank Lab ID: 1667638

Matrix: Soil/Solid (dry weight)

QC for Samples:
1222655001, 1222655002, 1222655003, 1222655007

Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	1.46J	2.50	0.750	mg/kg
Surrogates				
4-Bromofluorobenzene (surr)	72.6	50-150		%

Batch Information

Analytical Batch: VFC16123
Analytical Method: AK101
Instrument: Agilent 7890 PID/FID
Analyst: PHK
Analytical Date/Time: 6/10/2022 1:35:00PM

Prep Batch: VXX38686
Prep Method: SW5035A
Prep Date/Time: 6/10/2022 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Print Date: 06/30/2022 2:42:25PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1222655 [VXX38686]
 Blank Spike Lab ID: 1667639
 Date Analyzed: 06/10/2022 12:57

Spike Duplicate ID: LCSD for HBN 1222655
 [VXX38686]
 Spike Duplicate Lab ID: 1667640
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1222655001, 1222655002, 1222655003, 1222655007

Results by AK101

Parameter	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	12.5	13.9	111	12.5	13.4	107	(60-120)	3.90	(< 20)

Surrogates

4-Bromofluorobenzene (surr)	1.25		67	1.25		76	(50-150)	12.50	
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Batch Information

Analytical Batch: **VFC16123**
 Analytical Method: **AK101**
 Instrument: **Agilent 7890 PID/FID**
 Analyst: **PHK**

Prep Batch: **VXX38686**
 Prep Method: **SW5035A**
 Prep Date/Time: **06/10/2022 06:00**
 Spike Init Wt./Vol.: 1.25 mg/kg Extract Vol: 25 mL
 Dupe Init Wt./Vol.: 1.25 mg/kg Extract Vol: 25 mL

Print Date: 06/30/2022 2:42:27PM

Method Blank

Blank ID: MB for HBN 1837831 [VXX/38696]

Blank Lab ID: 1667994

QC for Samples:

1222655004, 1222655005, 1222655006

Matrix: Soil/Solid (dry weight)

Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	1.31J	2.50	0.750	mg/kg
Surrogates				
4-Bromofluorobenzene (surr)	89.3	50-150		%

Batch Information

Analytical Batch: VFC16125

Analytical Method: AK101

Instrument: Agilent 7890A PID/FID

Analyst: PHK

Analytical Date/Time: 6/13/2022 1:38:00PM

Prep Batch: VXX38696

Prep Method: SW5035A

Prep Date/Time: 6/13/2022 6:00:00AM

Prep Initial Wt./Vol.: 50 g

Prep Extract Vol: 25 mL

Print Date: 06/30/2022 2:42:29PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1222655 [VXX38696]
 Blank Spike Lab ID: 1667995
 Date Analyzed: 06/13/2022 13:01

Spike Duplicate ID: LCSD for HBN 1222655 [VXX38696]
 Spike Duplicate Lab ID: 1667996
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1222655004, 1222655005, 1222655006

Results by AK101

Parameter	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	12.5	12.5	100	12.5	12.4	99	(60-120)	1.10	(< 20)

Surrogates

4-Bromofluorobenzene (surr)	1.25		90	1.25		93	(50-150)	2.60	
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Batch Information

Analytical Batch: **VFC16125**
 Analytical Method: **AK101**
 Instrument: **Agilent 7890A PID/FID**
 Analyst: **PHK**

Prep Batch: **VXX38696**
 Prep Method: **SW5035A**
 Prep Date/Time: **06/13/2022 06:00**
 Spike Init Wt./Vol.: 1.25 mg/kg Extract Vol: 25 mL
 Dupe Init Wt./Vol.: 1.25 mg/kg Extract Vol: 25 mL

Print Date: 06/30/2022 2:42:31PM



Method Blank

Blank ID: MB for HBN 1837431 [XXX/46388]
Blank Lab ID: 1667336

Matrix: Soil/Solid (dry weight)

QC for Samples:

1222655001, 1222655002, 1222655003, 1222655004, 1222655005, 1222655006

Results by AK102

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Diesel Range Organics	10.0U	20.0	9.00	mg/kg
Surrogates				
5a Androstane (surr)	99.1	60-120		%

Batch Information

Analytical Batch: XFC16267
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: MDT
Analytical Date/Time: 6/23/2022 8:09:00PM

Prep Batch: XXX46388
Prep Method: SW3550C
Prep Date/Time: 6/9/2022 3:19:52PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 5 mL

Print Date: 06/30/2022 2:42:33PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1222655 [XXX46388]
 Blank Spike Lab ID: 1667337
 Date Analyzed: 06/21/2022 16:25

Spike Duplicate ID: LCSD for HBN 1222655
 [XXX46388]
 Spike Duplicate Lab ID: 1667338
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1222655001, 1222655002, 1222655003, 1222655004, 1222655005, 1222655006

Results by AK102

Parameter	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Diesel Range Organics	667	714	107	667	693	104	(75-125)	2.90	(< 20)
Surrogates									
5a Androstane (surr)	16.7		96	16.7		93	(60-120)	2.60	

Batch Information

Analytical Batch: **XFC16264**
 Analytical Method: **AK102**
 Instrument: **Agilent 7890B R**
 Analyst: **MDT**

Prep Batch: **XXX46388**
 Prep Method: **SW3550C**
 Prep Date/Time: **06/09/2022 15:19**
 Spike Init Wt./Vol.: 16.7 mg/kg Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 16.7 mg/kg Extract Vol: 5 mL



Method Blank

Blank ID: MB for HBN 1837431 [XXX/46388]
Blank Lab ID: 1667336

Matrix: Soil/Solid (dry weight)

QC for Samples:

1222655001, 1222655002, 1222655003, 1222655004, 1222655005, 1222655006

Results by AK103

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Residual Range Organics	50.0U	100	43.0	mg/kg
Surrogates				
n-Triacontane-d62 (surr)	95.1	60-120		%

Batch Information

Analytical Batch: XFC16267
Analytical Method: AK103
Instrument: Agilent 7890B R
Analyst: MDT
Analytical Date/Time: 6/23/2022 8:09:00PM

Prep Batch: XXX46388
Prep Method: SW3550C
Prep Date/Time: 6/9/2022 3:19:52PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 5 mL

Print Date: 06/30/2022 2:42:37PM



Blank Spike Summary

Blank Spike ID: LCS for HBN 1222655 [XXX46388]
 Blank Spike Lab ID: 1667337
 Date Analyzed: 06/21/2022 16:25

Spike Duplicate ID: LCSD for HBN 1222655
 [XXX46388]
 Spike Duplicate Lab ID: 1667338
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1222655001, 1222655002, 1222655003, 1222655004, 1222655005, 1222655006

Results by AK103

Parameter	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Residual Range Organics	667	711	107	667	691	104	(60-120)	2.80	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	16.7		103	16.7		96	(60-120)	6.40	

Batch Information

Analytical Batch: **XFC16264**
 Analytical Method: **AK103**
 Instrument: **Agilent 7890B R**
 Analyst: **MDT**

Prep Batch: **XXX46388**
 Prep Method: **SW3550C**
 Prep Date/Time: **06/09/2022 15:19**
 Spike Init Wt./Vol.: 16.7 mg/kg Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 16.7 mg/kg Extract Vol: 5 mL

Print Date: 06/30/2022 2:42:40PM



Method Blank

Blank ID: MB for HBN 1837551 [XXX/46394]
Blank Lab ID: 1667448

Matrix: Soil/Solid (dry weight)

QC for Samples:
1222655001, 1222655002, 1222655003, 1222655004, 1222655005, 1222655006

Results by 8270D SIM (PAH)

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1-Methylnaphthalene	12.5U	25.0	6.25	ug/kg
2-Methylnaphthalene	12.5U	25.0	6.25	ug/kg
Acenaphthene	12.5U	25.0	6.25	ug/kg
Acenaphthylene	12.5U	25.0	6.25	ug/kg
Anthracene	12.5U	25.0	6.25	ug/kg
Benzo(a)Anthracene	12.5U	25.0	6.25	ug/kg
Benzo[a]pyrene	12.5U	25.0	6.25	ug/kg
Benzo[b]Fluoranthene	12.5U	25.0	6.25	ug/kg
Benzo[g,h,i]perylene	12.5U	25.0	6.25	ug/kg
Benzo[k]fluoranthene	12.5U	25.0	6.25	ug/kg
Chrysene	12.5U	25.0	6.25	ug/kg
Dibenzo[a,h]anthracene	12.5U	25.0	6.25	ug/kg
Fluoranthene	12.5U	25.0	6.25	ug/kg
Fluorene	12.5U	25.0	6.25	ug/kg
Indeno[1,2,3-c,d] pyrene	12.5U	25.0	6.25	ug/kg
Naphthalene	10.0U	20.0	5.00	ug/kg
Phenanthrene	12.5U	25.0	6.25	ug/kg
Pyrene	12.5U	25.0	6.25	ug/kg
Surrogates				
2-Methylnaphthalene-d10 (surr)	84.9	58-103		%
Fluoranthene-d10 (surr)	85.1	54-113		%

Batch Information

Analytical Batch: XMS13201
Analytical Method: 8270D SIM (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: NRB
Analytical Date/Time: 6/27/2022 11:00:00AM

Prep Batch: XXX46394
Prep Method: SW3550C
Prep Date/Time: 6/10/2022 12:06:10PM
Prep Initial Wt./Vol.: 22.5 g
Prep Extract Vol: 5 mL

Print Date: 06/30/2022 2:42:42PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1222655 [XXX46394]

Blank Spike Lab ID: 1667449

Date Analyzed: 06/27/2022 11:20

Matrix: Soil/Solid (dry weight)

QC for Samples: 1222655001, 1222655002, 1222655003, 1222655004, 1222655005, 1222655006

Results by 8270D SIM (PAH)

Blank Spike (ug/kg)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	111	90.6	82	(43-111)
2-Methylnaphthalene	111	88.9	80	(39-114)
Acenaphthene	111	91.8	83	(44-111)
Acenaphthylene	111	91.8	83	(39-116)
Anthracene	111	95.9	86	(50-114)
Benzo(a)Anthracene	111	95.3	86	(54-122)
Benzo[a]pyrene	111	92.3	83	(50-125)
Benzo[b]Fluoranthene	111	94.4	85	(53-128)
Benzo[g,h,i]perylene	111	94.2	85	(49-127)
Benzo[k]fluoranthene	111	99.0	89	(56-123)
Chrysene	111	97.1	87	(57-118)
Dibenzo[a,h]anthracene	111	94.8	85	(50-129)
Fluoranthene	111	96.8	87	(55-119)
Fluorene	111	94.8	85	(47-114)
Indeno[1,2,3-c,d] pyrene	111	94.6	85	(49-130)
Naphthalene	111	88.3	79	(38-111)
Phenanthrene	111	101	91	(49-113)
Pyrene	111	96.7	87	(55-117)

Surrogates

2-Methylnaphthalene-d10 (surr)	111		76	(58-103)
Fluoranthene-d10 (surr)	111		81	(54-113)

Batch Information

Analytical Batch: XMS13201

Analytical Method: 8270D SIM (PAH)

Instrument: Agilent GC 7890B/5977A SWA

Analyst: NRB

Prep Batch: XXX46394

Prep Method: SW3550C

Prep Date/Time: 06/10/2022 12:06

Spike Init Wt./Vol.: 111 ug/kg Extract Vol: 5 mL

Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1222615019
 MS Sample ID: 1667450 MS
 MSD Sample ID: 1667451 MSD

Analysis Date: 06/27/2022 13:44
 Analysis Date: 06/27/2022 14:05
 Analysis Date: 06/27/2022 14:25
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1222655001, 1222655002, 1222655003, 1222655004, 1222655005, 1222655006

Results by 8270D SIM (PAH)

Parameter	Sample	Matrix Spike (ug/kg)			Spike Duplicate (ug/kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1-Methylnaphthalene	282U	127	187J	147 *	126	194J	154 *	43-111	3.40	(< 20)
2-Methylnaphthalene	282U	127	201J	158 *	126	220J	174 *	39-114	9.10	(< 20)
Acenaphthene	282U	127	119J	94	126	116J	92	44-111	2.70	(< 20)
Acenaphthylene	282U	127	116J	91	126	119J	94	39-116	2.30	(< 20)
Anthracene	282U	127	106J	83	126	99.7J	79	50-114	6.00	(< 20)
Benzo(a)Anthracene	282U	127	119J	93	126	105J	83	54-122	12.50	(< 20)
Benzo[a]pyrene	282U	127	113J	89	126	98.4J	78	50-125	13.40	(< 20)
Benzo[b]Fluoranthene	282U	127	125J	98	126	103J	82	53-128	18.90	(< 20)
Benzo[g,h,i]perylene	282U	127	106J	83	126	104J	83	49-127	1.20	(< 20)
Benzo[k]fluoranthene	282U	127	101J	79	126	103J	82	56-123	2.50	(< 20)
Chrysene	282U	127	127J	100	126	107J	85	57-118	17.20	(< 20)
Dibenzo[a,h]anthracene	282U	127	95.7J	75	126	97.2J	77	50-129	1.50	(< 20)
Fluoranthene	282U	127	157J	123 *	126	112J	89	55-119	33.40	* (< 20)
Fluorene	282U	127	120J	94	126	116J	92	47-114	2.60	(< 20)
Indeno[1,2,3-c,d] pyrene	282U	127	104J	82	126	102J	81	49-130	1.60	(< 20)
Naphthalene	226U	127	166J	130 *	126	173J	137 *	38-111	4.30	(< 20)
Phenanthrene	282U	127	149J	117 *	126	115J	92	49-113	24.70	* (< 20)
Pyrene	282U	127	155J	121 *	126	115J	92	55-117	28.50	* (< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		127	151	119 *	126	126	100	58-103	18.00	
Fluoranthene-d10 (surr)		127	91.6	72	126	93.8	74	54-113	2.40	

Batch Information

Analytical Batch: XMS13201
 Analytical Method: 8270D SIM (PAH)
 Instrument: Agilent GC 7890B/5977A SWA
 Analyst: NRB
 Analytical Date/Time: 6/27/2022 2:05:00PM

Prep Batch: XXX46394
 Prep Method: Sonication Extr Soil 8270 PAH SIM 5ml
 Prep Date/Time: 6/10/2022 12:06:10PM
 Prep Initial Wt./Vol.: 22.66g
 Prep Extract Vol: 5.00mL

Print Date: 06/30/2022 2:42:46PM



SGS North America Inc. CHAIN OF CUSTODY RECORD

1222655



CLIENT: SLR

CONTACT: Carl Benson PHONE #: 2221112

PROJECT NAME: Alyesha SERVS PROJECT/PWSID/PERMIT#:

REPORTS TO: Carl Benson E-MAIL: Profile #: 162313 GM

INVOICE TO: Alyeska QUOTE #: P.O. #: SPD 22300376

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Page 1 of 1

Section 3 Preservative

CONTAINERS

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/MATRIX CODE	#	Comp Grab MI (Multi-incremental)	Analysis*						REMARKS/LOC ID	
							Me/Al	D-6C	D-6C					
① AB	SBI-8	5/27/22	1230	Soil	2	Grab	X	X	X					
② AB Et	SBI-19 SBI-20		1235			Grab	X	X	X					
③ AB	SBI-5		1345			Grab	X	X	X					
④ AB	SB2-5-7		1430			Comp	X	X	X					
⑤ AB	SB2-7-11		1415			Comp	X	X	X					
⑥ AB	SB2-7-11		1800			Comp	X	X	X					
⑦ A	Top blank	5/27/22	0600		1	---	X							

NOTE: *The following analyses require specific method and/or compound list: BTEX, Metals, PFAS

Section 4 DOD Project? Yes No Data Deliverable Requirements: Level 2

Section 5 Relinquished By: (1) Date: 6/1/22 Time: 1409 Received By: [Signature]

Relinquished By: (2) Date: Received By:

Relinquished By: (3) Date: Time: Received By:

Relinquished By: (4) Date: 6/1/22 Time: 1400 Received For Laboratory By: [Signature]

Section 4 Cooler ID: Requested Turnaround Time and/or Special Instructions: STD TAT

Temp Blank °C: 4.0 DS7 Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Delivery Method: Hand Delivery [X] Commerical Delivery []



SGS Workorder #:

1222655

1222655

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
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Chain of Custody / Temperature Requirements	<i>Note: Temperature and COC seal information is found on the chain of custody form</i>
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DOD only: Did all sample coolers have a corresponding COC?	N/A	
If <0°C, were sample containers ice free?	Yes	
Note containers received with ice:		
Identify any containers received at non-compliant temperature: (Use form FS-0029 if more space is needed)		

Holding Time / Documentation / Sample Condition Requirement	<i>Note: Refer to form F-083 "Sample Guide" for specific holding times and sample containers.</i>
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Were samples received within analytical holding time?	Yes	
Do sample labels match COC? Record discrepancies.	Yes	
<i>Note: If information on containers differs from COC, default to COC information for login. If times differ <1hr, record details & login per COC.</i>		
Were analytical requests clear? <i>(i.e. method is specified for analyses with multiple option for method (Eg, BTEX 8021 vs 8260, Metals 6020 vs 200.8)</i>	Yes	
Were proper containers (type/mass/volume/preservative) used? Note: Exemption for metals analysis by 200.8/6020 in water.	Yes	

Volatile Analysis Requirements (VOC, GRO, LL-Hg, etc.)

Were all soil VOAs received with a corresponding % solids container?	Yes	
Were Trip Blanks (e.g., VOAs, LL-Hg) in cooler with samples?	Yes	
Were all water VOA vials free of headspace (e.g., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with Methanol+BFB?	Yes	

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

Additional notes (if applicable):
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Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1222655001-A	No Preservative Required	OK			
1222655001-B	Methanol field pres. 4 C	OK			
1222655002-A	No Preservative Required	OK			
1222655002-B	Methanol field pres. 4 C	OK			
1222655003-A	No Preservative Required	OK			
1222655003-B	Methanol field pres. 4 C	OK			
1222655004-A	No Preservative Required	OK			
1222655004-B	Methanol field pres. 4 C	OK			
1222655005-A	No Preservative Required	OK			
1222655005-B	Methanol field pres. 4 C	OK			
1222655006-A	No Preservative Required	OK			
1222655006-B	Methanol field pres. 4 C	OK			
1222655007-A	Methanol field pres. 4 C	OK			

Container Condition Glossary

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

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM - The container was received damaged.

FR - The container was received frozen and not usable for Bacteria or BOD analyses.

IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.

NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

QN - Insufficient sample quantity provided.