FINAL

PIPELINE RELEASE SITE CHARACTERIZATION REPORT

ADEC File #2538.38.017, Hazard ID #1548
COLD BAY, ALASKA

September 2022

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TABLE OF CONTENTS

D: Standard Operating Procedure – Field Screening with a UVOST
E: Data Quality Assessment Report
F: Laboratory Analytical Report
G: Photographic Log

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LIST OF ACRONYMS

%..... percent
°C..... degrees Celsius
°F ..... Fahrenheit
ADEC ..... Alaska Department of Environmental Conservation
ADS..... Arctic Data Services, LLC
AK ..... Alaska Method
bgs ..... below ground surface
BTEX..... benzene, toluene, ethylbenzene, and xylenes
CSM ..... conceptual site model
DQA ..... data quality assessment
DRO ..... diesel range organics
DTI ..... Dakota Technologies, Inc.
GPS..... global positioning system
ID..... identification
IDW ..... investigative-derived waste
LIF ..... Laser Induced Fluorescence
LLC ..... Limited Liability Company
M1 ..... standard reference solution
mL ..... milliliters
mg/kg..... milligrams per kilogram
NAPL..... non-aqueous phase liquid
PAH..... polycyclic aromatic hydrocarbons
PAL ..... project action level
PID ..... Photoionization detector
POL ..... petroleum, oil, or lubricant
ppm..... parts per million
QA/QC..... Quality Assurance/Quality Control
RE..... Reference Emitter
RPD ..... relative percent difference
scfm ..... standard cubic feet per minute
SGS..... SGS Environmental Services, Inc.
SOP..... standard operating procedure
UAA ..... University of Alaska Anchorage
UV ..... ultraviolet
UVOST™ ..... Ultra-Violet Optical Screening Tool, a registered trademark of Dakota Technologies, Inc., Fargo, North Dakota
VOC ..... volatile organic compound

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1. INTRODUCTION

This report was developed to present the results of analytical sampling of soil impacted by Jet A fuel remaining in the ditch on the south side of Reeve Avenue in Cold Bay, Alaska (Figure 1). This sampling event was conducted to evaluate the horizontal and vertical extent of impacted soil and to determine the level of contamination remaining in the ditch. The Alaska Department of Environmental Conservation (ADEC) File Number is 2538.38.017 and ADEC Hazard ID number is 1548. The characterization was conducted by Susitna Environmental, Limited Liability Corporation (LLC) (Susitna) on behalf of Integrity Environmental LLC and their client the Aleut Enterprise, LLC, owner of Frosty Fuels, LLC.

This report contains a description of the analytical sampling approach, a discussion of the analytical results, and recommendations for future action. Field notes (Attachment A), Ultra-Violet Optical Screening Tool (UVOST™) probe results (Attachment B), soil boring logs (Attachment C), Standard Operating Procedure (SOP) – Field Screening with a UVOST (Attachment D), a data quality assessment (DQA) report with an ADEC laboratory checklist (Attachment E), and the laboratory analytical data report (Attachment F) are provided included.

1.1. Site Description and Background

A release of an estimated 6,000 gallons of Jet A fuel from the return pipeline occurred on February 3, 1992. The owner/operator of the return pipeline at the time of the spill was Reeve Aleutian Air. A site investigation performed in March of 1992, showed an area of contamination located near the pipeline break, and in shallow soils (3 to 5 feet below ground surface [bgs]) along the south side of the road, approximately 500 to 800 feet from the release location (Hart Crowser, 1992a). At the culvert, the fuel exited to the north side of the road onto a parcel of land owned by the University of Alaska Anchorage (UAA). The fuel flowed to the northeast, and to the west along the edge of the road. In most locations, the contamination detected was confined at less than 4 feet bgs, except on the south side of the culvert where the product had pooled. In this location, contamination extended to approximately 7 feet bgs.

In 1992, soils near the pipeline break area were excavated (Hart Crowser, 1992b), and a stockpile was produced. Soils excavated from the pipeline break were placed in a bioremediation cell in June 1995. Sampling of the soil from the bioremediation cell soils last occurred in 2017. Field screening and analytical sampling conducted at that time to characterize the approximately 290 CY soil stockpile indicate that no contamination remained in the stockpile and the report recommended reuse of the soil as needed for roadways or capping material (Susitna, 2018c).

Soil samples collected from the ditch in 1995 showed that in areas previously sampled, diesel range organics (DRO) concentrations in the soils had degraded by 1- to 3-orders of magnitude over a 3-year period. Where the fuel had flowed westward along the north side of the road, DRO concentrations had decreased to <50 milligrams per kilogram (mg/kg). However, DRO concentrations above ADEC cleanup levels were still present (Hart Crowser, 1995a). Also, a 5-foot section of slotted piping was placed horizontally 4 feet bgs along the south side of the road near former boring CB-7. Probes were placed 3 feet and 5.5 feet from the middle of the side of the pipe. A blower was attached to determine if soils were sufficiently permeable for passage of air. Positive

pressures were read at both 3.5 and 5.5 feet from the underground piping with a flow rate of 5 standard cubic feet per minute (scfm). Oxygen concentrations at the observation probes were measured at 20.5 percent (%) and 18.5 %percent within 3 hours of blower start up. This indicates that oxygen can be delivered to the soil over a width of greater than 11 feet (Hart Crowser, 1995b).

In 1999, the full remediation system was installed to reduce soil DRO concentrations in the ditch (Hart Crowser, 2000). Soil samples were collected from the ditch on the south side of Reeve Avenue and from the UAA land on the north side of Reeve Avenue in 1999; DRO concentrations were 9,730 mg/kg and 10,700 mg/kg (Hart Crowser, 1999). Soil samples collected from the UAA land contained DRO concentrations less than 15 mg/kg; the UAA site was subsequently closed (ADEC, 2003).

On November 13, 2000, five soil samples and a duplicate were collected along the ditch on the south side of Reeve Ave. Samples were collected from 3 feet bgs using hand auguring techniques. Groundwater was observed in the bottom of each boring. DRO concentrations ranged from 707 mg/kg to 4,270 mg/kg.

In 2018, additional site characterization was performed to determine remaining contaminant concentrations along the ditch on the south side of Reeve Avenue. Soil screening and analytical results indicated contamination remained at 3 feet bgs at concentrations exceeding ADEC cleanup levels. Photoionization detector (PID) field screening results on the east end of the ditch, closer to the culvert, ranged from 22.7 to 154 mg/kg, but no analytical samples were collected from these locations (Susitna, 2018a).

Surface water (marine water) is located approximately 3,000 feet east of the site. The nearest domestic supply well appears to be located approximately 400 feet southeast of the site according to the Alaska Department of Natural Resources Well Log Tracking System (Well Log 41117). However, this well was installed in 1981 and may not be in use. The well is screened from 91 to 95 feet below ground surface and is likely in a deeper, confined aquifer than site contaminants. Up to 15 other water supply wells exist in the City of Cold Bay but are located further upgradient or cross-gradient from the site. This includes the City of Cold Bay public water supply wells located approximately 900 feet upgradient to the northeast of the site (public water system identification number 260414).

1.2. Project Objective and Scope of Work

This project was conducted to further delineate the horizontal and vertical extent of soil remaining in the ditch on the south side of Reeve Avenue that was impacted by a Jet A fuel spill in 1992. The scope of work for this project included delineating the soils along the ditch with Laser Induced Fluorescence (LIF)/Ultra-Violet Optical Screening Tool, a registered trademark of Dakota Technologies, Inc. (DTI), Fargo, North Dakota (UVOST™) technology, advancing 10 macro-core soil borings and collecting PID field screening and soil samples. Fieldwork was executed by Susitna field scientists meeting the ADEC definition of a "qualified environmental professional" as set forth in 18 AAC 75, Section 333 (ADEC, 2021).

The Scope of Work for this field effort consisted of the following tasks.

- Mobilize Susitna personnel and field gear to the site.

- Further delineate potentially impacted soil by advancing LIF/UVOST™ probes.
- Install 10 soil borings and collect PID field screening and soil samples.
- Collect global positioning system (GPS) readings of all temporary monitoring well locations.
- Submit soil samples to SGS Environmental Services, Inc. (SGS) (an ADEC-approved laboratory) for analysis of the contaminants of concern.
- Prepare a site Characterization Report following the receipt of the final laboratory report.

1.3. Contaminants of Concern

Based on previous investigations and removal actions, DRO is the appropriate contaminant of concern for this site. The project action levels (PALs) are based on ADEC 18 AAC 75 Method Two Tables B1 and B2 migration to groundwater cleanup levels (Table 1 and Table 2).

1.4. Regulatory Framework

The regulatory framework to guide the execution of this project was developed under consideration of the following regulations and guidance documents:

- The ADEC *Field Sampling Guidance*, dated October 2019 (ADEC, 2019).
- 18 AAC 75, *ADEC Oil and Other Hazardous Substances Pollution Control*, dated June 2021 (ADEC, 2021).

2. LIF/UVOST™ TECHNOLOGY

This section describes the LIF/UVOST™ technology used for site delineation during project activities.

2.1. Fluorescence

Fluorescence is a property of some compounds whereby absorbed ultraviolet (UV) light stimulates the release of photons (light) of a longer wavelength, often in the visible range. Since many aromatic hydrocarbons fluoresce, this property can be used to detect small amounts of a substance within a much larger matrix, such as diesel in soil. Laboratories have used fluorescence methods for decades. However, with the availability of high-powered light sources and optical fibers, this technology has recently been taken to the field.

2.2. LIF and UVOST™

The UVOST™ uses LIF technology to identify petroleum, oil, or lubricant (POL) contamination in the subsurface. The primary objective of this technology is to delineate the lateral and horizontal extent of petroleum contamination at a site with known or suspected contaminated soil and/or groundwater in the non-aqueous phase liquid (NAPL) form. UV light is sent through optical fibers that are strung through Geoprobe™ drill rods. The UV light exits the probe through a sapphire window on the side of the probe tip. As the probe is advanced, soil sliding past the window is exposed to UV light; if fluorescent compounds exist and are struck by the UV light, the compounds will fluoresce. The fluorescence response is transmitted through a fiber and analyzed by using an oscilloscope and a computer. Each probe provides continuous, real-time data on petroleum contamination at a maximum rate of one data reading per every two centimeters of downward push.

Signal (total fluorescence) versus depth where signal is relative to the Reference Emitter (RE). The total area of the waveform is divided by the total area of the Reference Emitter yielding the %RE. This %RE scales with the NAPL fluorescence. Petroleum hydrocarbons will fluoresce at different wavelengths. Viewing fluorescence by wavelength can provide information about the type of petroleum hydrocarbon present in the soil matrix. Since hydrocarbon bonds will fluoresce at different wavelengths, viewing the individual wavelengths provides distinct patterns of the waveform. These unique patterns are the 'fuel signatures' of the petroleum hydrocarbon within the soil matrix and can be used to differentiate differing petroleum contaminants (such as diesel, gasoline, coal tar, etc.). Signal intensities are calibrated to a known standard reference solution (M1) before each probe point. During the probe, the height and area under the waveform represents the signal intensity of each individual wavelength relative to that standard (i.e. % fluorescence is a percentage of M1). The concentration of a contaminant in the soil matrix is directly related to the signal intensity and % fluorescence. These %-fluorescence readings are delivered instantly to the system field control, typically a laptop computer, at a rate of one per second. By regulating the direct push rate of the drill machine to 2 centimeters per second, the log in turn records a %-fluorescence every 2 cm. By field standards, this is considered to be high density continuous logging. Soil samples are typically used in conjunction with the UVOST™ to confirm the specific contaminant and correlate the signal strength to more familiar analytical concentration values.

A real-time log of each probe is generated in the field using the UVOST software and is displayed on the laptop computer. The depth of probe advancement is reflected on the Y axis (left side), while percent fluorescence is on the X axis (bottom). A smaller box on the screen displays four separate-colored peaks, which represents the individual waveform pattern at each specific reading within the log. These wave patterns can be used to distinguish the differing POL signatures.

LIF utilizes the characteristic of polycyclic aromatic hydrocarbon (PAH) molecules to absorb UV photons and re-emit a portion of that energy as photons of longer wavelength, often in the visible range. Because molecular structure affects both absorption efficiency and emission wavelength, the variety of atomic arrangements of PAH compounds results in a wide band of fluorescence wavelengths. Within this band, low-molecular-weight PAHs fluoresce at the shorter (bluer) wavelengths, with fluorescence becoming progressively redder with increasing molecular weight. Gasoline, the most volatile of the common hydrocarbon fuels, contains low concentrations of predominately the lightest PAHs (e.g., naphthalene, with only two benzene rings) and thus fluoresces at the lighter blue wavelengths. Mid-range distillates, such as diesel, kerosene (Jet A fuel), and No. 2 heating oil, contain higher concentrations of PAHs, often with three or four benzene rings and thus fluoresces at blue and darker blue wavelengths. PAH concentrations and the highest proportion of heavy molecular weights (e.g., benzo(a)anthracene and benzo(a)pyrene, each with four benzene rings, and dibenzo(a,h)anthracene, with five benzene rings) and will fluoresce at redder (longer) wavelengths.

The UVOST™ system was operated according to the UVOST™ SOP provided in Attachment D.

2.3. LIF/UVOST™ Data Quality

The UVOST is monitored continuously to ensure the data quality objectives are achieved and maintained. The field team monitors the following items while operating the system.

- Operate the UVOST in accordance with the UVOST-SOP.
- Monitor laser signal energy each push and the wave pattern on the Oscilloscope.
- Verify the M1 signal level and the time delay are in the proper position and within limits.
- Calibrate the UVOST with M1 prior to every push.
- Monitor the graphic output on the UVOST computer and verify information is being recorded and the system is functioning properly.
- After every push – place M1 on the probe window to visually verify that the signals are within tolerance.
- Visually inspect the probe prior and after every push to verify it is in good working order and make repairs/adjustments as necessary.

2.4. LIF/UVOST™ Data Qualifications

System errors can occur while pushing the LIF/UVOST™ probe, if so that location is re-probed until a useable dataset is acquired. Exaggerated background readings or loss of signal from the LIF probe are the usual indications that a problem has occurred. Typical problems include cracked sapphire window, software errors, and/or electronic malfunctions. There were no problems to report associated with this investigation.

3. FIELD ACTIVITIES

Field activities were conducted at the site on August 17 and 18, 2021. Fourteen LIF/UVOST™ screening probes and 11 soil borings were advanced along the ditch. Fourteen primary soil samples and one duplicate sample were collected within the ditch area. The sections below discuss the field methods for LIF/UVOST™, soil boring advancement and sampling.

3.1. LIF/UVOST™ Probe Advancement

On August 17 and 18, 2021, fourteen LIF/UVOST™ probes (UV-01 to UV-14) were advanced using a Geoprobe™ 6620DT direct-push hydraulic percussion drill rig as shown on Figure 2. Each probe was pushed to varying depths from 6 to 20 feet bgs. See LIF/UVOST™ probe results in Attachment B and Table 3.

The first 10 LIF/UVOST™ probes were spaced out approximately 30 feet apart along the ditch on the south side of Reeve Avenue (Figure 2). The LIF/UVOST™ probe locations of UV-04 and UV-08 were advanced in the vicinity of the 2018 soil sample locations (SO-6 and SO-014, respectively) where the highest contaminant concentrations were detected at 3 feet bgs. After the initial 10 LIF/UVOST™ probes were advanced, four additional LIF/UVOST™ step out probes were installed to 6 feet bgs to further delineate the area. Probes UV-11 and UV-12 were placed 5 feet east and 8 feet west of UV-08, respectively and probes UV-13 and UV-14 were placed 6 feet east and 10 feet west of UV-04, respectively. The logs from each of these borings are provided in Attachment B.

All bore holes created during this investigation were sealed with bentonite chips and hydrated with water.

3.2. Soil Boring Advancement

Soil borings were also advanced by using a Geoprobe™ 6620DT direct-push hydraulic percussion drill rig with the Macro-core soil sampling system. The drill rig advanced a 4-foot-long, 2.5-inch-diameter sample barrel for each drive with a disposable polyvinyl chloride Macro-core sleeve to contain the soil sample core. Susitna continuously logged the soil borings to assess the soil for evidence of impact. Visual and olfactory observations, LIF/UVOST™ results as well as field screening results, were used to identify potentially impacted soil.

Eleven soil borings (SB-01 to SB-10 and step-out SB-10a) were placed adjacent to locations where the LIF/UVOST™ probes where advanced with correlating numbers. For example, soil boring SB-01 was advanced adjacent to LIF/UVOST™ location UV01, SB-02 was advanced adjacent to UV02 (Figure 3). And step-out boring SB-10a was drilled approximately 10 feet south of SB-10. Site soils primarily consisted of silty sand and gravel. Possible volcanic layers consisting of black fine grained and orange medium grained sand with orange silt was observed from 6.5 to 7 feet bgs in boring SB-10. Boring logs are provided in Attachment C.

3.3. Field Screening

A total of 32 soil samples were collected from various depths between 4 and 12 feet bgs for field screening with the PID from the ditch south of Reeve Avenue, and west of the culvert, encompassing the same area that was sampled by Hart Crowser in 2000, and resampled by Susitna in 2018. Heated head space PID readings and visual and olfactory observations of soil from each boring were used to estimate the extent of potential POL contamination at the site. The highest PID readings and visual and olfactory observations from each soil core are provided on the boring logs in Attachment C. Heated head space readings were collected at each soil boring location in one- and two-foot intervals at varying depth intervals. The PID was calibrated onsite before use in accordance with the manufacturer's specifications.

Each screening sample was collected, heated, and agitated to promote volatilization in accordance with the procedures outlined in the ADEC *Field Sampling Guidance* (ADEC, 2019). Quart-sized Ziploc® bags with double lock seals were partially filled with soil and immediately sealed to trap the volatile vapors. The headspace samples were then warmed to at least 40 degrees Fahrenheit (°F) for a period of 10 minutes, but not longer than one hour, to permit headspace vapors to develop in the bag. The screening samples were agitated for 15 seconds at the beginning and end of the headspace development to promote volatilization prior to screening with the PID. After sufficient time had passed for the development of vapors, the PID sampling probe was inserted into the bag to measure the volatile organics. Soil screening results for each analytical soil sample collected are provided in Table 1 and Table 2. Screening results ranged from 0.4 ppm to a maximum of 673.8 ppm in SB-09 at 11 to 12 feet bgs (see field notes in Attachment A for complete field screening results). Note that no analytical samples were collected from boring SB-10a, only a soil screening sample from 8-10 feet bgs. The screening result from this sample was 290.4 ppm.

3.4. Collection of Analytical Soil Samples

Fifteen analytical soil samples (plus 1 duplicate sample) were collected from locations correlating to the 2018 sample locations plus areas that further delineate the lateral and vertical extent of impacted soil. Boring logs showing where analytical soil samples were collected are provided in Attachment C. Five borings were sampled at two depth intervals (SB-01, SB-04, SB-07, SB-08, and SB-10). All other borings were sampled at one depth interval (see Table 1, Table 2, and boring logs in Appendix C). No analytical samples were collected from step-out boring SB-10a and only one duplicate sample was collected due to a limited supply of sample containers. Analytical sample locations were typically collected from depth intervals with the highest PID readings and/or a hydrocarbon odor. However, in some borings, the depths were selected to determine if shallow contamination had migrated downward toward groundwater. In two borings (SB-09 and SB-10), samples were not collected from the bottom of the excavation where the highest PID readings were detected because this was interpreted as groundwater contamination likely coming from the adjacent Tank Farm and no evidence of contamination was observed in shallower soil above the water table and smear zone.

All soil samples were analyzed for DRO by Method AK 102, and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by SW8021B. Soil samples collected from SB-01 (9-10 feet bgs) and

SB-4 (7-8 feet bgs) were also analyzed for PAHs by SW8270D SIM and volatile organic compounds (VOCs) by SW8260D (Table 2).

Soil samples were collected by a Qualified Environmental Professional (QEP), or a Qualified Sampler as defined in ADEC 18AAC75.333 (ADEC, 2021) and in accordance with the collection and preservation requirements outlined in the ADEC *Field Sampling Guidance* (ADEC, 2019) to ensure all chemistry data quality objectives are met, and that all data is defensible and usable for the project. Using disposable sampling spoons, Susitna collected soil samples for volatile analyses first, to minimize the loss of volatile compounds. For volatile samples, a minimum of 50 grams of soil was placed directly into tared 4-ounce jars with a Teflon®-lined septum fused to the lid. Immediately following collection, 25 milliliters (mL) of methanol preservative was added to the jar to completely submerge (and preserve) the volatile soil sample. A trip blank sample accompanied all volatile samples to detect and identify any volatile contamination of the samples while travelling to and from the lab. Soil was then collected for the remaining analyses and placed into laboratory-provided sample jars without preservative. After sample collection, each jar was appropriately labeled, and immediately placed into a cooler with sufficient gel ice to maintain sample temperatures of 4 degrees Celsius (°C) ± 2 °C during transport to SGS in Anchorage, Alaska for analysis.

3.5. Work Plan Deviations

The deviations from the work plan (Susitna, 2018b) that occurred during the execution of the project are listed below.

1. According to the work plan only five primary soil samples were to be collected from the areas with the highest field screening results. However, additional soil samples were collected for a total of 14 primary soil samples.
2. Investigation using LIF/UVOST™ was not included in the work plan but was utilized to implement collection of more comprehensive soil data at the site since the instrumentation was available at Cold Bay during the project. The LIF/UVOST™ investigation was conducted in addition to the soil borings described in the work plan and the data was used to inform selection of the soil boring locations and analytical sample depth intervals.
3. Because more analytical soil samples were collected than planned, field duplicates were not collected at a frequency of 10% due to a lack of sample containers. Only one field duplicate accompanied the 14 primary soil samples.

3.6. Quality Control Samples

All data generated by the laboratory was reviewed by Arctic Data Services, LLC (ADS). The data quality review conducted by ADS evaluated precision, accuracy, sensitivity, representativeness, comparability, and completeness of the data by reviewing laboratory-supplied quality assurance/quality control (QA/QC) information as well as conducting independent QA/QC checks on the data. The review was conducted in accordance with ADS Standard Operating Procedures for Stage 2A Data Validation v1.1, which meet requirements of the ADEC Technical Memorandum on Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and

Sample Handling (ADEC, 2017). Laboratory QC sample recoveries and relative percent differences (RPDs) were compared to laboratory control limits. Field-duplicate RPDs were compared to ADEC-recommended measurement quality objectives.

One primary and one duplicate soil sample was collected at 8-10 feet bgs from soil boring SB07. Precision, accuracy, representativeness, comparability, and completeness were deemed acceptable, and the data are usable for the purposes of this project. An ADEC laboratory data review checklist was completed for the single sample delivery group, and is provided along with the complete Data Quality Assessment in Attachment E.

3.7. Survey Activities

LIF/UVOST™ probe and soil boring locations were recorded in the field with an EOS Arrow 100 GPS with sub-meter accuracy. Coordinates for the project were referenced to the North American Datum 1983 in Alaska State Plane Zone 7 with units in feet.

3.8. Investigation Derived Waste

The investigative-derived waste (IDW) generated during the investigation effort consisted of disposable sampling equipment (i.e., sample gloves, paper towels, and soil boring sleeves) and soil boring cuttings. The disposable sampling equipment was bagged, taped shut and placed into a solid waste receptacle for disposal at the Cold Bay Landfill. Cuttings from the soil borings (approximately 10 gallons) were placed in a 55-gallon drum for later transportation and disposal.

4. RESULTS

LIF/UVOST™ probe results and analytical sample results are discussed in the following sections. The LIF/UVOST™ probe results are provided in Attachment B, a summary of the analytical soil results are provided in Tables 1 and 2, and the LIF/UVOST™ summary is provided in Table 3. The ADEC Laboratory Data Review Checklist is provided in Attachment E and the complete laboratory analytical report, including the chain of custody, is provided in Attachment F.

4.1. LIF/UVOST™ Results

Fourteen LIF/UVOST™ probes were advanced along the ditch south of Reeve Avenue. In general, most all the LIF/UVOST™ probe locations show typical background (noncontaminated) soil conditions from the ground surface (0 feet) down to 6 and 20 feet bgs except for the following. The darker orange response seen in most of the LIF/UVOST graphs (Attachment B) appear to represent natural organics in the soil, a common occurrence. The blue, highly elevated responses shown in UV-01 (2.74 feet and 17.55 feet bgs), UV-04 (7.48 feet bgs), and UV-09 (10.58 feet bgs) reflect POL impacted soil at those soil horizons.

4.2. Analytical Soil Sample Results

Eleven soil borings were advanced to 12 feet bgs and 14 primary analytical soil samples (and one duplicate) were collected from varying depth intervals. Only one soil boring (SB-04) exhibited a concentration of DRO (3,680 mg/kg) at 7 to 8 feet bgs, above the PAL of 250 mg/kg. The UV-04 LIF/UVOST shows a POL spike at the same depth interval (Attachment B). The soil sample collected from 10-11 feet bgs in this boring was non-detect for DRO. The 2021 location of SB-04/UV-04 corresponds with the 2018 location (SO-05) where soil collected at three feet bgs contained DRO, 1-methylnaphthlene and naphthalene above ADEC cleanup levels. All other soil borings had analyte concentrations that were either non-detect or below the applicable cleanup levels.

Saturated soil was observed in soil borings SB-01 (10.5 feet bgs) and SB-10 (10.5 to 12 feet bgs) indicating the presence of groundwater at those depths. Elevated PID results (158.6 to 673.8 parts per million [ppm]) were detected only in the saturated zones of soil borings SB-09, SB-10, and step-out boring SB-10a, indicating that the impacted soil is not continuous from the ground surface through the vadose zone and likely from a separate upgradient source. Given the proximity of the Tank Farm and known fuel product on the groundwater at that site, the saturated zone soil contamination seen during investigation of the pipeline release may be from the Tank Farm.

5. CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is provided on Figure 4. This CSM represents an assessment of current and future site conditions based on limited subsurface DRO soil contamination. Surface soil contamination was removed in 1992 and a treatment system was installed in 1999. Due to these previous remedial actions, soil contamination appears to be limited to approximately three to five feet bgs and does not appear to extend to groundwater. Analytical samples for volatile contaminants (BTEX and VOCs) were not detected, indicating the volatilization of the contaminants to air is an insignificant exposure pathway. This CSM assumes there are no current residents occupying the site and that the primary current activities would be recreational, industrial, and subsistence use. Current and future receptors that could reasonably be exposed to contaminated soil would be construction workers excavating deeper than three feet bgs in the ditch. Based on the results of this investigation, only the soil exposure media is applicable and all other exposure media are incomplete.

6. CONCLUSIONS

In 2018, additional site characterization was performed to determine contaminant concentrations along the ditch on the south side of Reeve Avenue. Soil screening and analytical results from the road ditch on the south side of Reeve Avenue indicate contamination was detected at 3 feet bgs at concentrations exceeding ADEC cleanup levels along most of the pipeline. PID field screening results on the east end of the ditch, closer to the culvert, ranged from 22.7 to 154 ppm, but no analytical samples were collected from these locations in 2018.

The 2021 soil screening and analytical sampling focused on soil deeper than three feet bgs to determine the vertical extent of contamination. Screening and analytical results indicate contamination likely from the 1992 spill is present at 7-8 feet bgs in one location. However, elevated PID results in the saturated zone suggest that there may be a separate upgradient source. Impacted groundwater may be migrating from the Frosty Fuel Tank Farm located to the north-northwest of the site. The Frosty Fuel Tank Farm is a contaminated site (ADEC File No. 2538.38.015) with a significant free product groundwater plume.

Based on a combination of screening and analytical data from 2018 and 2021, it appears that residual soil contamination remains in shallow soil approximately 3 to 5 feet bgs along most of the pipeline. However, soil contamination appears to extend deeper only at SB-04 (from 7 to 8 feet bgs). Analytical data collected from 10 to 11 feet bgs in this boring did not contain contaminants above ADEC soil cleanup levels, indicating the remaining residual contamination at depth is limited.

Contaminated surface soil was excavated in 1992 and a soil treatment system was installed in 1999. Samples from 2018 found DRO-contaminated soil at approximately 3 feet bgs. Only one location in 2021 (SB-04) contained evidence of DRO contamination deeper than five feet bgs, but the contamination did not extend to groundwater based on soil analytical results. Smear zone soil contamination detected in borings SB-09 and SB-10 on the eastern end of the site appear to be from groundwater contamination likely associated with the adjacent Tank Farm. The CSM for the site indicates insignificant risk to human health for most receptors, with the exception of construction workers, who may excavate and be exposed to soil in the ditch deeper than three feet bgs. Maximum DRO contaminate levels in subsurface soil (3,680 mg/kg) are less than the ADEC maximum allowable concentration of 12,500 mg/kg (ADEC, 2021).

Based on the results of this investigation, it is recommended that this site be considered for cleanup complete determination under ADEC regulations.

7. REFERENCES

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Susitna Environmental, LLC (Susitna), 2018a. Draft *Pipeline Release Soil Sampling Report, ADEC File #2538.38.017, Hazard ID #1548, Cold Bay, Alaska*. December.

Susitna, 2018b. *Final Pipeline Release Soil Sampling Work Plan, ADEC File #2538.38.017, Hazard ID #1548, Cold Bay, Alaska*. September.

Susitna, 2018c. *Final Stockpile Characterization Report, ADEC File #2538.38.017, Hazard ID #1548, Cold Bay, Alaska*. June.

FIGURES

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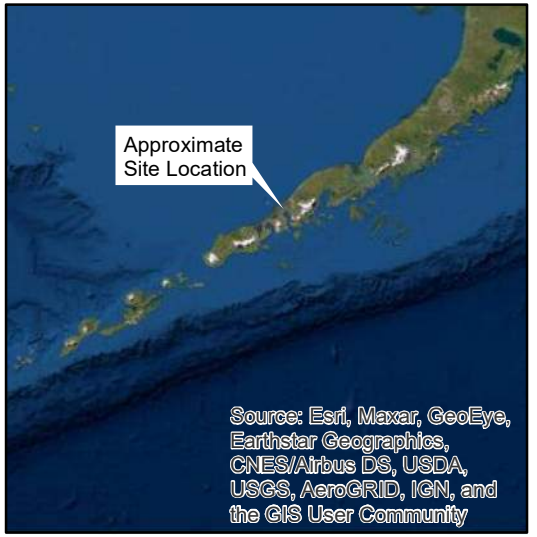
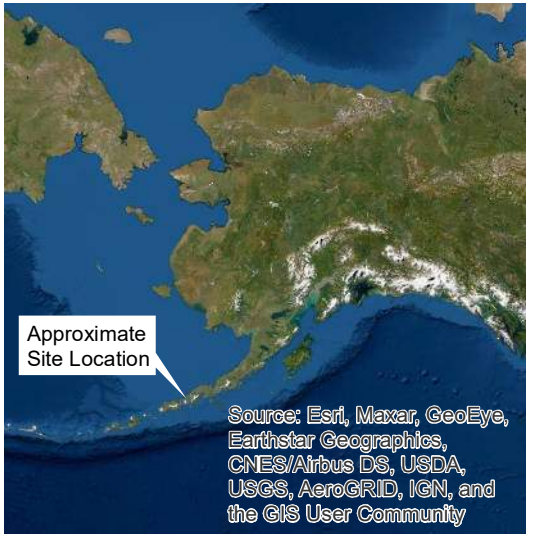
Figure 1
Site Location

Notes:
Image Source: TerraServer, Inc.
July 2014





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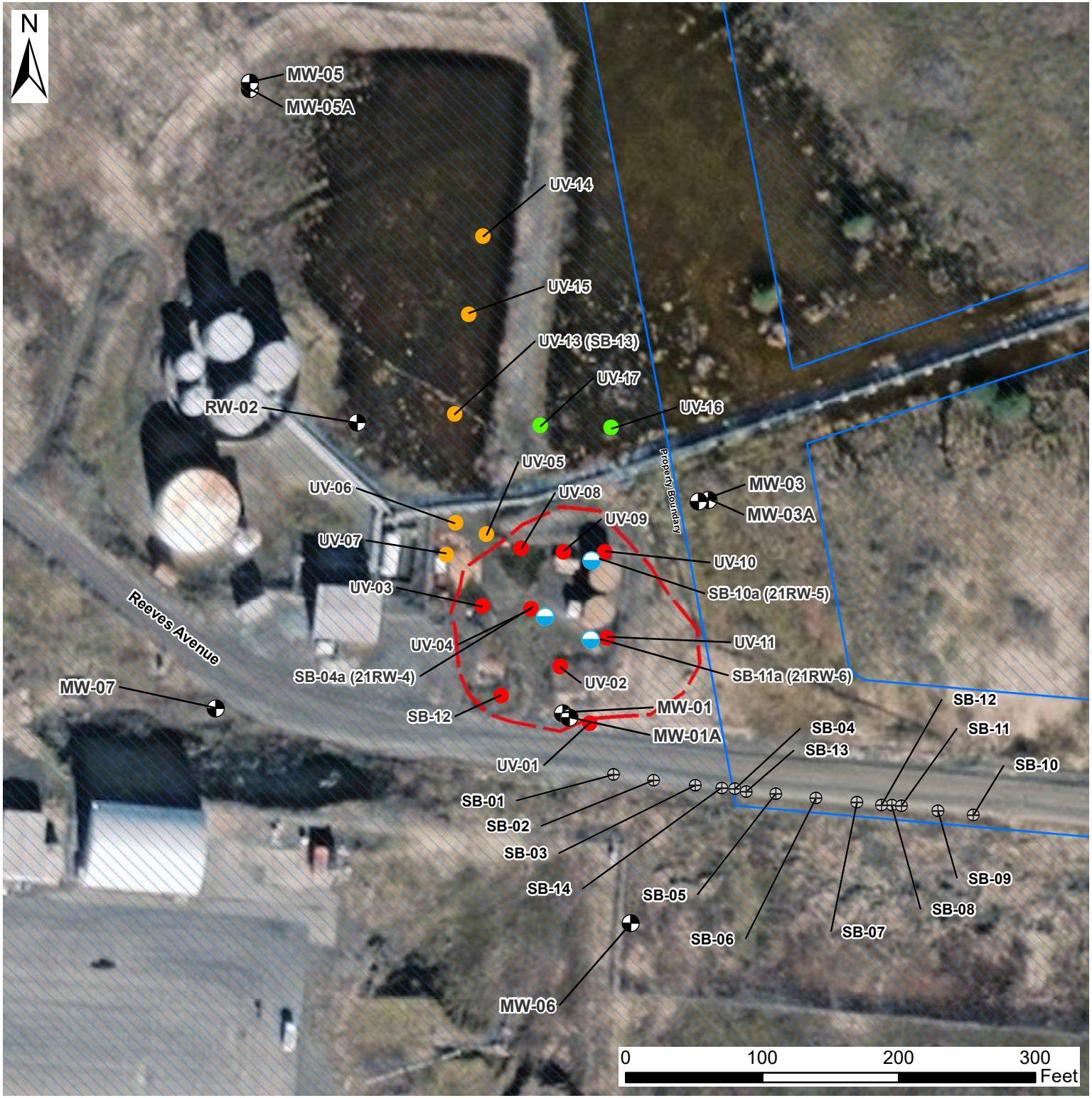

Figure 2
Frosty Fuels Tank Farm
Plume Delineation

Legend

- UVOST Location with no Fuel Response
- UVOST Location with Potential Soil Contamination
- UVOST Location with Potential LNAPL Response
- Monitoring Well
- 2021 Boring Location from the Pipeline Release Site Characterization
- Land Parcel Boundary
- Approximate Plume

Notes:
Plume was estimated from UVOST boring locations.
Image Source: Maxar Imagery, March 2019
LNAPL - Light Non-Aqueous Phase Liquid
UVOST -Ultra Violet Optical Screening Tool

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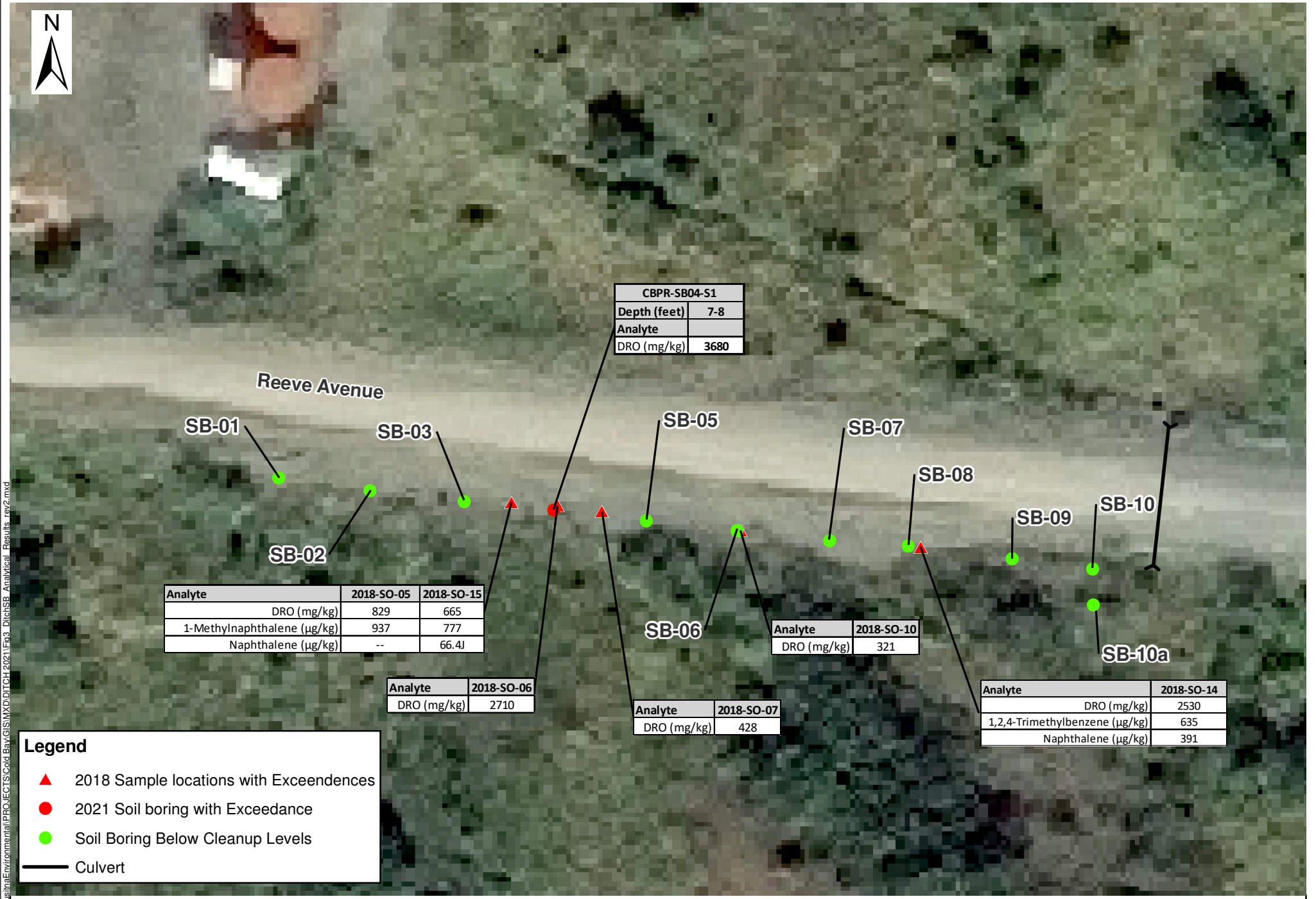

Figure 3
Pipeline Release Soil Boring Locations and Soil Sampling Exceedances

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Pipeline Release, Cold Bay, Alaska
ADEC File #2538.38.017, Hazard ID #1548

Completed By: Susitna Environmental
Date Completed: 9/13/2022

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

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

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

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

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

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

Current & Future Receptors

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

Revised, 10/01/2010

TABLES

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Table 1 Cold Bay Frosty Fuels Pipeline
2021 BTEX, DRO, and PAHs Soil Sample Results

			Location	SB-01		SB-02	SB-03	SB-04		SB-05	SB-06		SB-07		SB-08		SB-09	SB-10	
			Client Sample ID	CBPR-SB01-S1	CBPR-SB01-S2	CBPR-SB02-S1	CBPR-SB03-S1	CBPR-SB04-S1	CBPR-SB04-S2	CBPR-SB05-S1	CBPR-SB06-S1	CBPR-SB06-S2	CBPR-SB07-S1	CBPR-SB07-S2	CBPR-SB08-S1	CBPR-SB08-S2	CBPR-SB09-S1	CBPR-SB10-S1	CBPR-SB10-S2
			QC Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Dupiicate	Primary	Primary	Primary	Primary	Primary
			Depth (feet)	7-8	9-10	8-10	11-12	7-8	10-11	9-11	5-6	9-11	8-10	8-10	4-5.5	9-11	4-6	4-6	8-10
			PID (ppm)	0.8	4.9	1.7	0.8	18.7	4.5	1	0.4	0.5	0.9	0.9	0.4	5.6	3.6	NA	158.6
Method	**Analyte**	**CAS**	**Units**	**PAL**	**Result**														
8021B	*Benzene*	71-43-2	mg/kg	0.022	0.00980 U	NA	0.0102 U	0.0102 U	NA	0.00995 U	0.00810 U	0.0203 U	0.0108 U	0.0124 U	0.0176 U	0.0152 U	0.00855 U	NA	0.0353 U	0.0113 U
	Ethylbenzene	100-41-4	mg/kg	0.13	0.0196 U	NA	0.0204 U	0.0203 U	NA	0.0199 U	0.0162 U	0.0405 U	0.0215 U	0.0247 U	0.0353 U	0.0304 U	0.0171 U	NA	0.0705 U	0.0226 U
	Toluene	108-88-3	mg/kg	6.7	0.0196 U	NA	0.0204 U	0.0203 U	NA	0.0199 U	0.0162 U	0.0405 U	0.0215 U	0.0247 U	0.0353 U	0.0304 U	0.0171 U	NA	0.0705 U	0.0226 U
	Xylene, Isomers m & p	179601-23-1	mg/kg	NA	0.0392 U	NA	0.0409 U	0.0406 U	NA	0.0398 U	0.0324 U	0.081	0.0430 U	0.0494 U	0.0705 U	0.0610 U	0.0343 U	NA	0.142 U	0.0451 U
	Xylenes	1330-20-7	mg/kg	1.5	0.0590 U	NA	0.0615 U	0.0610 U	NA	0.0595 U	0.0486 U	0.122 U	0.0645 U	0.0740 U	0.106 U	0.0910 U	0.0515 U	NA	0.212 U	0.0675 U
	o-Xylene	95-47-6	mg/kg	NA	0.0196 U	NA	0.0204 U	0.0203 U	NA	0.0199 U	0.0162 U	0.0405 U	0.0215 U	0.0247 U	0.0353 U	0.0304 U	0.0171 U	NA	0.0705 U	0.0226 U
8270DSIM	*1-Methylnaphthalene*	90-12-0	mg/kg	0.41	NA	0.0153 U	NA	NA	0.0720 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	91-57-6	mg/kg	1.3	NA	0.0153 U	NA	NA	0.0720 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	83-32-9	mg/kg	37	NA	0.0153 U	NA	NA	0.0720 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	208-96-8	mg/kg	18	NA	0.0153 U	NA	NA	0.0720 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	120-12-7	mg/kg	390	NA	0.0153 U	NA	NA	0.0720 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	56-55-3	mg/kg	0.7	NA	0.0153 U	NA	NA	0.0144 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	50-32-8	mg/kg	1.5	NA	0.0153 U	NA	NA	0.0144 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	205-99-2	mg/kg	15	NA	**0.0143 J**	NA	NA	0.0144 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	191-24-2	mg/kg	2300	NA	**0.00878 J**	NA	NA	0.0144 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	207-08-9	mg/kg	150	NA	0.0153 U	NA	NA	0.0144 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	218-01-9	mg/kg	600	NA	**0.00771 J**	NA	NA	0.0144 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzo(a,h)anthracene	53-70-3	mg/kg	1.5	NA	0.0153 U	NA	NA	0.0144 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	206-44-0	mg/kg	590	NA	**0.0168 J**	NA	NA	0.0144 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	86-73-7	mg/kg	36	NA	0.0153 U	NA	NA	0.0720 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	15	NA	0.0153 U	NA	NA	0.0144 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	91-20-3	mg/kg	0.038	NA	0.0122 U	NA	NA	0.0575 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	85-01-8	mg/kg	39	NA	**0.00864 J**	NA	NA	0.0720 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	129-00-0	mg/kg	87	NA	**0.0135 J**	NA	NA	0.0144 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AK102	*Diesel Range Organics*	DRO-C10-C25	mg/kg	250	11.1 U	**16.9 J**	12.1 U	12.4 U	**3,680**	11.9 U	**51.0**	15.3 U	11.6 U	13.3 U	13.7 U	**184**	12.1 U	**42.6 J**	21.0 U	12.9 U

Notes

bold	The analyte was detected.
red highlight	The analyte was detected at a concentration above the PAL.
grey highlight	The analyte was not detected, however the LOD exceeds the PAL.
BTEX	benzene, toluene, ethylbenzene and total xylenes
CAS	Chemical Abstract Service registry number
ID	identification
LOD	limit of detection
LOQ	limit of quantitation
mg/kg	milligrams per kilogram
NA	not applicable / not analyzed
PAL	project action level
ppm	parts per million
SDG	sample delivery group
QC	quality control

Data Qualifiers

J	The quantitation is considered estimated, with an indeterminate direction of bias due to detection below the LOQ (*laboratory-applied)* .
U	non-detect

Table 2 Cold Bay Frosty Fuels Pipeline
2021 VOC Soil Sample Results

				Location	SB-01	SB-04	Trip Blank
				Client Sample ID	CBPR-SB01-S2	CBPR-SB04-S1	TB-01
				QC Type	Primary	Primary	Trip Blank
				Depth (feet)	9-10	7-8	NA
				PID (ppm)	4.9	18.7	NA
Method	**Analyte**	**CAS**	**Units**	**PAL**	**Results**		
8260D	*1,1,1,2-Tetrachloroethane*	630-20-6	mg/kg	0.022	0.0189 U	0.0168 U	0.0101 U
	1,1,1-Trichloroethane	71-55-6	mg/kg	32	0.0236 U	0.0210 U	0.0126 U
	1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	0.003	0.00189 U	0.00168 U	0.00100 U
	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	mg/kg	310	0.0945 U	0.0840 U	0.0505 U
	1,1,2-Trichloroethane	79-00-5	mg/kg	0.0014	0.000945 U	0.000840 U	0.000505 U
	1,1-Dichloroethane	75-34-3	mg/kg	0.092	0.0236 U	0.0210 U	0.0126 U
	1,1-Dichloroethene	75-35-4	mg/kg	1.2	0.0236 U	0.0210 U	0.0126 U
	1,1-Dichloropropene	563-58-6	mg/kg	NA	0.0236 U	0.0210 U	0.0126 U
	1,2,3-Trichlorobenzene	87-61-6	mg/kg	0.15	0.0945 U	0.0840 U	0.0505 U
	1,2,3-Trichloropropane	96-18-4	mg/kg	0.000031	0.00189 U	0.00168 U	0.00100 U
	1,2,4-Trichlorobenzene	120-82-1	mg/kg	0.082	0.0236 U	0.0210 U	0.0126 U
	1,2,4-Trimethylbenzene	95-63-6	mg/kg	0.61	0.0945 U	0.0840 U	0.0505 U
	1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	NA	0.0945 U	0.0840 U	0.0505 U
	1,2-Dibromoethane	106-93-4	mg/kg	0.00024	0.00142 U	0.00126 U	0.000755 U
	1,2-Dichlorobenzene	95-50-1	mg/kg	2.4	0.0236 U	0.0210 U	0.0126 U
	1,2-Dichloroethane	107-06-2	mg/kg	0.0055	0.00189 U	0.00168 U	0.00100 U
	1,2-Dichloropropane	78-87-5	mg/kg	0.03	0.00945 U	0.00840 U	0.00505 U
	1,3,5-Trimethylbenzene	108-67-8	mg/kg	0.66	0.0236 U	0.0210 U	0.0126 U
	1,3-Dichlorobenzene	541-73-1	mg/kg	2.3	0.0236 U	0.0210 U	0.0126 U
	1,3-Dichloropropane	142-28-9	mg/kg	NA	0.00945 U	0.00840 U	0.00505 U
	1,4-Dichlorobenzene	106-46-7	mg/kg	0.037	0.0236 U	0.0210 U	0.0126 U
	2,2-Dichloropropane	594-20-7	mg/kg	NA	0.0236 U	0.0210 U	0.0126 U
	2-Butanone	78-93-3	mg/kg	15	0.236 U	0.209 U	0.126 U
	2-Chlorotoluene	95-49-8	mg/kg	NA	0.0236 U	0.0210 U	0.0126 U
	2-Hexanone	591-78-6	mg/kg	0.11	0.114 U	0.101 U	0.0605 U
	4-Chlorotoluene	106-43-4	mg/kg	NA	0.0189 U	0.0168 U	0.0101 U
	4-Isopropyltoluene	99-87-6	mg/kg	NA	0.0755 U	0.0670 U	0.0403 U
	4-Methyl-2-pentanone	108-10-1	mg/kg	18	0.236 U	0.209 U	0.126 U
	Acetone	67-64-1	mg/kg	38	0.236 U	0.209 U	0.126 U
	Benzene	71-43-2	mg/kg	0.022	0.0118 U	0.0105 U	0.00630 U
	Bromobenzene	108-86-1	mg/kg	0.36	0.0236 U	0.0210 U	0.0126 U
	Bromochloromethane	74-97-5	mg/kg	NA	0.0236 U	0.0210 U	0.0126 U
	Bromodichloromethane	75-27-4	mg/kg	0.0043	0.00189 U	0.00168 U	0.00100 U
	Bromoform	75-25-2	mg/kg	0.1	0.0236 U	0.0210 U	0.0126 U
	Bromomethane	74-83-9	mg/kg	0.024	0.0189 U	0.0168 U	0.0101 U
	Carbon disulfide	75-15-0	mg/kg	2.9	0.0945 U	0.0840 U	0.0505 U
	Carbon tetrachloride	56-23-5	mg/kg	0.021	0.0118 U	0.0105 U	0.00630 U
	Chlorobenzene	108-90-7	mg/kg	0.46	0.0236 U	0.0210 U	0.0126 U
	Chloroethane	75-00-3	mg/kg	72	0.189 U	0.168 U	0.101 U
	Chloroform	67-66-3	mg/kg	0.0071	0.00565 U	0.00505 U	0.00302 U
	Chloromethane	74-87-3	mg/kg	0.61	0.0236 U	0.0210 U	0.0126 U
	Dibromochloromethane	124-48-1	mg/kg	0.0027	0.00472 U	0.00419 U	0.00252 U
	Dibromomethane	74-95-3	mg/kg	0.025	0.0236 U	0.0210 U	0.0126 U
	Dichlorodifluoromethane	75-71-8	mg/kg	3.9	0.0945 U	0.0840 U	0.0505 U
	Ethylbenzene	100-41-4	mg/kg	0.13	0.0236 U	0.0210 U	0.0126 U
	Hexachlorobutadiene	87-68-3	mg/kg	0.02	0.0189 U	0.0168 U	0.0101 U
	Isopropylbenzene	98-82-8	mg/kg	5.6	0.0236 U	0.0210 U	0.0126 U
	Methyl-tert-butyl ether (MTBE)	1634-04-4	mg/kg	0.4	0.0945 U	0.0840 U	0.0505 U
	Methylene chloride	75-09-2	mg/kg	NA	0.0945 U	0.0840 U	0.0505 U
	Naphthalene	91-20-3	mg/kg	0.038	0.0236 U	0.0210 U	0.0126 U
	Styrene	100-42-5	mg/kg	10	0.0236 U	0.0210 U	0.0126 U
	Tetrachloroethene (PCE)	127-18-4	mg/kg	0.19	0.0118 U	0.0105 U	0.00630 U
	Toluene	108-88-3	mg/kg	6.7	0.0236 U	0.0210 U	0.0126 U
	Trichloroethene (TCE)	79-01-6	mg/kg	NA	0.00945 U	0.00840 U	0.00505 U
	Trichlorofluoromethane	75-69-4	mg/kg	41	0.0472 U	0.0419 U	0.0251 U
	Vinyl Chloride	75-01-4	mg/kg	NA	0.000755 U	0.000670 U	0.000403 U
	Vinyl acetate	108-05-4	mg/kg	1.1	0.0945 U	0.0840 U	0.0505 U
	Xylene, Isomers m & p	179601-23-1	mg/kg	NA	0.0472 U	0.0419 U	0.0251 U
	Xylenes	1330-20-7	mg/kg	1.5	0.0710 U	0.0630 U	0.0377 U
	cis-1,2-Dichloroethene	156-59-2	mg/kg	0.12	0.0236 U	0.0210 U	0.0126 U
	cis-1,3-Dichloropropene	10061-01-5	mg/kg	NA	0.0118 U	0.0105 U	0.00630 U
	n-Butylbenzene	104-51-8	mg/kg	20	0.0236 U	0.0210 U	0.0126 U
	n-Propylbenzene	103-65-1	mg/kg	9.1	0.0236 U	0.0210 U	0.0126 U
	o-Xylene	95-47-6	mg/kg	NA	0.0236 U	0.0210 U	0.0126 U
	sec-Butylbenzene	135-98-8	mg/kg	28	0.0236 U	0.0210 U	0.0126 U
	tert-Butylbenzene	98-06-6	mg/kg	NA	0.0236 U	0.0210 U	0.0126 U
	trans-1,2-Dichloroethene	156-60-5	mg/kg	1.3	0.0236 U	0.0210 U	0.0126 U
	trans-1,3-Dichloropropene	10061-02-6	mg/kg	NA	0.0118 U	0.0105 U	0.00630 U

Notes

bold The analyte was detected.

red highlight The analyte was detected at a concentration above the PAL.

grey highlight The analyte was not detected, however the LOD exceeds the PAL.

CAS Chemical Abstract Service registry number

ID identification

LOD limit of detection

LOQ limit of quantitation

mg/kg milligrams per kilogram

NA not applicable / not analyzed

PAL project action level

QC quality control

VOC volatile organic compounds

Data Qualifiers

J The quantitation is considered estimated, with an indeterminate direction of bias due to detection below the LOQ (*laboratory-applied)* .

U non-detect

Table 3 2021 UVOST and Soil Boring Screening Summary			
Soil Boring ID/UVOST ID (Depth in feet bgs)	**HHS PID Screening Depth (feet bgs)**	**PID Result**	**UVOST Result (Result Depth in feet bgs)**
SB-01 (12)	6-7	0.8	(2.74) Light-end Fuel Response
UV-01 (20)	9-10	4.9	(17.55) Light-end Fuel Response
SB-02 (12)	4-6	0.8	Fill and Background
UV-02 (20)	6-8	1.3	
	8-10	1.7	
SB-03 (12)	4-6	2.6	Fill and Background
UV-03 (20)	6-8	1.0	
	11-12	0.8	
SB-04 (12)	7-8	18.7	(7.48) Possible POL Response
UV-04 (16)	9-10	4.5	
SB-05 (12)	4-6	5.4	Background
UV-05 (10)	6-8	0.6	
	9-11	1.0	
SB-06 (12)	4-6	0.4	Background
UV-06 (10)	6.8	0.4	
SB-07 (12)	4-6	0.7	Background
UV-07 (10)	6-8	0.8	
	8-10	0.9	
SB-08 (12)	4-6	1.9	Background
UV-08 (10)	6.8	0.6	
	8-10	5.6	
	10-12	1.7	
SB-09 (12)	4-6	3.6	(10.58) Light-end Fuel Response
UV-09 (14)	6-8	8.6	
	8-10	241.0*	
	11-12	673.8*	
SB-10	4-6	2.7	Background
UV-10 (12)	8-10	2.0	
	10-12	158.6*	
SB-11 UV-11 (6)	NA	NA	Background
SB-12 UV-12 (6)	NA	NA	Background
SB-13 UV-13 (6)	NA	NA	Background
SB-14 UV-14 (6)	NA	NA	Background

Notes

* Elevated PID results in these soil horizons is considered to be from an unknown source

Red text indicates UVOST screening locations with results indicating potential fuel responses

bgs = below ground surface

HHS = heated headspace

ID = identification

NA = not applicable

PID = photoionization detector

UVOST = Ultra-Violet Optical Screening Tool

APPENDIX A

Field Notes

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Cold Bay

2021

Rite in the Rain®
ALL-WEATHER
UNIVERSAL
№ 371FX

Frosty Fuels
Pipeline Release Investigation

Book # 2

Cold Bay Pipeline Release 8/17/21

14:50 UVOST screening in ditch to determine extent and plan analytical samples. Borings 30' apart.
1457 Begin SB01. Moderate data spike from 2.0'-3.0' bgs. Hard pan @ 12'-16'. Data spike @ ~16' to 18', which is water table. Fuel from tank farm.
1513 Move to SB-02 (CBPR-UV02).
1516 Begin SB-02. No data spikes. Water at ~17' bgs, no spike at water table. Total depth 20' bgs.
1533 Begin SB-03. No data spikes, Total depth 20'.
1550 Move to SB-04, location of hot spot SO6 from 2018. Small spike in data from 6.5'-9' bgs, low amplitude. May be slightly off-set from 2018 location. No data spikes below 9', total depth 16'.
1608 Move to SB-05. No data spikes, total depth 10' bgs.
1620 move to SB-06. No data spikes, total depth 10' bgs.
1635 move to SB07. No data spikes,

Scale: 1 square =

total depth 10' bgs.
1648 Move to SB-08. No data spikes, total depth 10' bgs. (Loc. 2018 SO14).
1702 Move to SB-09. Data spike from 10' to 11' bgs. No data spikes below 11', total depth 14' bgs.
1715 Move to SB-10. No data spikes, total depth 12' bgs.
1737 SB-11 is stepout of SB-08, approx 5' east of SB-08, where ~2,500 mg/kg DRO found in 2018. at 3' bgs. No data spikes, total depth 6.0' bgs.
1747 SB12 is stepout ~8' west of SB08. No obvious data spikes, total depth 6.0' bgs.
1759 Move back to do stepouts around SB-04. SB-13 located ~6' east of SB-04. No data spikes, total depth 6.0' bgs.
1809 SB14 is stepout ~10' west of SB04. No data spikes, total depth 6.0' bgs.
1820 Will plan to collect macro cores and analytical at locations 1, 4, 6, 8, & 10 tomorrow.
1845 Return to Lodge

Scale: 1 square

Cold Bay Pipeline Release 8/18/21

Nelson Crone, Moana Leirer, Russ Beck

0800 meet at garage & pack gear for Macro Core sampling.

0930 Drill rig set up for macro core. Move to SB-01.

1000 Drill rig set up for macro core move to SB-04.

1035 Begin core at SB-06.

1104 Begin core at SB-08.

1138 Begin core at SB-10

1230 Break for lunch

1315 Back on site

1435 Begin core at SB-02.

1450 Begin core at SB-03.

Begin core at SB-05

Begin core at SB-07

Begin core at SB-09

1630 Begin core at SB-10A

Scale: 1 square = _____

PID results table (heated headspace)

SB-01	6-7'	0.8 ppm
SB-01	9-10'	4.9 ppm
SB-04	4-5'	80.1 ppm
SB-04	7-8'	18.7 ppm
SB-04	9-10'	4.5 ppm
SB-06	4-6'	0.4 ppm
SB-06	6-8'	0.4 ppm
SB-06	9-11'	0.5 ppm
SB-08	4-6'	1.9 ppm
SB-08	6-8'	0.6 ppm
SB-08	8-10'	5.6 ppm
SB-08	10-12'	1.7 ppm
SB-10	4-6'	2.7 ppm
SB-10	8-10'	7.0 ppm
SB-10	10-12'	158.6 ppm
SB-02	4-6'	0.8 ppm
SB-02	6-8'	1.3 ppm
SB-02	8-10'	1.7 ppm
SB-03	4-6'	2.6 ppm
SB-03	6-8'	1.0 ppm
SB-03	11-12'	0.8 ppm
SB05	4'-6'	5.4 ppm
SB-05	6'-8'	0.6 ppm

Scale: 1 square = _____

Rite in the Rain

Cold Bay Pipeline Release 8/18/21

PID Results Table (heated headspace)

SB-05	9'-11'	–	1.0 PPM
SB-07	4-6'	–	0.7 ppm
SB-07	6-8'	–	0.8 ppm
SB-07	8-10'	–	0.9 ppm
SB-09	4-6'	–	3.6 ppm
SB-09	6-8'	–	8.6 ppm
SB-09	8-10'	–	241.0 ppm
SB-09	11-12'	–	673.8 ppm
SB-10A	8-10'	–	290.4 ppm

Analytical Sample Summary

0948 Collect soil sample CBPR-SB01-S1 at 7-8' for DRO/BTEX

0955 Collect sample CBPR-SB01-S2 for DRO/PAHs/VOCs (9'-10')

1009 Collect sample CBPR-SB04-S1 from 7'-8' For DRO/PAHs/~~BTEX~~VOCs

10:18 collect CBPR-SB04-S2 from 10'-11' for DRO/BTEX

10:47 Collect CBPR-SB06-S1 from 5'-6' for DRO/BTEX.

10:58 Collect CBPR-SB06-S2 from 9'-11' for DRO/BTEX

11:17 collect CBPR-SB08-S1 from 4'-5' For DRO/BTEX

Scale: 1 square = _____

Cold Bay Pipeline Release 8/18/21

11:58 Collect CBPR-SB08-S2 from 9'-11' for DRO/BTEX.

12:10 Collect CBPR-SB10-S1 from 4'-6' for DRO/BTEX.

12:15 Collect CBPR-SB10-S2 from 8'-10' for DRO/BTEX.

14:15 Collect CBPR-SB02-S1 from 8-10' For DRO/BTEX.

1505 Collect CBPR-SB03-S1 from 11-12' for DRO/BTEX.

1522 Collect CBPR-SB05-S1 from 9'-11' for DRO/BTEX.

1552 Collect CBPR-SB07-S1 from 8-10' For DRO/BTEX and duplicate sample CBPR-SB07-S2 (Time on sample 16:00).

16:20 Collect CBPR-SB09-S1 from 4'-6' For DRO only.

16:30 Move to tank Farm, recorded in Book #1.

Scale: 1 square = _____

Rite in the Rain

APPENDIX B

UVOST Probe Results

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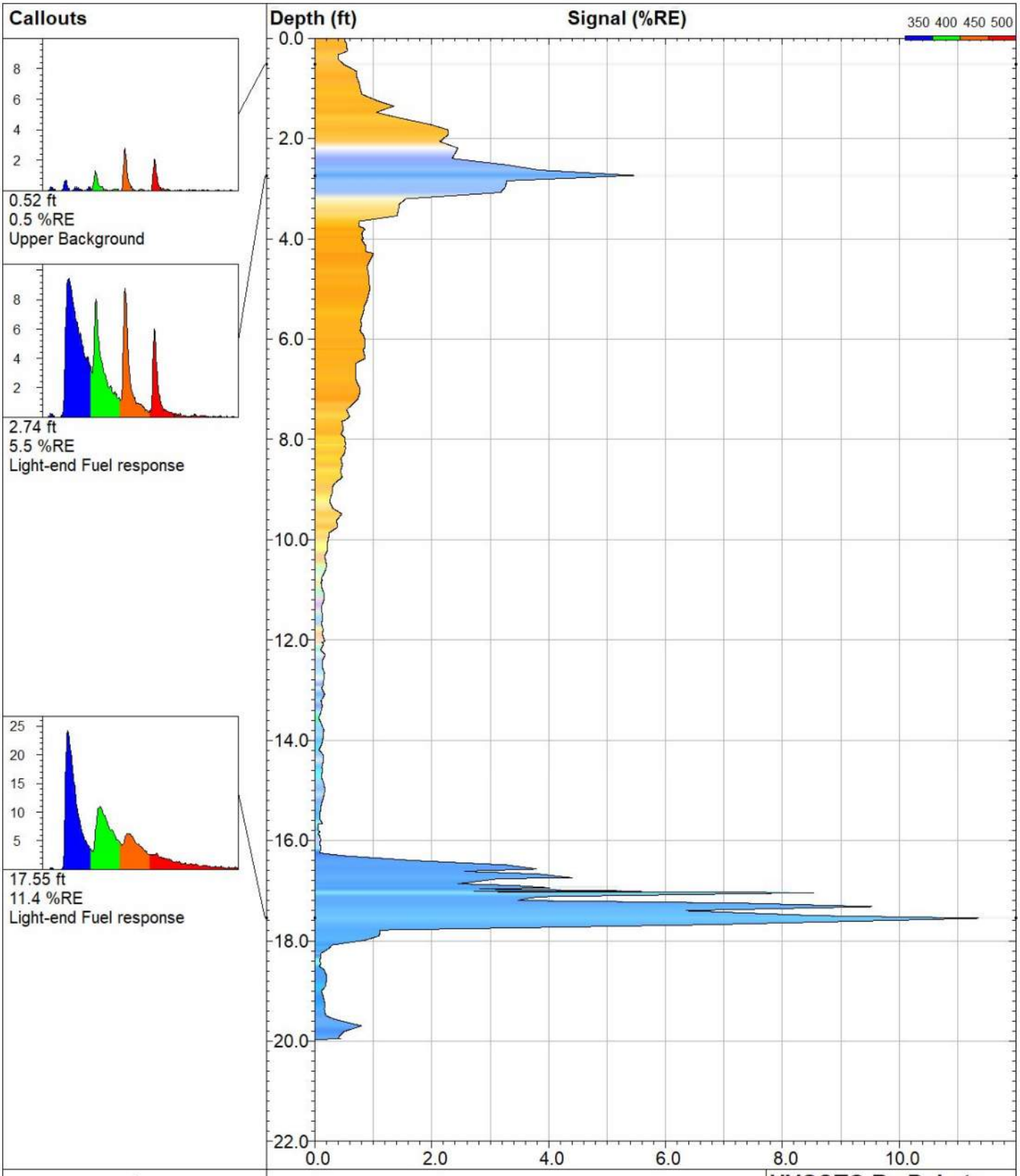

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CBPR UV01

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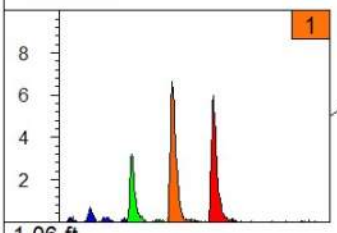
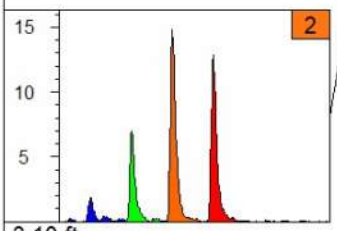
Site: **Cold Bay- Pipeline**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **19.96 ft**
Client / Job: **Susitna Env /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **11.4 %RE @ 17.55 ft**
Operator / Unit: **PCaron / UVOST1016**	*Elevation:* **Unavailable**	*Date & Time:* **2021-08-17 14:57 ADT**

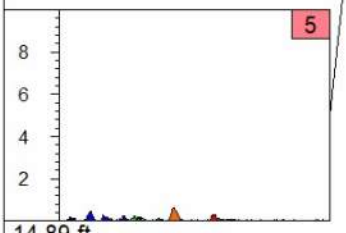
Callouts



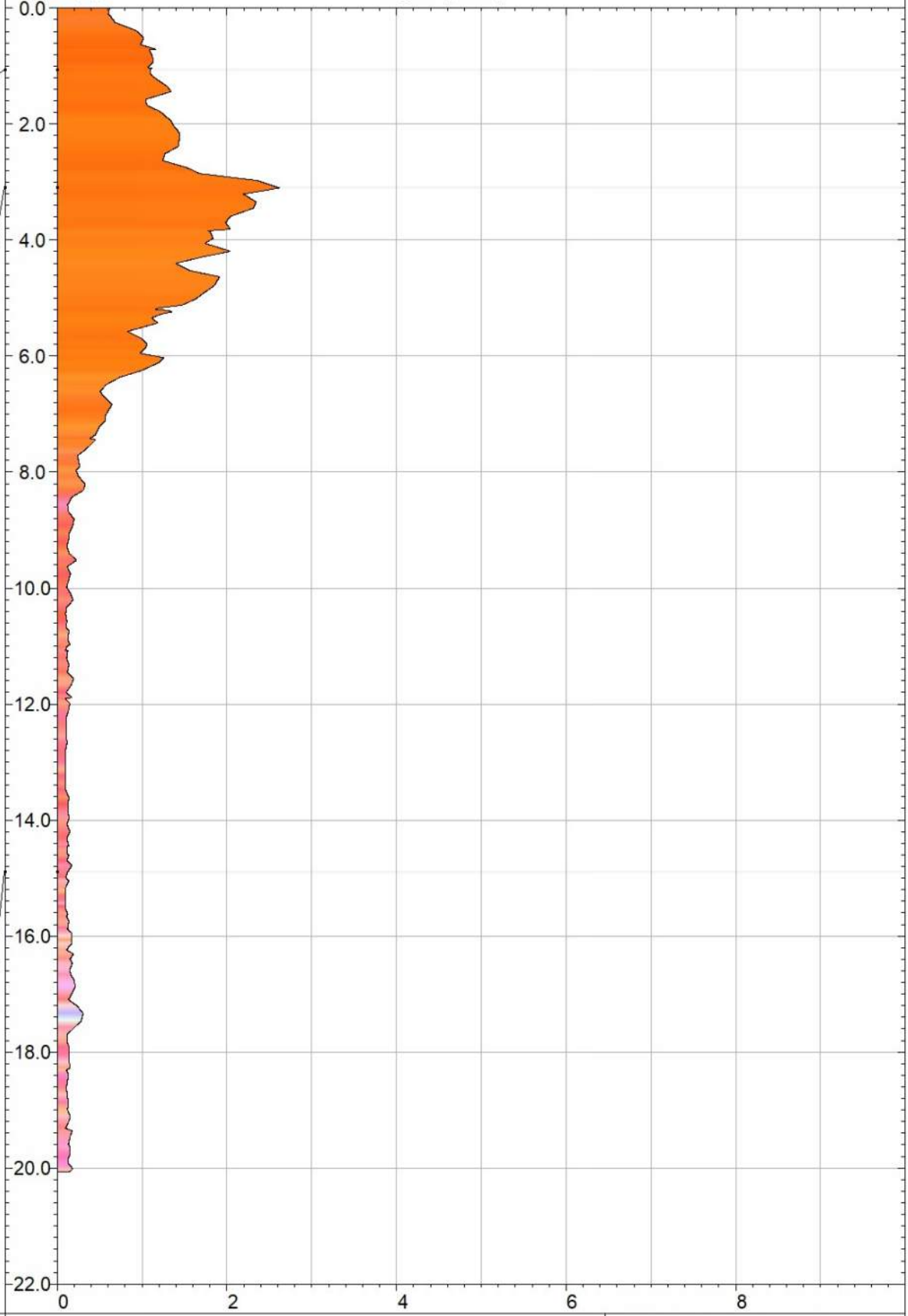
1.06 ft
1.1 %RE
Upper Background



3.10 ft
2.6 %RE
Fill Material



14.89 ft
0.1 %RE
Lower Background



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CBPR UV02

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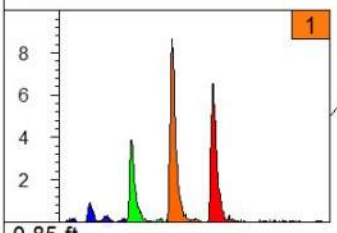
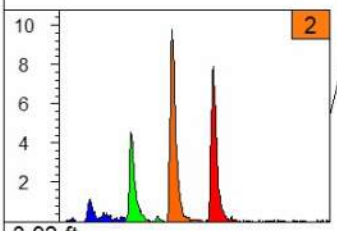
Site: **Cold Bay- Pipeline**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **20.06 ft**
Client / Job: **Susitna Env /**	X Coord.(Long/East): **Unavailable**	Max Signal: **2.6 %RE @ 3.10 ft**
Operator / Unit: **PCaron / UVOST1016**	Elevation: **Unavailable**	Date & Time: **2021-08-17 15:16 ADT**

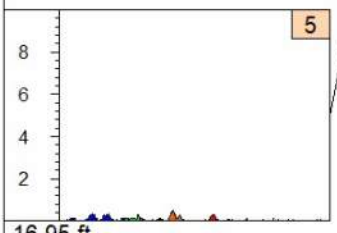
Callouts



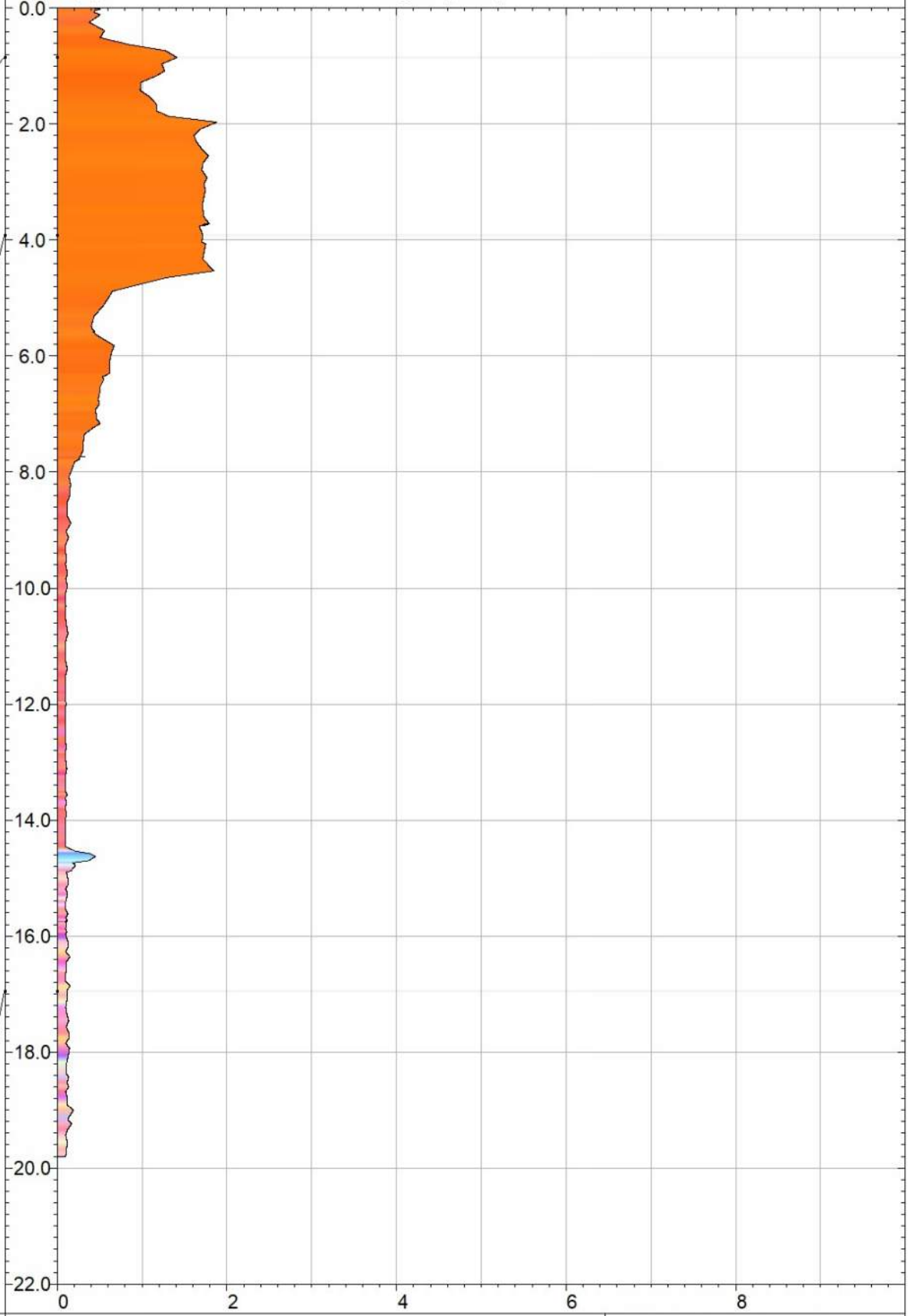
0.85 ft
1.4 %RE
Upper Background



3.92 ft
1.7 %RE
Fill Material



16.95 ft
0.1 %RE
Lower Background



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CBPR UV03

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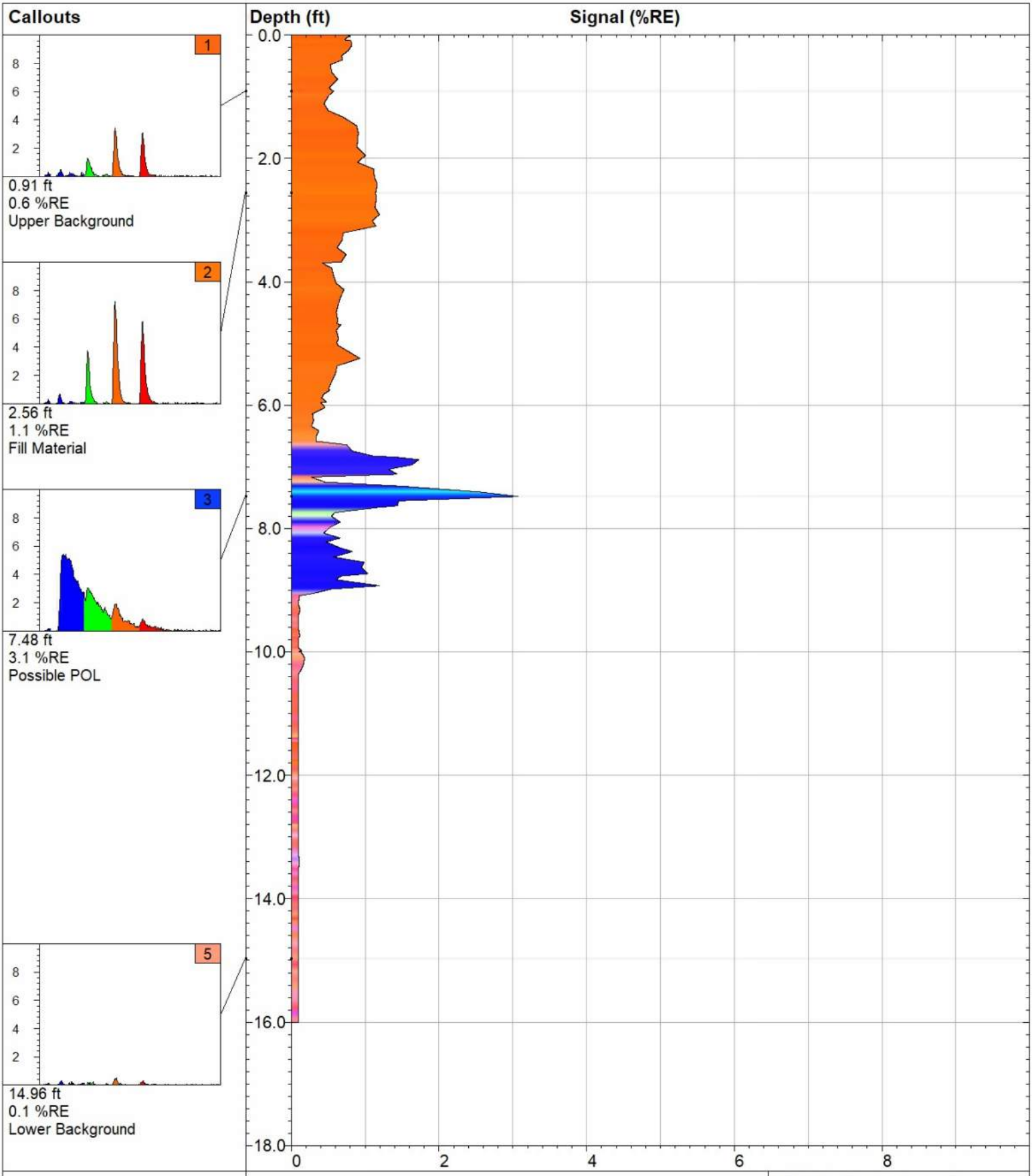
Site: **Cold Bay- Pipeline**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **19.80 ft**
Client / Job: **Susitna Env /**	X Coord.(Long/East): **Unavailable**	Max Signal: **1.9 %RE @ 1.97 ft**
Operator / Unit: **PCaron / UVOST1016**	Elevation: **Unavailable**	Date & Time: **2021-08-17 15:33 ADT**



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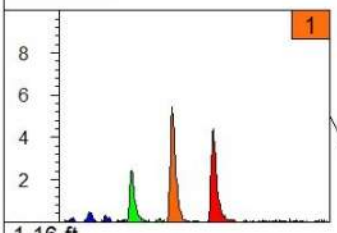
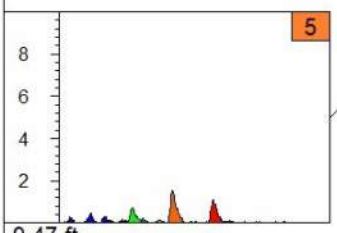
Site: **Cold Bay- Pipeline**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **16.01 ft**
Client / Job: **Susitna Env /**	X Coord.(Long/East): **Unavailable**	Max Signal: **3.1 %RE @ 7.48 ft**
Operator / Unit: **PCaron / UVOST1016**	Elevation: **Unavailable**	Date & Time: **2021-08-17 15:51 ADT**

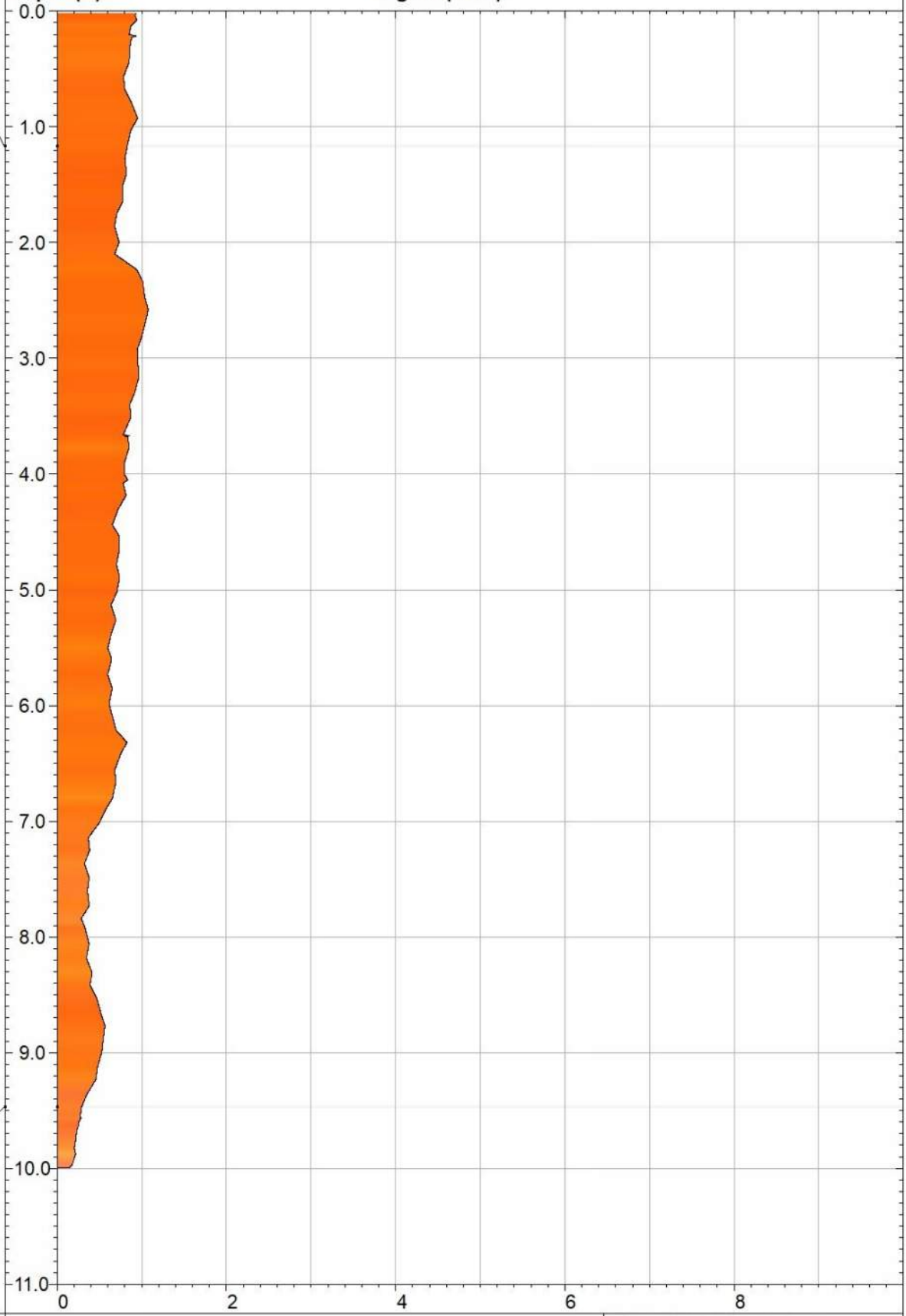
Callouts



1.16 ft
0.8 %RE
Upper Background



9.47 ft
0.3 %RE
Lower Background



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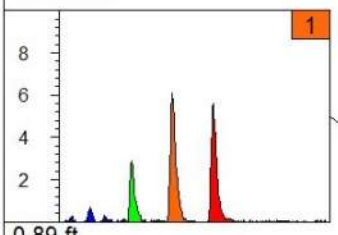
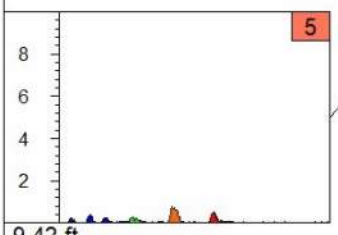
Site: **Cold Bay- Pipeline**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **9.99 ft**
Client / Job: **Susitna Env /**	X Coord.(Long/East): **Unavailable**	Max Signal: **1.1 %RE @ 2.58 ft**
Operator / Unit: **PCaron / UVOST1016**	Elevation: **Unavailable**	Date & Time: **2021-08-17 16:10 ADT**

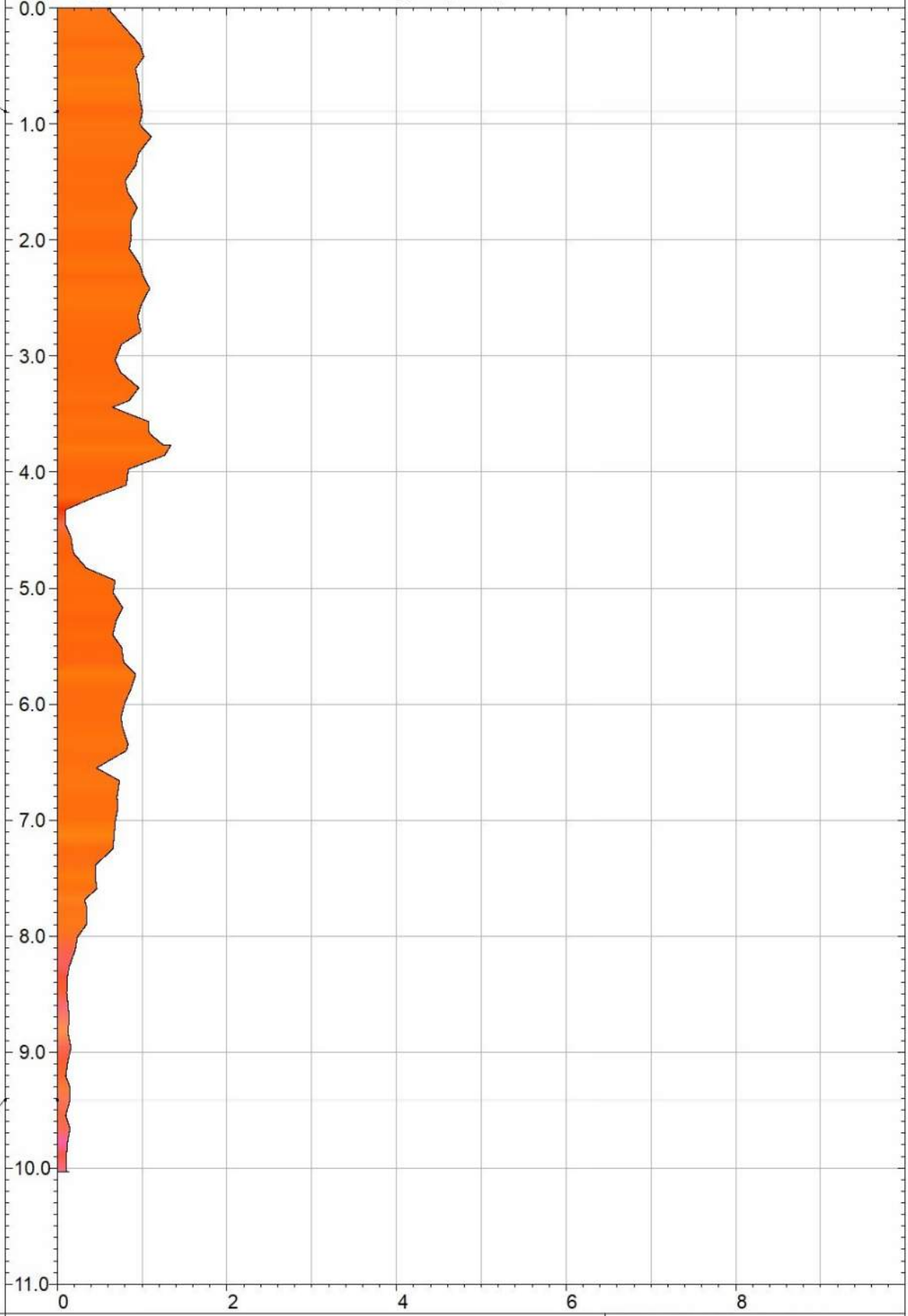
Callouts



0.89 ft
1.0 %RE
Upper Background



9.42 ft
0.1 %RE
Lower Background



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CBPR UV06

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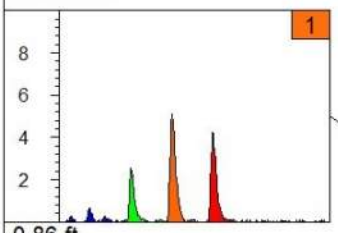
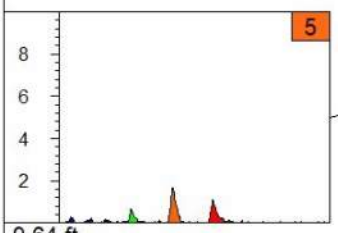
Site: **Cold Bay- Pipeline**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **10.03 ft**
Client / Job: **Susitna Env /**	X Coord.(Long/East): **Unavailable**	Max Signal: **1.3 %RE @ 3.77 ft**
Operator / Unit: **PCaron / UVOST1016**	Elevation: **Unavailable**	Date & Time: **2021-08-17 16:23 ADT**

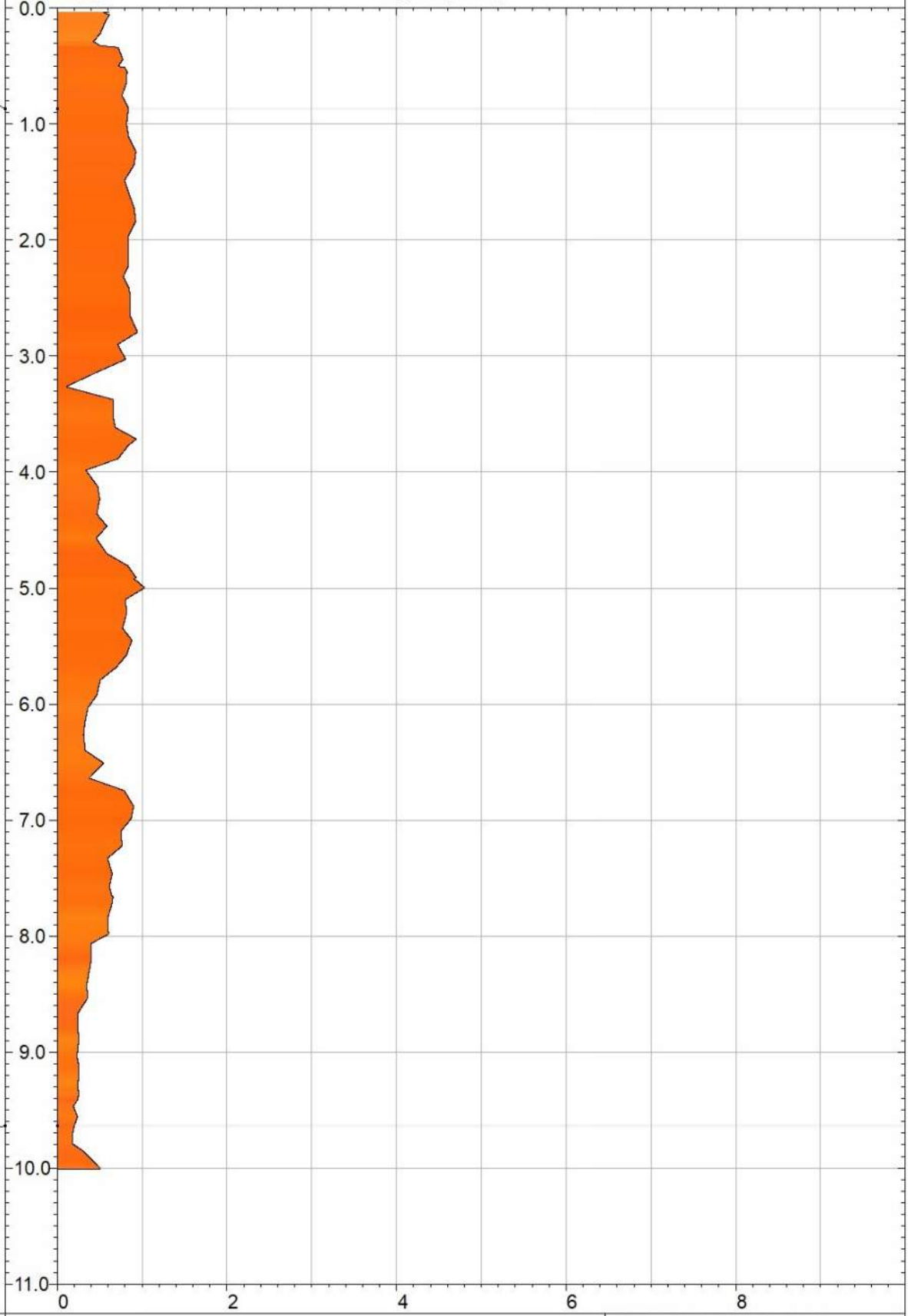
Callouts



0.86 ft
0.8 %RE
Upper Background



9.64 ft
0.2 %RE
Lower Background



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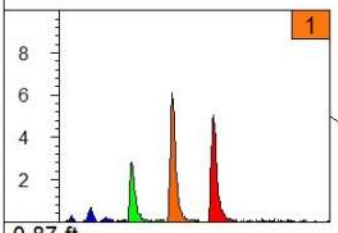
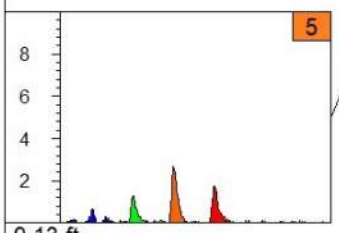
Site: **Cold Bay- Pipeline**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **10.01 ft**
Client / Job: **Susitna Env /**	X Coord.(Long/East): **Unavailable**	Max Signal: **1.0 %RE @ 5.00 ft**
Operator / Unit: **PCaron / UVOST1016**	Elevation: **Unavailable**	Date & Time: **2021-08-17 16:36 ADT**

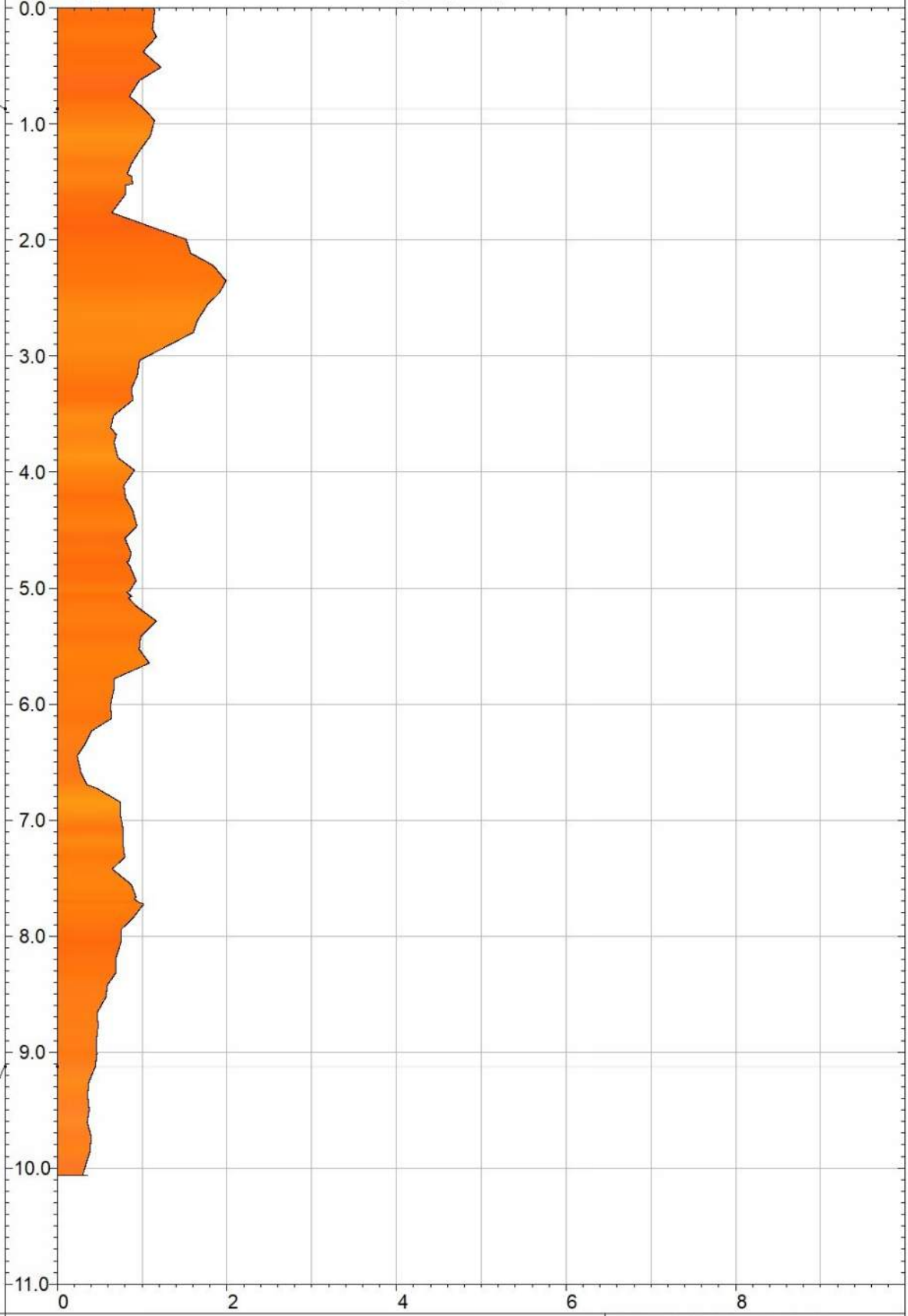
Callouts



0.87 ft
1.0 %RE
Upper Background



9.13 ft
0.4 %RE
Lower Background



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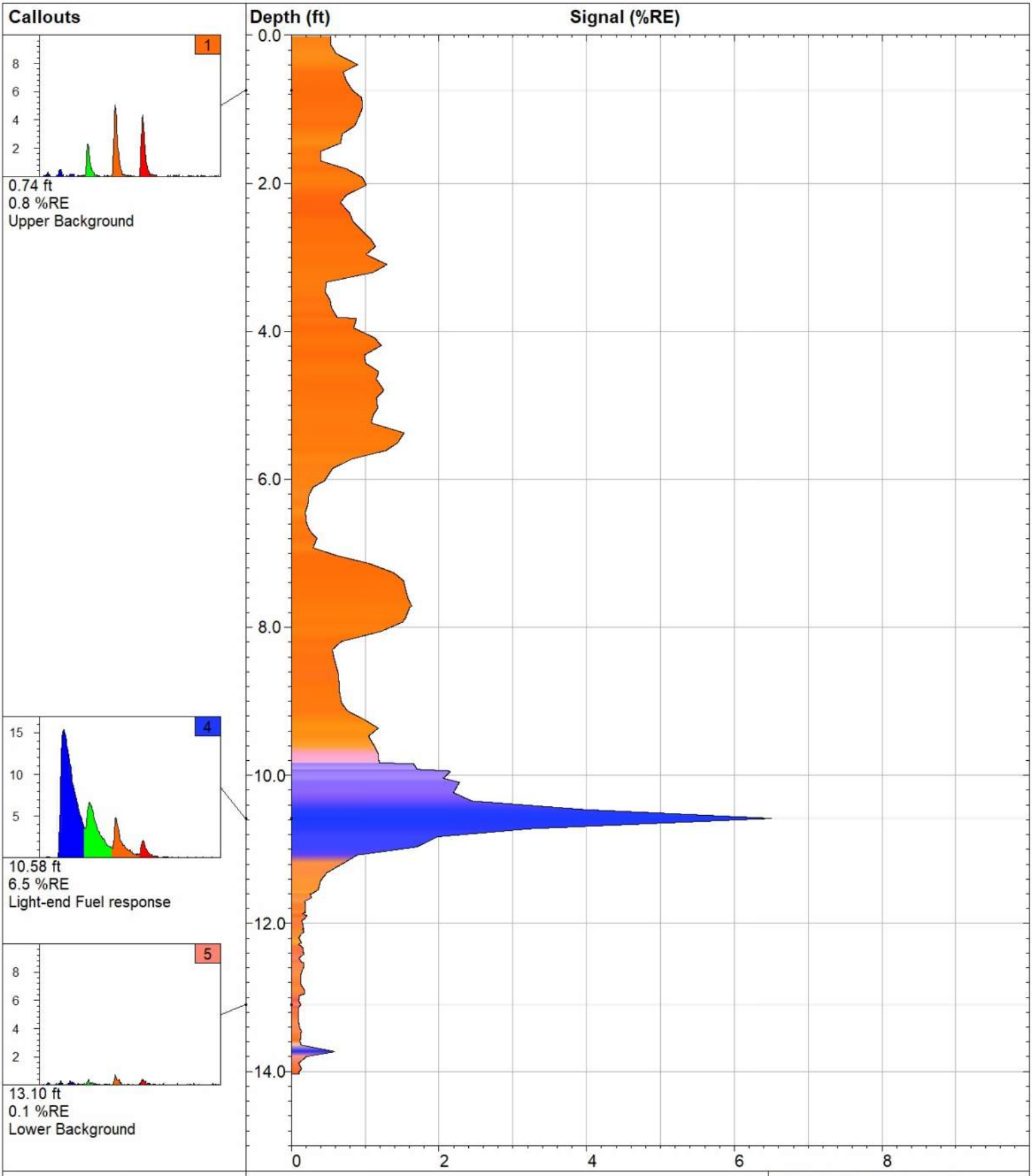
Site: **Cold Bay- Pipeline**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **10.06 ft**
Client / Job: **Susitna Env /**	X Coord.(Long/East): **Unavailable**	Max Signal: **2.0 %RE @ 2.35 ft**
Operator / Unit: **PCaron / UVOST1016**	Elevation: **Unavailable**	Date & Time: **2021-08-17 16:49 ADT**



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CBPR UV09

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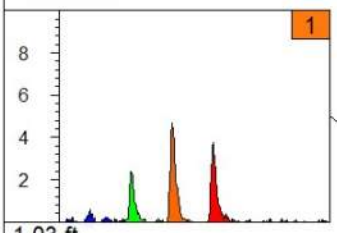
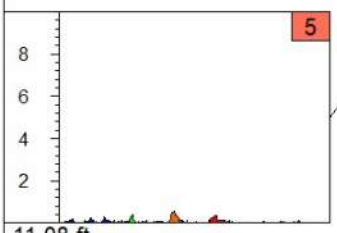
Site: **Cold Bay- Pipeline**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **14.03 ft**
Client / Job: **Susitna Env /**	X Coord.(Long/East): **Unavailable**	Max Signal: **6.5 %RE @ 10.58 ft**
Operator / Unit: **PCaron / UVOST1016**	Elevation: **Unavailable**	Date & Time: **2021-08-17 17:03 ADT**

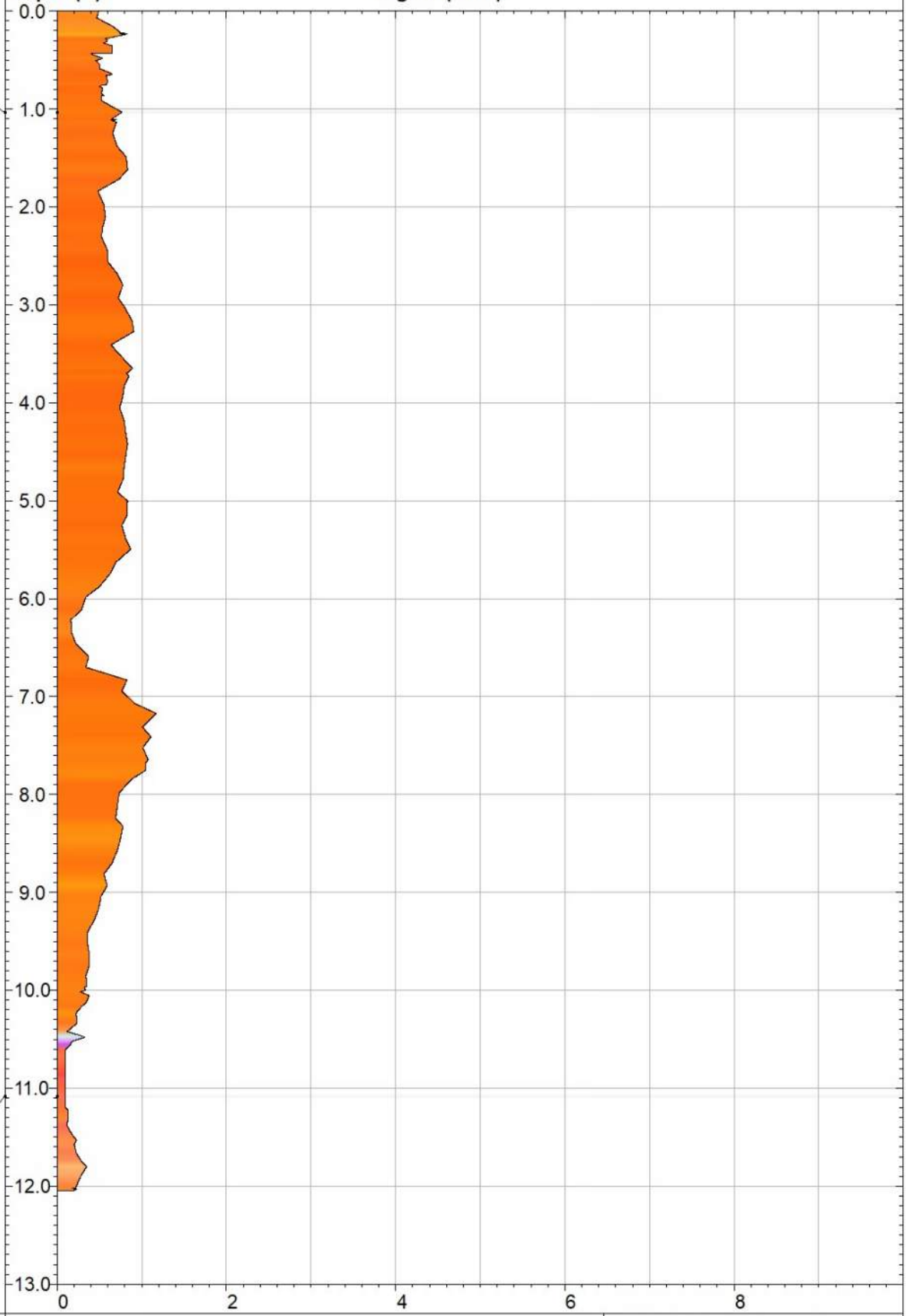
Callouts



1.03 ft
0.8 %RE
Upper Background



11.08 ft
0.1 %RE
Lower Background



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CBPR UV10

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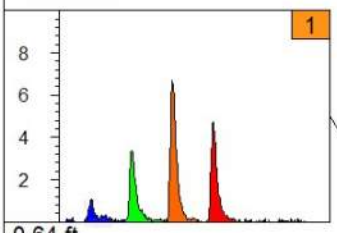
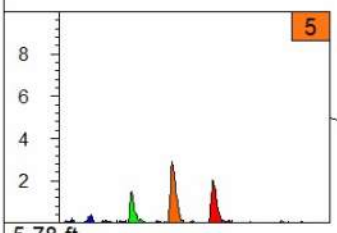
Site: **Cold Bay- Pipeline**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **12.05 ft**
Client / Job: **Susitna Env /**	X Coord.(Long/East): **Unavailable**	Max Signal: **1.2 %RE @ 7.17 ft**
Operator / Unit: **PCaron / UVOST1016**	Elevation: **Unavailable**	Date & Time: **2021-08-17 17:18 ADT**

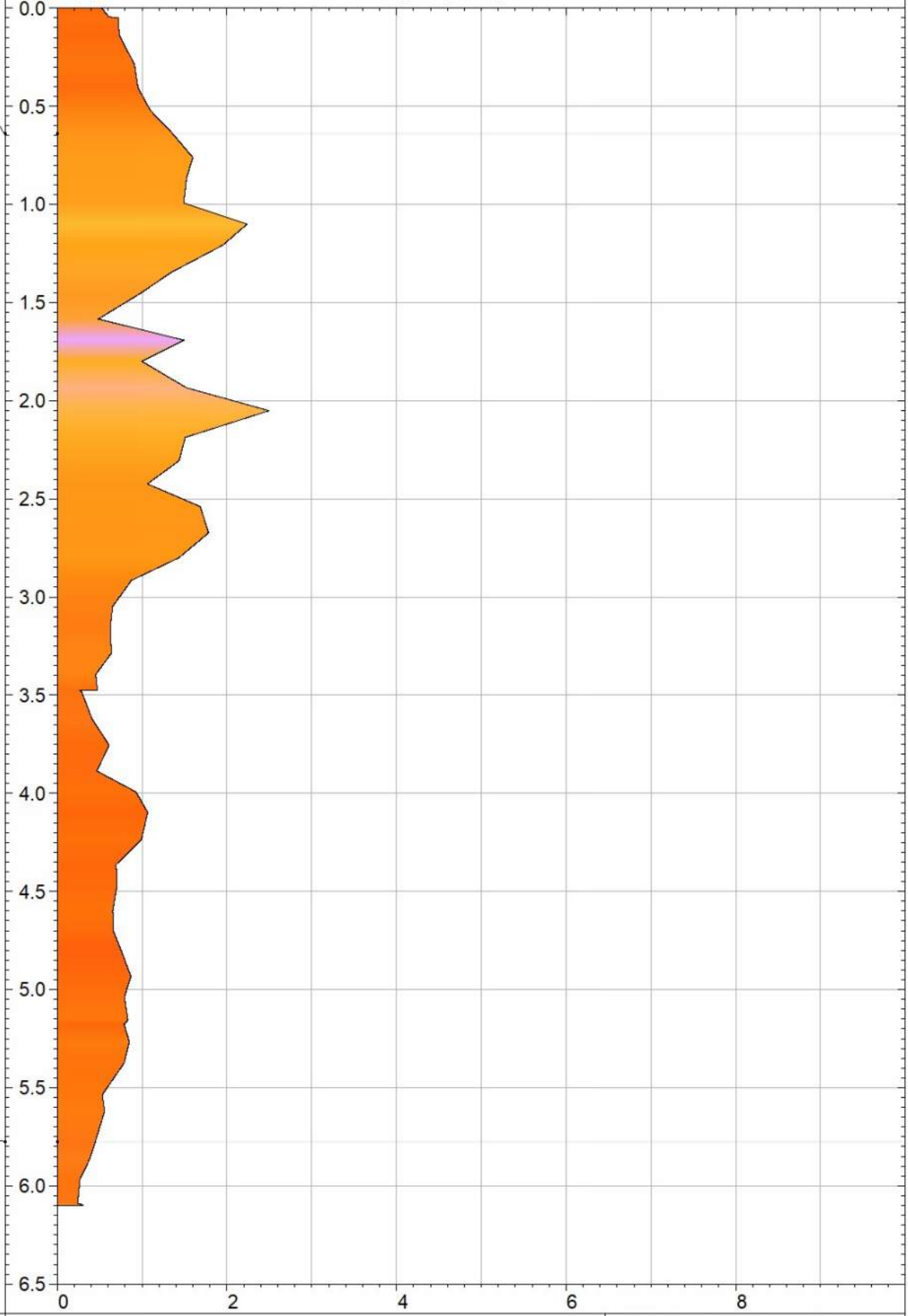
Callouts



0.64 ft
1.4 %RE
Upper Background



5.78 ft
0.4 %RE
Lower Background



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CBPR UV11

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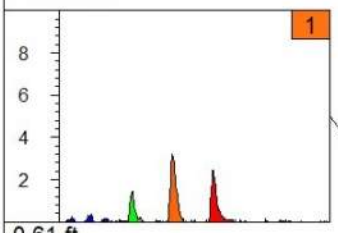
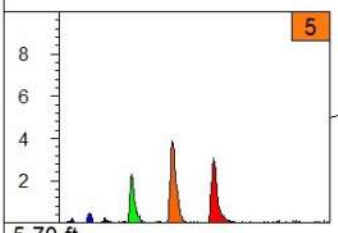
Site: **Cold Bay- Pipeline**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **6.10 ft**
Client / Job: **Susitna Env /**	X Coord.(Long/East): **Unavailable**	Max Signal: **2.5 %RE @ 2.05 ft**
Operator / Unit: **PCaron / UVOST1016**	Elevation: **Unavailable**	Date & Time: **2021-08-17 17:39 ADT**

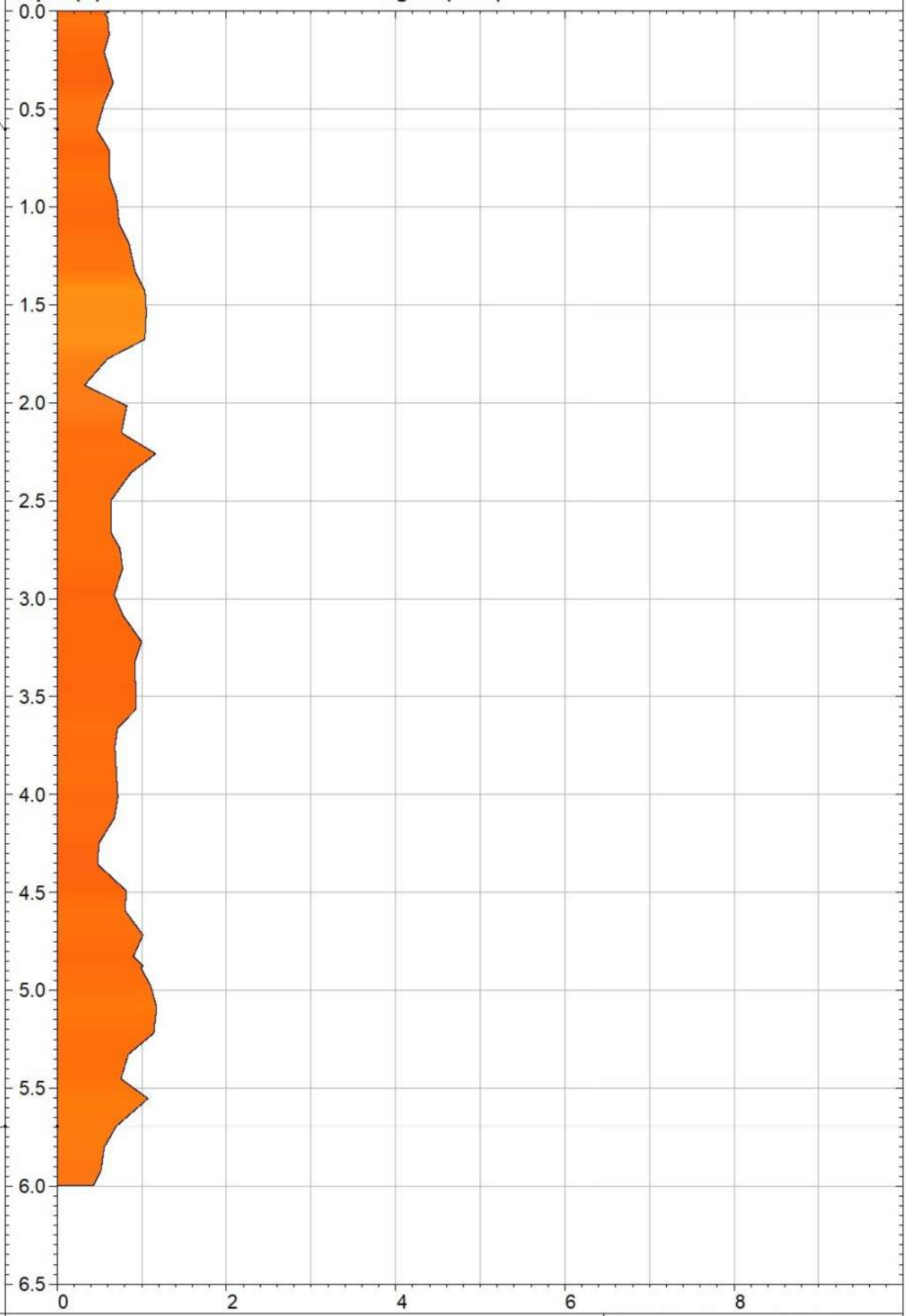
Callouts



0.61 ft
0.5 %RE
Upper Background



5.70 ft
0.7 %RE
Lower Background



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CBPR UV12

UVOST® By Dakota
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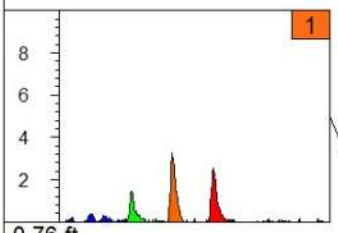
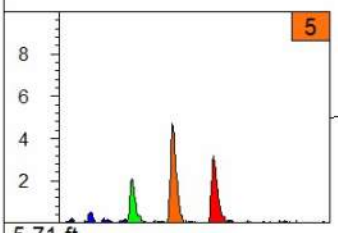
Site: **Cold Bay- Pipeline**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **6.00 ft**
Client / Job: **Susitna Env /**	X Coord.(Long/East): **Unavailable**	Max Signal: **1.2 %RE @ 5.09 ft**
Operator / Unit: **PCaron / UVOST1016**	Elevation: **Unavailable**	Date & Time: **2021-08-17 17:49 ADT**

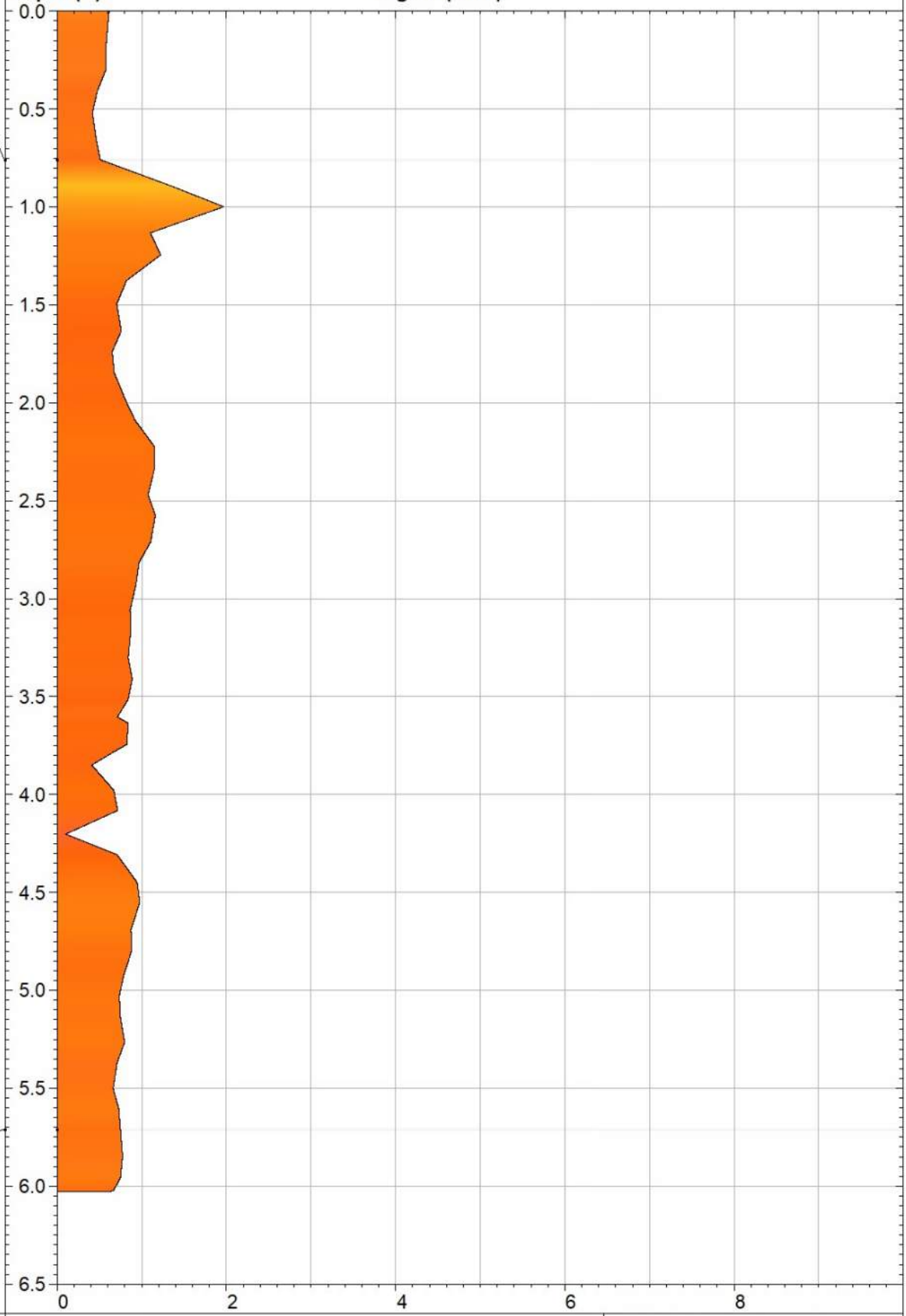
Callouts



0.76 ft
0.5 %RE
Upper Background



5.71 ft
0.7 %RE
Lower Background



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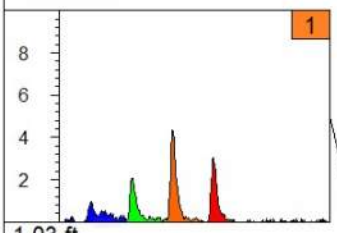
CBPR UV13

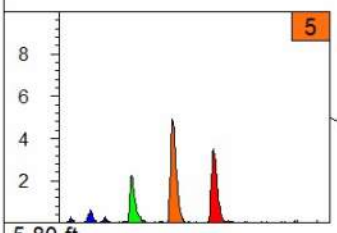
UVOST® By Dakota
www.DakotaTechnologies.com

Site: **Cold Bay- Pipeline**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **6.03 ft**
Client / Job: **Susitna Env /**	X Coord.(Long/East): **Unavailable**	Max Signal: **2.0 %RE @ 1.00 ft**
Operator / Unit: **PCaron / UVOST1016**	Elevation: **Unavailable**	Date & Time: **2021-08-17 18:02 ADT**

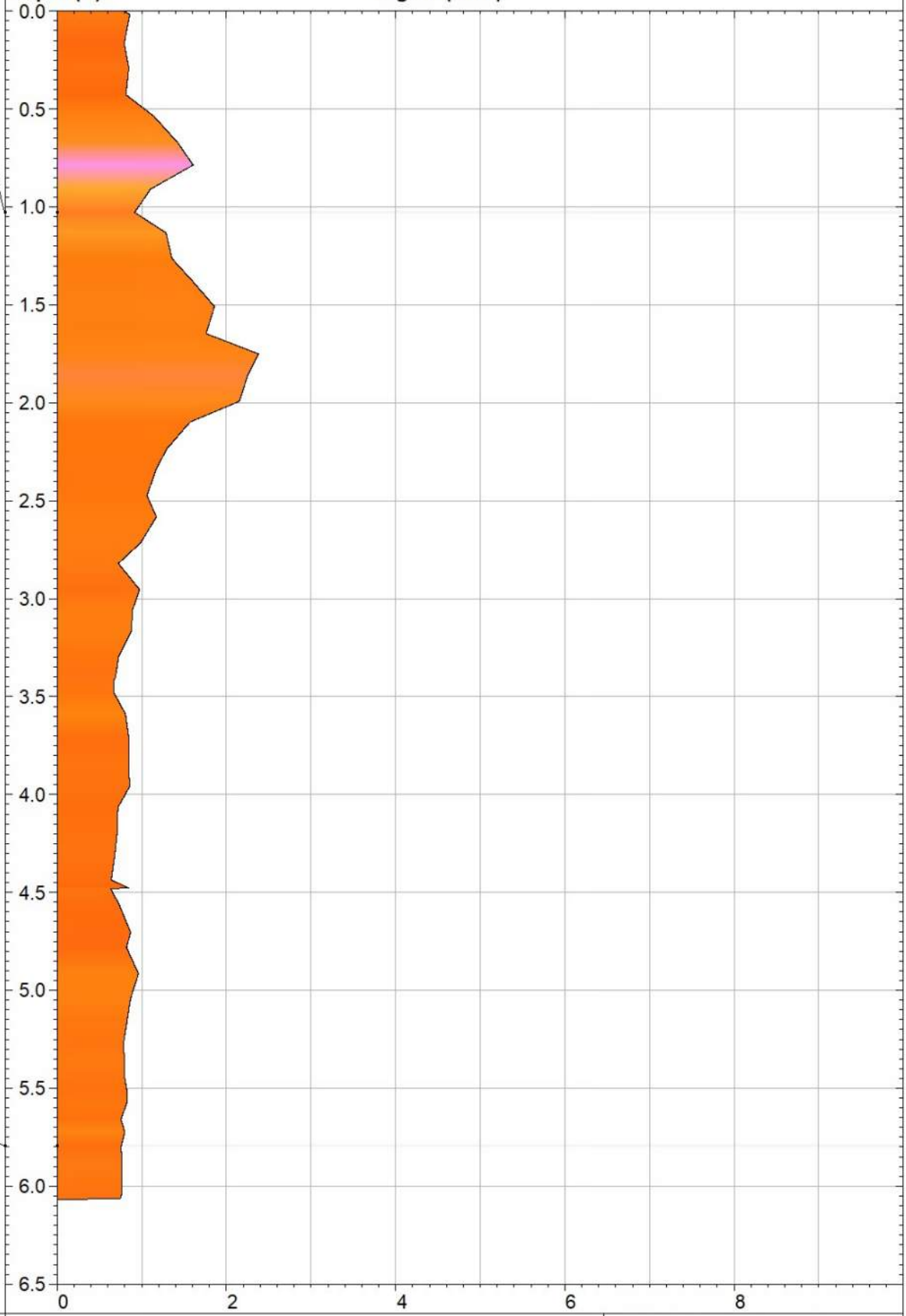
Callouts



1.03 ft
0.9 %RE
Upper Background



5.80 ft
0.8 %RE
Lower Background



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CBPR UV14

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Site: **Cold Bay- Pipeline**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **6.07 ft**
Client / Job: **Susitna Env /**	X Coord.(Long/East): **Unavailable**	Max Signal: **2.4 %RE @ 1.75 ft**
Operator / Unit: **PCaron / UVOST1016**	Elevation: **Unavailable**	Date & Time: **2021-08-17 18:11 ADT**

APPENDIX C

Soil Boring Logs

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Boring Log

SUSITNA ENVIRONMENTAL, LLC

Project Name: Cold Bay Pipeline Release
Project/Contract Number:
Date: 8/18/21
Logged By: Russ Beck
Company: Susitna
Driller: Paul Caron
Company: Brice

Boring Location ID SB-01

Boring Start Time: 0936
Boring Completion Time:
Total Depth:

Depth Below Ground Surface (Feet)	Insitu PID Reading (ppm)	Lithology Notes
0		~~Dark brown silty sand with gravel, dry, No odor~~
4		
	4.9 ppm	4'-8' Dark brown silty sand w/gravel, dry, no odor
8	~~Sample~~ Sample	
	~~Sample~~	8'-12' light gray sandy silt with gravel. Saturated at ~~@~~ 10.5' No odor. Gravel up to ~~10.5'~~ 11.5'.
	0.8 ppm	
12		

Analytical Samples

Sample ID	Time	Depth Interval (feet bgs)	Analyses
CBPR-SB01-S1	09:48	7'-8'	DRO/BTEX
CBPR-SB01-S2	09:55	9'-10'	DRO/PAHs/VOCs

Boring Log

SUSITNA ENVIRONMENTAL, LLC

Project Name: Cold Bay Pipeline Release
Project/Contract Number:
Date: 8/18/2
Logged By: Russ Beck
Company: Susitna
Driller: Paul Caron
Company: Brice

Boring Location ID SB-02

Boring Start Time: 2:35
Boring Completion Time: 1445
Total Depth: 12'

Depth Below Ground Surface (Feet)	Insitu PID Reading (ppm)	Lithology Notes
0		0
4		
	0.8	0-8 Dark brown sandy silt w/gravel to 1", dry, no odor.
8	1.3	
	1.7	8-12 Dark gray sandy silt w/gravel to 1.5"; damp, no odor. Analytical 8-10'.
12		

Analytical Samples

Sample ID	Time	Depth Interval (feet bgs)	Analyses
CBPR-SB02-S1	14:45	8-10'	DRO/BTEX

Boring Log

SUSITNA ENVIRONMENTAL, LLC

Project Name: Cold Bay Pipeline Release
Project/Contract Number:
Date: 8/18/21
Logged By: Russ Beck
Company: Susitna
Driller: Paul Caron
Company: Brice

Boring Location ID SB-03

Boring Start Time: 1450
Boring Completion Time: 1500
Total Depth: 12'

Depth Below Ground Surface (Feet)	Insitu PID Reading (ppm)	Lithology Notes
0		
4		
	3.6	4-8 light brown to light gray sandy silt with gravel to 1". Dry, no odor
8	1.0	
		8-12 Dark gray sandy silt w/gravel to 1.5". Damp, no odor. Analytical from 11-12'.
12	0.8	

Analytical Samples

Sample ID	Time	Depth Interval (feet bgs)	Analyses
CBPR-SB03-S1	15:05	11-12'	DRO/BTEX

Boring Log

SUSITNA ENVIRONMENTAL, LLC

Project Name: Cold Bay Pipeline Release
Project/Contract Number:
Date: 8/18/21
Logged By: Russ Beck
Company: Susitna
Driller: Paul Caron
Company: Brice

Boring Location ID SB-04

Boring Start Time: 1000
Boring Completion Time: 1009
Total Depth: 12'

Depth Below Ground Surface (Feet)	Insitu PID Reading (ppm)	Lithology Notes
0		
4	80.1	~~Dar~~ 4 – 5.5' Dark brown silt with sand, dry, moderate HC odor. Collect PID from 4–5.
8	10.7	5.5 – 8' light gray silty sand w/gravel to 0.25". Dry, moderate HC odor. Analytical 7'–8' sample
12	4.5 ppm	8 – 10 Dark brown mixed sand/silt layers, ~ 2" to 3" thick, HC odor from 8–9'. Damp 10 – 12 Gray/reddish silt, damp, no HC odor. Analytical 10 – 11'. Gravel

Analytical Samples

Sample ID	Time	Depth Interval (feet bgs)	Analyses
CBPR-SB04-S1	10:09	7'–8'	DRO/PAHs/VOCs
CBPR-SB04-S2	10:18	10'–11'	DRO/BTEX

Boring Log

SUSITNA ENVIRONMENTAL, LLC

Project Name: Cold Bay Pipeline Release
Project/Contract Number:
Date: 8/18/21
Logged By: Russ Beck
Company: Susitna
Driller: Paul Caron
Company: Brice

Boring Location ID SB-05

Boring Start Time: 1505
Boring Completion Time:
Total Depth:

Depth Below Ground Surface (Feet)	Insitu PID Reading (ppm)	Lithology Notes
0		
4	5.4	4-8 Dark reddish brown silty sand with gravel to 1.5", dry, slight HC odor from 4' to 5'.
8	0.6	
		8-12 Dark gray sand w/silt w/gravel to 0.25", damp, slight HC odor. Analytical from 9-11'.
12	1.0	

Analytical Samples

Sample ID	Time	Depth Interval (feet bgs)	Analyses
CBPR-SB05-S1	15:22	9-11'	DRO/BTEX

Boring Log

SUSITNA ENVIRONMENTAL, LLC

Project Name: Cold Bay Pipeline Release
Project/Contract Number:
Date: 8/18/21
Logged By: Russ Beck
Company: Susitna
Driller: Paul Caron
Company: Brice

Boring Location ID SB-06

Boring Start Time: 1035
Boring Completion Time: 10:45
Total Depth: 12'

Depth Below Ground Surface (Feet)	Insitu PID Reading (ppm)	Lithology Notes
0		
4		
PID 4	0.4	4-8' Dark reddish brown silt with sand, dry, no HC odor. Analytical 5' to 6'.
PID 8	0.4	
PID 9-11	0.5	8-10.5 Dark brown sandy silt, dry to damp, no HC odor. 10.5-12 Light gray silt, damp, no HC odor. Analytical 9'-11'.
12		

Analytical Samples

Sample ID	Time	Depth Interval (feet bgs)	Analyses
CBPR-SB06-S1	10:47	5'-6'	DRO/BTEX
CBPR-SB06-S2	10:58	9'-11'	DRO/BTEX

Boring Log

SUSITNA ENVIRONMENTAL, LLC

Project Name: Cold Bay Pipeline Release
Project/Contract Number:
Date: 8/18/21
Logged By: Russ Beck
Company: Susitna
Driller: Paul Carron
Company: Brice

Boring Location ID SB-07

Boring Start Time: 15:35
Boring Completion Time: 15:45
Total Depth: 12'

Depth Below Ground Surface (Feet)	Insitu PID Reading (ppm)	Lithology Notes
0		
4		
	0.7	4-8: Dark reddish brown sandy silt w/gravel to 2", dry, no odor.
8	0.8	
		8-12 Dark reddish brown sandy silt w/gravel to 1", damp, no odor.
	0.9	Analytical 8-10, and duplicate.
12		

Analytical Samples

Sample ID	Time	Depth Interval (feet bgs)	Analyses
CBPR-SB07-S1	15:52	8-10	DRO/BTEX
CBPR-SB07-S2	16:00	8-10	Duplicate of CBPR-SB07-S1

Boring Log

SUSITNA ENVIRONMENTAL, LLC

Project Name: Cold Bay Pipeline Release
Project/Contract Number:
Date: 8/18/21
Logged By: Russ Belk
Company: Susitna
Driller: Paul Caron
Company: Brice

Boring Location ID SB-08

Boring Start Time: 11:04
Boring Completion Time: 11:15
Total Depth: 12'

Depth Below Ground Surface (Feet)	Insitu PID Reading (ppm)	Lithology Notes
0		
4		
PID 4-5.5'	1.9	4-~~8~~.5 Dark brown silt w/ fine to coarse sand, damp, slight HC odor.
PID 6-8	0.6	5.5-8 - Light brown ~~silty~~ sandy silt, damp, no HC odor, w/ 2" thick black sandy silt @ 11'. Analytical 4-5.5'.
8		
PID 8-10	5.6	8-9.5 Reddish brown ~~silty~~ sandy silt, damp, slight organic odor.
PID 10-12	1.7	9.5-12 Grayish brown sandy silt, damp, no HC odor. Rounded gravel to 1". Analytical 9'-11'.
12		

Analytical Samples

Sample ID	Time	Depth Interval (feet bgs)	Analyses
CBPR-SB08-S1	11:17	4-5.5'	DRO/BTEX
CBPR-SB08-S2	11:58	9-11'	DRO/BTEX

Boring Log

SUSITNA ENVIRONMENTAL, LLC

Project Name: Cold Bay Pipeline Release
Project/Contract Number:
Date: 8/18/21
Logged By: Russ Beck
Company: Susitna
Driller: Paul Caron
Company: Brice

Boring Location ID SB-09

Boring Start Time: 16:02
Boring Completion Time: 16:12
Total Depth: 12'

Depth Below Ground Surface (Feet)	Insitu PID Reading (ppm)	Lithology Notes
0		~~0~~
4	3.6	4-8: Dark reddish brown sandy silt with gravel to 0.25" dry, no odor. Analytical for DRO only from 4-6'.
8	8.6	
	241.0	8-12 Dark gray sandy silt, damp @ 9', strong HC odor 9-12'. No analytical from 8-12, not contamination from ditch.
12	~~678~~.8	

Analytical Samples

Sample ID	Time	Depth Interval (feet bgs)	Analyses
CBPR-SB09-S1	16:20	4-6	DRO

Boring Log

SUSITNA ENVIRONMENTAL, LLC

Project Name: Cold Bay Pipeline Release
Project/Contract Number:
Date: 8/18/21
Logged By: Russ Beck
Company: Susitna
Driller: Paul Caron
Company: Brice

Boring Location ID SB-10

Boring Start Time: 11:38
Boring Completion Time: 11
Total Depth: ~~12~~ 12'

Depth Below Ground Surface (Feet)	Insitu PID Reading (ppm)	Lithology Notes
0		
4		
PID 4-6	2.7	4 - 6.5 Dark brown silt, with sand, damp, no HC odor.
		6.5 - 7 Possible volcanic layers, Black fine grained sand, orange coarse sand, brownish orange silt, damp, no HC odor.
8		7-8.0 Dark brown sandy silt, damp, no HC odor. Analytical 4-6
PID 8-10	2.0	8-10.5 Light reddish brown silt w/sand, gravel to 1", damp, no HC odor.
PID 10-12	158.6	10.5 - 12 Dark gray silty sand, (saturated) damp, no HC odor,
12		Analytical 8-10. No sample of 10-12' range with the high PID reading. That is from another source and is in saturated zone.

Analytical Samples

Sample ID	Time	Depth Interval (feet bgs)	Analyses
CBPR-SB10-S1	12:10	4-6'	DRO/BTEX
CBPR-SB10-S2	12:15	8-10'	DRO/BTEX

APPENDIX D

SOP – Field Screening with a UVOST

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Brice Environmental Services Corporation

STANDARD OPERATING PROCEDURE

Field Screening with a UVOST

1.0 INTRODUCTION

The purpose of this Standard Operating Procedure (SOP) is to describe the procedures for the collection of field screening data using an ultraviolet optical screening tool (UVOST). This procedure is applicable to the UVOST system (also known as ROST, or rapid optical screening tool) developed and provided by Dakota Technologies, Inc. (DTI) of Fargo, ND. It is a requirement of the End User License (EUL) from DTI that the UVOST system be operated by a certified UVOST operator.

Principle Behind the UVOST

The UVOST uses laser-induced fluorescence (LIF) technology to identify POL contamination in the subsurface. The primary objective of this technology is to delineate the lateral and horizontal extent of petroleum contamination at a site with known or suspected contaminated soil and/ or groundwater in the non-aqueous phase liquid (NAPL) form. The UVOST is advanced through the subsurface using a percussion-driven, direct push drill unit. Each probe provides continuous, real-time data on petroleum contamination at a maximum rate of one datum reading per every two centimeters of downward push.

Fluorescence is a property within some compounds where absorbed ultraviolet (UV) light stimulates the release of photons (light) at a specific wavelength, often in the visible range. Since many aromatic hydrocarbons fluoresce, this property can be used to detect small amounts of a substance within a much larger matrix; such as gasoline in soil. Laboratories have used fluorescence as an analytical method for decades. The availability of high-powered light sources and optical fibers has recently allowed these fluorescence methods to be taken and applied to in-field activities.

The UVOST sends UV light through optical fibers that are strung through hollow direct push steel rods. The light reflects off a tiny mirror within the UVOST probe (known as the SPOC) and exits the SPOC through a small sapphire window. As the probe is advanced, soil sliding past the window becomes exposed to UV light. If contaminants with fluorescent compounds exist within the exposed media, the compounds will fluoresce. The fluorescence response is then transmitted back through a fiber line and analyzed by an oscilloscope. The specific analysis of the oscilloscope is interpreted and displayed instantaneously in graphical and numerical form on a fluorescence vs. depth (FVD) log. Since hydrocarbon bonds will fluoresce at different wavelengths, viewing the individual wavelengths provides distinct patterns of the waveform. These unique patterns are the 'fuel signatures' of the petroleum hydrocarbon within the soil matrix and can be used to differentiate between petroleum contaminants (such as diesel, gasoline, coal tar, etc).

2.0 EQUIPMENT

The following equipment is necessary but additional equipment may also be necessary:

- UVOST system;
- UVOST laptop;
- Central communication hub and data cables;
- Depth encoder
- Remote operator display;
- Fiber-optic cable;
- SPOC/ assembled;
- Power source/ generator;
- Probe rods and tooling;

3.0 STANDARD OPERATING PROCEDURE

3.1 POWER UP/DOWN

To power up the UVOST, simply switch the power on using the power switch on the front of UVOST's e-deck. All peripheral devices are powered through the cabling – minimizing tangles and trip hazards. The laser takes several minutes of warm-up. If powering up from cold conditions (overnight, etc.), make sure you let the laser run at least 10-15 minutes prior to attempting your first Reference Emitter (RE) calibration. Overnight heaters are recommended if operating in sub-freezing conditions to minimize warm-up times in the morning. Extremely high or low temperatures negatively affect laser power; if used in extreme conditions one should attempt to store the UVOST system in a temperature controlled environment to assure proper operation. Other factors that can affect the temperature regulation of the UVOST system include winds, ventilation, direct sun, etc., but case heater can assist with temperature regulation.

To power down the UVOST, switch off the power button.

3.2 BOOT PC AND CHECK SOFTWARE FUNCTION

Make sure all drivers are loaded and ready. Start the optical screening tool (OST) system software. Indicators in the software will assist in alerting you to problem connections and the general status of the components (Hardware Tab). See the software manual for specifics on the OST software.

3.3 PROPER SYSTEM FUNCTION

Once the OST software is started and functional, check the depth encoding and associated peripheral functions. Actuating the probe (or hand advancing the string pot) should show "Current Depth" changing on the OST software (Depth tab). The Remote Display should be functional and show the status. Activate the "Info Tab" and make sure the job information is updated for proper storage of each LIF log.

3.4 SPOC SETUP

Unscrew the window and carefully examine the mirror and window for ANY trace grease, lint, and moisture; it is important that they are very clean. Assure that all o-rings, seals, and adapters are in correct order – including Teflon tape, and associated hardware. With the SPOC tip left off the SPOC, dry

the air inside the SPOC, and quickly screw in window. Check for moisture condensing inside the window by placing an ice cube on the window for 10 seconds and then visually observing condensation. If there is condensation, dry the SPOC air again. Slightly tighten the mirror and fiber optic Swagelok seals (finger tight). Adjust fiber terminator up/down to achieve proper distance from mirror to collimate the laser beam. Use white paper to verify that the laser beam has been collimated. The energy may have to be increased to do this.

Place the RE in front of window and adjust the laser energy (Fiber I/O block screw) to achieve approximately ¾ scale with the oscilloscope's CH2 on 20 mV/div. Adjust the mirror (using window pick/hook) to image only the sapphire window – not epoxy or SPOC barrel (a full circle image should appear on paper, there should be no clipping of the circle). This generally occurs approximately 1/3 of the way down from top of window.

Clean/polish window and then make sure that background does not exceed ~2.5mV peak signals. If the background signal is high, carefully inspect it for imaging of the sides/epoxy or contamination (lint, cotton fibers, fuel, moisture, grease, etc.) An unacceptably high background can make interpretation extremely difficult.

Once the mirror/fiber/window system is achieving proper results, tighten the Swageloks securely. Use ONLY the supplied wrenches to hold the SPOC securely during tightening. This is most readily assured by laying the SPOC down and only handling the wrenches. Use the mirror pick/hook to hold the mirror firmly in place during tightening to prevent rotation. Make sure the laser beam stays centered in the window (side to side) and 1/3 down from the top (toward first rod).

With window/mirror/fiber terminator secured, proceed with attaching the drive tip, adapter, extension rod, and tighten extremely well with 2 pipe wrenches or a pipe wrench and a vice. Teflon tape helps reduce loosening from rattling/vibration.

3.5 BACKGROUND READING

Wipe the window clean and acquire a "Background" (blank) waveform with the Acq BckG command. A perfect system would yield no waveform in the last 3 channels– only white noise. The first channel (scatter channel) should not exceed full screen on the 2mV/division scale on the oscilloscope while in clean soil. Try to achieve <2mV peak signal in the last 3 channels; aim for getting the signal as small as possible. A background waveform that looks like the contaminant of interest suggests leakage and contamination of the internal SPOC mirror/window OR simply a dirty window. Clean the window with methanol or solvent if soap/water does not work.

3.6 RE CALIBRATION

Calibration should be done just before each UVOST logging event. Do NOT calibrate with RE until the direct push rig is ready to advance the probe. Pre-push with dummy tip if obstructions are likely or getting a "straight hole going" is difficult. Place the RE on the window (making sure window is very clean). Immediately acquire the RE reading with the Acq RE command. Extended exposure to laser light can form excimers and photodegradation – causing a morph in waveform shape/intensity.

If the fiber optic lengths have changed, the software may correct the delay time to achieve proper position in window. The RE signal levels should exceed 5,000 pVs but not exceed 12,000 pVs; 6,000 to

9,000 pVs is the optimum range. There should be consistency between RE readings (± 500 pVs), especially within the same project/site. Make sure the RE waveform shape "looks right". Extremely noisy/jagged REs, misshapen REs, and missing/low channel contributions indicate damaged or loose fiber optics/filters/detector. Attain an 8:1 (+/- 1) ratio of fluorescence to scatter.

3.7 LOGGING

Follow these steps to acquire a UVOST log:

Step 1. With proper RE and background acquired, pertinent log information recorded, and probe in position (window just below ground surface [~1 inch]), activate the Record command.

Step 2. If a recent RE has not been acquired, the OST software will send an alert that it's not recent (at least one log event old). Proceed with you recent (perhaps you just aborted a "false start"/crooked log) – or cancel out and acquire the RE you forgot to acquire. You can "rescue" an RE if it's for a rational purpose (such as an accidentally aborted log and you want to continue logging and probe is under ground, under water during a barge project, etc.) DO NOT purposefully continue logging without a new RE for each log if you're having problems acquiring a new RE due to a problem. FIX the problem, acquire a good RE, and then proceed. Failure to acquire a new RE for each log will generate inaccurate data.

Step 3. Choose a directory and name for the log. UVOST auto-suggests the name sequentially to reduce typing. To absolutely avoid accidental overwrite of any OST file, the OST software creates a unique time/date name and uses that name in place of overwrites (even if the user approved an overwrite (choose "OK"). If necessary, a file can be deleted from the Save File dialog after clicking on it once, but before hitting OK. That prevents the Windows software from reporting an overwrite to the OST and cueing the unique filename routine; however, the safest method is to choose "OK" to overwrite – and rename files later.

Step 4. Once the name is chosen, choose whether or not to "zero" the depth. For normal logs always choose "Yes" and zero out depth. If continuing an aborted log (accidental termination) choose "No". The log should continue at the depth where you left off.

Step 5. As the log progresses, make sure the system is operating properly. Observe the oscilloscope or OST display to watch for unusual events such as:

- The probe advancing at a speed other than approximately 0.75 inch/sec – although slower is acceptable, faster is not recommended.
- Strange background drifts several feet under (possible fogging), etc.
- Broken depth cable or poor connection. This will result in jumps in depth or a loss of depth increase – even though the operator is advancing the probe
- Incorrect depths indicating a possible rod length or string pot calibration factor mismatch
- Sudden loss of waveform (flatline) indicating a possible fiber optic break due to a broken probe
- Depth is advancing, but new waveform updates are not showing up indicating poor triggering. Verify that "**Trig'd**" is showing up on oscilloscope approximately every second. If it is not, hit the "Trigger 50%" button on the scope or look for other causes such as the "Stop" button on the laser being accidentally pushed.

Step 6. Once refusal is reached – or target depth is reached – activate the End command. All pertinent data is stored and the oscilloscope scale is automatically returned to the default 20mV/div scale in preparation for next RE.

Step 7. Inspect the probe, window, etc. for leaks, breaks, and loose parts in preparation for next the next logging event (push).

3.8 PRINTING/EXPORTING LIF LOGS

Once the push is complete the log can be viewed (a log can be also opened from file and viewed with the OST software). It is necessary to print the log to paper or export it to an electronic image (JPG file). Prior to print/export it is most often desirable to select callout waveforms. Select single waveforms by clicking the log at any depth, which creates a stats bar. Transfer single logs by dragging/dropping the stats bar or with the < bar next to each callout box. Select the average of a region of waveforms along a log by clicking the log, holding down the mouse button, and then releasing at a second depth along the log. Transfer average zone waveforms by dragging/dropping the bottom stats bar or with the < bar next to each callout box. Reasons to select certain depths/regions include:

- Bracketing what appear to be continually affected zones - this helps the client/consultant "summarize" the general NAPL zones and easily jot down depths for future validation sampling, project design, discussion with site owner, etc.
- It's best to bracket large zones of homogenous NAPL - do not span different products.
- Highlighting unusual signatures – perhaps to suggest a sampling location or to "flag" things the client needs to investigate or discount.
- Highlighting a background to remind viewer what "clean" looks like.
- Any potential "false positives" such as mineral/plant/urban background/highly degraded NAPL – the different waveform should help client understand that its not the target contaminant.
- Use caution when highlighting single waveforms from the rising edge of NAPL hits – the waveforms in these areas are usually saturated because the oscilloscope scaling wasn't able to fully respond – they are morphed and may cause unnecessary confusion and alarm
- Do not start with top and work down – pick a callout "straight across" for neater appearance
- Avoid "crossing" of the depths of multiple callouts to minimize confusion.

It is best that the UVOST operator and the client discuss depth/RE scales, depths of interest, etc. ahead of time to hopefully avoid lots of "reprints".

Annotate the callouts (text box under each waveform) to guide the client. If it is the product expected then the callout box can be left blank; but if it's unusual, significant, or out of the ordinary, guide the viewer with a brief description.

Each time a log is printed/exported, the settings are saved in a lif.plt (plot) file. This allows the same callouts and depths to be available later. It is suggested that the very first print/export of a log in the file is saved as "field" to preserve what the client received originally. Subsequent print schemes are also saved. Later, upon opening, you can choose which of the various schemes to open the file with.

4.0 MAINTENANCE

Maintenance should be performed by qualified personnel only. The major maintenance items of the UVOST are:

- Laser power/ charge
- Regular inspection of SPOC condition
- Regular inspection of cables

4.1 LASER RECHARGE

During the M1 calibration, the RE signal level needs to exceed the 5,000 pVs minimum and should not exceed 12,000 pVs; with 6,000-9,000 pVs being optimal. When the response drops below 6,000 pVs, it is appropriate to recharge the laser with the DTI pre-mix. It is also common to give the laser a "fresh" charge prior to each new project area to increase consistency and data quality."

4.2 EQUIPMENT INSPECTION

At the start of each UVOST, the physical condition of the probe equipment (SPOC and rods) should be inspected to identify any damage that might cause interference or indicate possible future interference with collecting quality data. During the probe, the UVOST operator should closely monitor the data acquisition to identify any peculiarities in the data and/or the system. Unusual behavior can be an indication of faulty communication lines.

Equipment should be subjected to simple trouble shooting procedures to ensure proper function. The remedy to improper equipment is almost always replacement.

5.0 REFERENCES

Dakota Technologies, *UVOST Standard Operating Procedures*.

APPENDIX E

Data Quality Assessment Report

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Arctic Data Services

250 Cushman St. Ste. 3D
Fairbanks, AK 99701
907-457-3147

Date:	10/27/2021
Project name:	Cold Bay Frosty Fuels Pipeline 2021
Laboratory:	SGS North America, Inc. – Anchorage, AK (SGSA)
Sample Delivery Groups:	1215384
Reviewed by:	Alex Thompson
Title:	Chemist
Approved by:	Rodney Guritz
Title:	Principal Chemist

To: Mr. Russ Beck
Susitna Environmental, LLC
2419 McKenzie Drive
Anchorage, AK 99517

Data Quality Assessment

This letter summarizes the findings of a data quality assessment (DQA) conducted by Arctic Data Services, LLC (ADS) on behalf of Susitna Environmental, LLC (Susitna) for the above-referenced project data. Precision, accuracy, sensitivity, representativeness, comparability, and completeness of the data were evaluated by reviewing laboratory-supplied quality assurance/quality control (QA/QC) information as well as conducting independent QC checks on the data. A Stage 2A validation was conducted in general accordance with the ADS's *Standard Operating Procedure for Stage 2A Data Validation v1.1* (ADS, 2020). Stage 2A validation includes reviewing sample handling, custody, and sample-batch level QC information and applying data qualifiers to sample results affected by anomalies and QC failures and summarizing the impacts to data quality. Instrument-level QC information was not reviewed. This validation meets the requirements of the Alaska Department of Environmental Conservation (ADEC) *Technical Memorandum on Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling* (March 2017). In the absence of project-specific control limits or measurement quality objectives (MQOs), QC-sample recoveries and relative percent differences (RPDs) were compared to laboratory control limits. Field-duplicate RPDs were compared to ADEC-recommended MQOs. To evaluate analytical sensitivity, limits of quantitation (LOQs) and limits of detection (LODs) were compared to the most stringent of the following project action limits (PALs): 18 Alaska Administrative Code (AAC) 75.341 Method Two Table B1/B2 Migration to Groundwater Soil Cleanup Levels (MTG SCLs) and the Human Health Soil Cleanup Levels (HH SCLs) for the Under 40-Inch Zone.

An ADEC laboratory data review checklist was completed for the single sample delivery group (SDG) and is attached to this DQA. Also attached is a tabular summary of results lacking adequate analytical sensitivity (Table 1). The following sections provide a summary of the findings for each QA/QC element reviewed; anomalies that had no impact to data quality are discussed in the checklist and are not further described herein.

Sample Analysis Summary

Analytical results for 16 soil samples (including a QC field duplicate) were reviewed. The samples were submitted in a single SDG to SGSA for analysis of one or more of the following:

- diesel range organics (DRO) by Alaska Method AK102;
- polycyclic aromatic hydrocarbons (PAHs) by EPA SW846 Method 8270D with selected ion monitoring (SIM);
- volatile organic compounds (VOCs) by EPA SW846 Method 8260D; and,
- benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA SW846 Method 8021B.

Sample Preservation, Handling, Custody, and Holding Times

Sample receipt forms (SRFs) were reviewed to check that samples were received in good condition, properly preserved, and within the required temperature range. Chain of custody (COC) forms were reviewed to confirm that custody was not breached during sample handling. Dates of sample collection, preparation, and analysis were compared to check that method holding times were not exceeded.

There were no sample preservation, handling, custody, or holding time failures affecting project-sample data quality.

Analytical Sensitivity

Analytical sensitivity was evaluated by checking that LOQs and LODs were below relevant PALs where target analytes were not detected.

A number of 8260D VOC analytes (and a single 8270DSIM naphthalene result) had LODs and/or LOQs exceeding the most stringent applicable cleanup level for various samples. Refer to Table 1 (attached) for a full list of results lacking adequate analytical sensitivity. Refer to the *Sensitivity* section of the *Summary of Data Quality Indicators* below for further discussion.

Method Blanks

The laboratory analyzed and reported a method blank (MB) for each preparatory batch, to check for laboratory-based sample contamination. Associated project-sample results were considered affected where the analyte was detected within 10 times the MB concentration. Results affected by blank contamination are qualified as estimated and flagged ‘B’, indicating a high bias and potential false-positive detection.

There were no method blank detections affecting project-sample data quality.

Trip Blanks

Trip blank samples (TBs) were submitted alongside volatile organic analysis samples and analyzed for GRO and VOCs, to check for cross-contamination of samples during sampling, shipment, or storage. Associated project-sample results would be considered affected where the analyte was detected within 10 times the TB concentration.

There were no trip blank detections affecting project-sample data quality.

Laboratory Control Samples

The laboratory analyzed and reported laboratory control samples (LCSs) for each preparatory batch, to assess laboratory extraction efficiency and analytical accuracy. In some cases, LCS duplicates (LCSDs) were used to assess analytical precision. LCS and LCSD recovery information and LCS/LCSD RPD information (where available) were reviewed.

There were no LCS/LCSD recovery or RPD failures affecting project-sample data quality.

Matrix Spike Samples

Matrix spikes (MS) and MS duplicates (MSD) were analyzed for organic batches, to evaluate potential matrix interference affecting accuracy and/or precision. MS/MSD recovery and RPDs were evaluated only if the parent sample (the sample spiked for the MS/MSD) was in the project-sample set. MS/MSD recovery was only evaluated if the spiking concentration was greater than the native analyte concentration.

There were no MS/MSD recovery failures affecting project-sample data quality. Refer to the checklist for further discussion.

Surrogate Recovery

Samples submitted for analysis of organic compounds were spiked with analyte surrogates to evaluate extraction efficiency and to check for matrix interference. Surrogate recoveries were reviewed for each project sample and analysis. Surrogate recovery failures are only considered to affect project results for samples that are not heavily diluted (dilution factor < 10).

There were no surrogate recovery failures affecting project-sample data quality. Refer to the checklist for further discussion.

Field Duplicates

One field duplicate sample pair was collected and submitted, falling short of the 10% minimum required frequency. Due to this failure, our ability to evaluate overall precision is limited, however no results are qualified due to this omission. Laboratory-QC sample duplicate RPDs, and RPDs of the one submitted field-duplicate pair, indicate precision was generally in control.

RPDs between field-duplicate results were calculated where at least one of the results was quantitatively detected (above the LOQ). In the case that one result was not detected, RPDs were calculated using the LOD for the non-detect result.

There were no field duplicate sample pair RPD failures affecting project-sample data quality.

Summary of Data Quality Indicators

The following sections summarize the findings of the above review with respect to the six data quality indicators: sensitivity, precision, accuracy, representativeness, comparability, and completeness. Note that this evaluation of representativeness, comparability, and completeness is limited to consideration of analytical data quality only. Assessment of data usability in the context of the project must be conducted by the project team as a whole, taking into account the data quality issues summarized herein, as well as overall project objectives.

Sensitivity

Sensitivity describes the ability of the sampling and analytical methodology to meet detection and/or quantitation limit objectives. A number of 8260D VOC analytes and a single 8270DSIM naphthalene result had LODs and/or LOQs that exceed the most stringent applicable cleanup level. Results where the LOD exceeds the PAL cannot be used to rule out the potential presence of the analyte at concentrations above the PAL for the sampled location. Refer to Table 1 for a full list of results lacking adequate analytical sensitivity. The majority of results with poor sensitivity are halogenated hydrocarbons, which are not a contaminant of concern for the site. Overall sensitivity is deemed acceptable, with exceptions highlighted in Table 1.

Precision

Precision is a measure of the reproducibility of repetitive measurements. Precision was evaluated based on laboratory QC-sample and field-duplicate sample RPDs. There were no laboratory QC sample duplicate or field sample duplicate pair RPD failures affecting project-sample data quality. As noted above, field-duplicate collection frequency fell short of the 10% minimum required frequency. However, based on other measures of precision, overall precision was deemed acceptable.

Accuracy

Accuracy is a measure of the correctness, or the closeness, between the true value and the quantity detected. Accuracy was evaluated based on analyte recoveries for laboratory QC samples and recovery of surrogate spikes for project samples. Sample handling and preservation anomalies that may have impacted data accuracy are also taken into consideration.

No sample handling and preservation anomalies affected project data for the submitted SDG. Laboratory QC-sample recovery indicated generally adequate analytical accuracy. There were no QC sample or surrogate recovery failures affecting project-sample data quality or usability. No results were affected by contamination. Overall accuracy is deemed acceptable.

Representativeness

Representativeness describes the degree to which data accurately and precisely represent site characteristics. Representativeness is affected by factors such as sample frequency and matrix or contaminant heterogeneity, as well as analytical performance (including sensitivity, accuracy, and precision) and sample cross-contamination.

Samples were collected in accordance with an approved work plan. No results were qualified due to QC anomalies affecting accuracy or precision. Overall representativeness is deemed acceptable for the purposes of this project.

Comparability

Comparability describes whether two data sets can be considered equivalent with respect to project goals. Comparability is affected by factors such as sampling methodology and analytical performance (including sensitivity, accuracy, and precision). Comparability was evaluated by checking that standard analytical methods were employed, and analytical performance was acceptable. Data review findings generally support that the dataset is comparable; however, comparability should be evaluated by the project team considering sample collection methodology and historic results alongside data quality and analytical methodology.

Completeness

Completeness describes the amount of valid data obtained from the sampling event. It is calculated as the percentage of usable measurements compared to the total number of measurements. The soil data are 100% complete, with no results rejected in the course of this review.

Conclusions and Limitations

Sensitivity, precision, accuracy, representativeness, comparability, and completeness were deemed acceptable, and the data are usable for the purposes of this project. No results were qualified during the course of this review. Project sample results lacking adequate sensitivity are listed in the provided table (Table 1).

This review was based solely on information provided by the analytical laboratory in the laboratory reports for the SDG reviewed. ADS did not review instrument-level QC elements, such as calibration verification or internal standard response, except to the extent that the laboratory identified instrument-level anomalies in the case narrative. ADS did not conduct independent validation of the data (e.g. recalculating results based on instrument responses) or review any raw chemical data (e.g. chromatograms). A data quality assessment helps reduce the risk of reliance on data of compromised quality, however, it does not eliminate that risk.

Attachments:

Table 1	Summary of Qualified Data
ADEC Laboratory Data Review Checklists:	1215384

Table 1 - Analytical Sensitivity Summary

Cold Bay Frosty Fuels 2021 Pipeline Release

Data Quality Assessment

Table 1 - Analytical Sensitivity Summary												
Client Sample ID	**Matrix**	**Method**	**Analyte**	**CAS**	**Units**	**DL**	**LOD**	**LOQ**	**Result**	**Lab_Flags**	**PAL**	**PAL Source**
CBPR-SB01-S2	Soil	8260D	*1,1,1,2-Tetrachloroethane*	630-20-6	mg/kg	0.0117	0.0189	0.0378	ND	None	0.0220	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*1,1,2,2-Tetrachloroethane*	79-34-5	mg/kg	0.00117	0.00189	0.00378	ND	None	0.00300	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*1,1,2-Trichloroethane*	79-00-5	mg/kg	0.000944	0.000945	0.00189	ND	None	0.00140	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*1,2,3-Trichlorobenzene*	87-61-6	mg/kg	0.0566	0.0945	0.189	ND	None	0.150	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*1,2,3-Trichloropropane*	96-18-4	mg/kg	0.00117	0.00189	0.00378	ND	None	0.0000310	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*1,2-Dibromoethane*	106-93-4	mg/kg	0.00142	0.00142	0.00283	ND	None	0.000240	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*1,4-Dichlorobenzene*	106-46-7	mg/kg	0.0147	0.0236	0.0472	ND	None	0.0370	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*2-Hexanone*	591-78-6	mg/kg	0.113	0.114	0.227	ND	None	0.110	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*Benzene*	71-43-2	mg/kg	0.00736	0.0118	0.0236	ND	None	0.0220	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*Bromomethane*	74-83-9	mg/kg	0.0151	0.0189	0.0378	ND	None	0.0240	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*Carbon tetrachloride*	56-23-5	mg/kg	0.00736	0.0118	0.0236	ND	None	0.0210	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*Chloroform*	67-66-3	mg/kg	0.00566	0.00565	0.0113	ND	None	0.00710	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*Dibromochloromethane*	124-48-1	mg/kg	0.00283	0.00472	0.00944	ND	None	0.00270	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*Dibromomethane*	74-95-3	mg/kg	0.0147	0.0236	0.0472	ND	None	0.0250	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*Hexachlorobutadiene*	87-68-3	mg/kg	0.0117	0.0189	0.0378	ND	None	0.0200	ADEC MTG SCL
CBPR-SB01-S2	Soil	8260D	*Naphthalene*	91-20-3	mg/kg	0.0147	0.0236	0.0472	ND	None	0.0380	ADEC MTG SCL

Table 1 - Analytical Sensitivity Summary												
Client Sample ID	**Matrix**	**Method**	**Analyte**	**CAS**	**Units**	**DL**	**LOD**	**LOQ**	**Result**	**Lab_Flags**	**PAL**	**PAL Source**
CBPR-SB04-S1	Soil	8260D	*1,1,1,2-Tetrachloroethane*	630-20-6	mg/kg	0.0104	0.0168	0.0335	ND	None	0.0220	ADEC MTG SCL
CBPR-SB04-S1	Soil	8260D	*1,1,2,2-Tetrachloroethane*	79-34-5	mg/kg	0.00104	0.00168	0.00335	ND	None	0.00300	ADEC MTG SCL
CBPR-SB04-S1	Soil	8260D	*1,1,2-Trichloroethane*	79-00-5	mg/kg	0.000838	0.000840	0.00168	ND	None	0.00140	ADEC MTG SCL
CBPR-SB04-S1	Soil	8260D	*1,2,3-Trichlorobenzene*	87-61-6	mg/kg	0.0503	0.0840	0.168	ND	None	0.150	ADEC MTG SCL
CBPR-SB04-S1	Soil	8260D	*1,2,3-Trichloropropane*	96-18-4	mg/kg	0.00104	0.00168	0.00335	ND	None	0.0000310	ADEC MTG SCL
CBPR-SB04-S1	Soil	8260D	*1,2-Dibromoethane*	106-93-4	mg/kg	0.00126	0.00126	0.00252	ND	None	0.000240	ADEC MTG SCL
CBPR-SB04-S1	Soil	8260D	*1,4-Dichlorobenzene*	106-46-7	mg/kg	0.0131	0.0210	0.0419	ND	None	0.0370	ADEC MTG SCL
CBPR-SB04-S1	Soil	8260D	*2-Hexanone*	591-78-6	mg/kg	0.101	0.101	0.201	ND	None	0.110	ADEC MTG SCL
CBPR-SB04-S1	Soil	8260D	*Bromomethane*	74-83-9	mg/kg	0.0134	0.0168	0.0335	ND	None	0.0240	ADEC MTG SCL
CBPR-SB04-S1	Soil	8260D	*Chloroform*	67-66-3	mg/kg	0.00503	0.00505	0.0101	ND	None	0.00710	ADEC MTG SCL
CBPR-SB04-S1	Soil	8260D	*Dibromochloromethane*	124-48-1	mg/kg	0.00252	0.00419	0.00838	ND	None	0.00270	ADEC MTG SCL
CBPR-SB04-S1	Soil	8260D	*Dibromomethane*	74-95-3	mg/kg	0.0131	0.0210	0.0419	ND	None	0.0250	ADEC MTG SCL
CBPR-SB04-S1	Soil	8260D	*Hexachlorobutadiene*	87-68-3	mg/kg	0.0104	0.0168	0.0335	ND	None	0.0200	ADEC MTG SCL
CBPR-SB04-S1	Soil	8260D	*Naphthalene*	91-20-3	mg/kg	0.0131	0.0210	0.0419	ND	None	0.0380	ADEC MTG SCL
CBPR-SB04-S1	Soil	8270DSIM	*Naphthalene*	91-20-3	mg/kg	0.0288	0.0575	0.115	ND	None	0.0380	ADEC MTG SCL
CBPR-SB06-S1	Soil	8021B	*Benzene*	71-43-2	mg/kg	0.0130	0.0203	0.0405	ND	None	0.0220	ADEC MTG SCL
CBPR-SB08-S1	Soil	8021B	*Benzene*	71-43-2	mg/kg	0.00973	0.0152	0.0304	ND	None	0.0220	ADEC MTG SCL
CBPR-SB10-S1	Soil	8021B	*Benzene*	71-43-2	mg/kg	0.0226	0.0353	0.0707	ND	None	0.0220	ADEC MTG SCL
CBPR-SB10-S1	Soil	8021B	*Ethylbenzene*	100-41-4	mg/kg	0.0509	0.0705	0.141	ND	None	0.130	ADEC MTG SCL
CBPR-SB10-S2	Soil	8021B	*Benzene*	71-43-2	mg/kg	0.00721	0.0113	0.0225	ND	None	0.0220	ADEC MTG SCL

Table 1 - Analytical Sensitivity Summary												
Client Sample ID	**Matrix**	**Method**	**Analyte**	**CAS**	**Units**	**DL**	**LOD**	**LOQ**	**Result**	**Lab_Flags**	**PAL**	**PAL Source**
CBPR-SB07-S1	Soil	8021B	*Benzene*	71-43-2	mg/kg	0.00790	0.0124	0.0247	ND	None	0.0220	ADEC MTG SCL
CBPR-SB07-S2	Soil	8021B	*Benzene*	71-43-2	mg/kg	0.0113	0.0176	0.0353	ND	None	0.0220	ADEC MTG SCL
TB-01	Soil	8260D	*1,2,3-Trichloropropane*	96-18-4	mg/kg	0.000624	0.00100	0.00201	ND	None	0.0000310	ADEC MTG SCL
TB-01	Soil	8260D	*1,2-Dibromoethane*	106-93-4	mg/kg	0.000755	0.000755	0.00151	ND	None	0.000240	ADEC MTG SCL
TB-01	Soil	8260D	*2-Hexanone*	591-78-6	mg/kg	0.0604	0.0605	0.121	ND	None	0.110	ADEC MTG SCL
TB-01	Soil	8260D	*Dibromochloromethane*	124-48-1	mg/kg	0.00151	0.00252	0.00503	ND	None	0.00270	ADEC MTG SCL
TB-01	Soil	8260D	*Dibromomethane*	74-95-3	mg/kg	0.00785	0.0126	0.0252	ND	None	0.0250	ADEC MTG SCL
TB-01	Soil	8260D	*Hexachlorobutadiene*	87-68-3	mg/kg	0.00624	0.0101	0.0201	ND	None	0.0200	ADEC MTG SCL

Analytical Sensitivity Summary

Definitions:

Grey highlight indicates the result LOD exceeds the PAL
Other listed results have LOQs that exceed the listed PAL

CAS: Chemical Abstract Service registry number
DL: detection limit
LOD: limit of detection
LOQ: limit of quantitation
QC: quality control
ND/U: non-detect
NA: not applicable
PAL: project action limit
ADEC: Alaska Department of Environmental Conservation
AAC: Alaska Administrative Code

PAL Sources:

ADEC MTG SCL: ADEC 18 AAC 75.341 Method Two, Table B1, Migration to Groundwater Soil Cleanup Levels

Laboratory Data Review Checklist

Completed By:

Alex Thompson

Title:

Chemist

Date:

2021-10-15

Consultant Firm:

Arctic Data Services, LLC for Susitna Environmental, LLC

Laboratory Name:

SGS Environmental Services, Inc.

Laboratory Report Number:

1215384

Laboratory Report Date:

09/30/2021 11:45:07

CS Site Name:

Cold Bay Frosty Fuels Tank Farm Dock Pipeline

ADEC File Number:

2538.38.024

Hazard Identification Number:

26673

1.) Laboratory

1.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 analyzed by SGS North America, Inc. in Anchorage, AK.

1.b) If 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 to another laboratory.

2.) Chain of Custody

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

○ Yes ◉ No ○ N/A

Comments:

The second page of the COC was not signed by the laboratory receiver. Both pages were received at once in a single cooler by the laboratory and custody was maintained. All pages of the COC should be signed by the sample custodian upon receipt.

2.b) Correct analyses requested?

○ Yes ◉ No ○ N/A

Comments:

DRO, BTEX, PAH, and VOC analyses were requested, however no specific analytical methods were requested. The laboratory coordinated with the client and performed AK102 analysis for DRO, 8021 analysis for BTEX, 8270DSIM for PAHs, and 8260D for VOCs.

3.) Laboratory Sample Receipt Documentation

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

◉ Yes ○ No ○ N/A

Comments:

Samples were hand delivered in a single cooler directly to the SGS Anchorage laboratory, and were received within the acceptable temperature range.

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

(●) Yes ( ) No ( ) N/A

Comments:

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

(●) Yes ( ) No ( ) N/A

Comments:

Samples were received in good condition.

3.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:

There were no sample receiving discrepancies.

3.e) Data quality or usability affected?

Data quality and usability were not affected.

4.) Case Narrative

4.a) Present and understandable?

(●) Yes ( ) No ( ) N/A

Comments:

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

(●) Yes ( ) No ( ) N/A

Comments:

The laboratory identified a number of QC anomalies, which are addressed in the following relevant sections of this checklist.

4.c) Were all corrective actions documented?

○ Yes ○ No ◉ N/A

Comments:

No corrective actions were documented or performed.

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

The case narrative sates that results affected by an MS/MSD RPD failure are considered estimated in the parent sample. Refer to Section 6.b below for further discussion.

5.) Sample Results

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

◉ Yes ○ No ○ N/A

Comments:

As stated above, the laboratory performed the appropriate analytical methods for the requested analytes.

5.b) All applicable holding times met?

◉ Yes ○ No ○ N/A

Comments:

5.c) All soils reported on a dry weight basis?

◉ Yes ○ No ○ N/A

Comments:

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

○ Yes ◉ No ○ N/A

Comments:

LOQs and LODs for non-detect results were compared to the following project action limits (PALs):

ADEC 18 AAC 75.341 Method Two, Table B1, Migration to Groundwater Soil Cleanup Levels for Soil matrix samples.
ADEC 18 AAC 75.341 Method Two, Table B1, Under 40 Inch Zone, Human Health Soil Cleanup Levels for Soil matrix samples.
ADEC 18 AAC 75.341 Method Two, Table B2, Petroleum Hydrocarbon Migration to Groundwater Soil Cleanup Levels for the Under 40-inch Zone for Soil matrix samples.

Sixteen non-detect results had LODs and/or LOQs exceeding the PAL for sample CBPR-SB01-S2, 15 non-detect results had LODs and/or LOQs exceeding the PAL for sample CBPR-SB04-S1, six non-detect result(s) had LODs and/or LOQs exceeding the PAL for sample TB-01, two non-detect results had LODs and/or LOQs exceeding the PAL for sample CBPR-SB10-S1, one non-detect result had LODs and/or LOQs exceeding the PAL for sample CBPR-SB10-S2, one non-detect result had LODs and/or LOQs exceeding the PAL for sample CBPR-SB07-S2, one non-detect result had LODs and/or LOQs exceeding the PAL for sample CBPR-SB08-S1, one non-detect result had LODs and/or LOQs exceeding the PAL for sample CBPR-SB07-S1, and 1 non-detect result had LODs and/or LOQs exceeding the PAL for sample CBPR-SB06-S1.

Refer to Table 1- Analytical Sensitivity Summary table of the data quality assessment for a full list of non-detect results lacking adequate analytical sensitivity.

5.e) Data quality and usability affected?

Data quality was not affected. Non-detect results where the LOD exceeds the PAL cannot be used to rule out the potential presence of the analyte at concentrations above the PAL for the sampled location.

6.) QC Samples

Method/Lab Blank

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

(●) Yes ( ) No ( ) N/A

Comments:

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

(●) Yes ( ) No ( ) N/A

Comments:

There were no method blank detections identified.

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

No results were affected by method blank contamination

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

( ) Yes ( ) No (●) N/A

Comments:

No results were affected. See above.

6.a.v) Data quality or usability affected?

Data quality and usability were not affected.

Laboratory Control Sample/Duplicate (LCS/LCSD)

6.b.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:

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

○ Yes ○ No ◉ N/A

Comments:

There were no inorganic analyses performed in this work order.

6.b.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:

6.b.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:

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

No results were affected by LCS/LCSD recovery failures. No results were affected by LCS/LCSD RPD failures.

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

○ Yes ○ No ◉ N/A

Comments:

No results were affected by LCS/LCSD recovery or RPD failures.

6.b.vii) Data quality or usability affected?

Data quality and usability were not affected.

Matrix Spike/Duplicate (MS/MSD)

Note: Select N/A if MS/MSDs are not required for the project.

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

○ Yes ○ No ◉ N/A

Comments:

MS/MSDs were not required to be submitted for this work order, per the approved work plan.

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

○ Yes ○ No ◉ N/A

Comments:

There were no inorganic analyses performed in this work order.

6.c.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:

Trichlorofluoromethane was recovered above laboratory control limits in the MS associated with 8260D prep batch VXX37726. However, the spiked parent sample was not associated with project-sample set, so no results are considered affected.
Fluoranthene and pyrene were recovered above laboratory control limits in the MS associated with 8270DSIM prep batch XXX45460. However, the spiked parent sample was not associated with project-sample set, so no results are considered affected.

6.c.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. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

○ Yes ◉ No ○ N/A

Comments:

MS/MSD RPDs for a number of PAH analytes exceeded the laboratory control limit for 8270DSIM prep batch XXX45460; however, as mentioned above, the spiked parent sample was not associated with project-sample set, so no results are considered affected.

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

No results were affected by MS/MSD recovery failures. No results were affected by MS/MSD RPD failures.

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

○ Yes ○ No ◉ N/A

Comments:

No results were affected by MS/MSD recovery or RPD failures.

6.c.vii) Data quality or usability affected?

Data quality and usability were not affected.

Surrogates

Note: Surrogates for organic analyses only or Isotope Dilution Analytes (IDA) for isotope dilution methods

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

◉ Yes ○ No ○ N/A

Comments:

6.d.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:

There were one surrogate recovery failure identified in project samples. Refer to the table below for further details.

Sample_ID	Matrix	Method	Surrogate	DF	Recovered	LCL	UCL	Recovery
CBPR-SB04-S1	Soil	8270DSIM	2-Methylnaphthalene-d10	5.0	159.0	58.0	103.0	High

6.d.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:

Project-sample results are not considered affected if the associated surrogate was recovered high and the associated analytes were non-detect. No results were qualified.

6.d.iv) Data quality or usability affected?

Data quality and usability were not affected.

Trip Blanks

Note: Only required for volatile analyses

6.e.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:

Sample "TB-01" was submitted alongside project VOA samples and analyzed by the following volatile methods: 8260D.

6.e.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:

Samples were submitted in a single cooler.

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

◉ Yes ○ No ○ N/A

Comments:

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

No analytes were detected in any trip blank sample. No samples are affected.

6.e.v) Data quality or usability affected?

Data quality and usability were not affected.

Field Duplicate(s) or Replicates

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

(●) Yes ( ) No ( ) N/A

Comments:

One field duplicate(s) were collected and submitted, compared to 16 total samples (6.3% collection frequency), falling short of the minimum required frequency. Refer to the table below for a list of primary samples and associated duplicates for submitted duplicate pairs.

Primary Sample	Association Type	Associated Samples
CBPR-SB07-S2	Field_Duplicate	CBPR-SB07-S1

6.f.ii) Submitted blind to lab?

(●) Yes ( ) No ( ) N/A

Comments:

6.f.iii) Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% Water/Air, 50% Soil)

(●) Yes ( ) No ( ) N/A

Comments:

RPDs for each field duplicate sample pair were calculated and compared to the ADEC recommended measurement quality objectives (MQO) for the sample medium (50%), where an analyte was quantitatively detected (above the LOQ) in at least one sample. There were no field duplicate sample pair RPD failures identified.

6.f.iv) Data quality or usability affected?

Data quality and usability were not affected.

Decontamination/Rinsate or Equipment Blanks

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

○ Yes ○ No ◉ N/A

Comments:

Samples were collected with single-use or dedicated equipment, no equipment blank was necessary.

6.g.ii) All results less than LOQ and project specified objectives?

○ Yes ○ No ◉ N/A

Comments:

N/A; No equipment/decontamination blank samples were submitted.

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

N/A; see above.

6.g.iv) Data quality or usability affected?

Data quality and usability were not affected.

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

7.a) Defined and Appropriate?

○ Yes ○ No ◉ N/A

Comments:

There were no additionally applied laboratory qualifiers.

APPENDIX F

Laboratory Analytical Results

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Laboratory Report of Analysis

To: Susitna Environmental, LLC
2221 Muldoon Road, #179
Anchorage, AK 99504
(907)903-6760

Report Number: **1215384**

Client Project: **Cold Bay FF Pipeline Release**

Dear Russ Beck,

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

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

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

Sincerely,
SGS North America Inc.

_____

Justin Nelson Date
Project Manager
Justin.Nelson@sgs.com

Case Narrative

SGS Client: **Susitna Environmental, LLC**
SGS Project: **1215384**
Project Name/Site: **Cold Bay FF Pipeline Release**
Project Contact: **Russ Beck**

Refer to sample receipt form for information on sample condition.

CBPR-SB04-S1 (1215384003) PS

8270D SIM - PAH surrogate recovery for 2-methylnaphthalene-d10 does not meet QC criteria due to sample dilution.
8270D SIM - The PAH LOQs are elevated due to sample dilution. The sample was analyzed at a dilution due to matrix interference with internal standards.

1215419013MS (1632783) MS

8270D SIM - PAH MS recoveries for fluoranthene and pyrene do not meet QC criteria. Refer to the LCS for accuracy requirements.

1215384002(1633006MS) (1633007) MS

8260D - MS recovery for Trichlorofluoromethane does not meet QC criteria. See LCS for accuracy requirements.

1215419013MSD (1632784) MSD

8270D SIM - PAH MS/MSD RPD for multiple analytes does not meet QC criteria. The results for these analytes are considered estimated in the parent sample.

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

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Report of Manual Integrations

Laboratory ID	Client Sample ID	Analytical Batch	Analyte	Reason
8270D SIM (PAH)				
1215419013	LABREFQC	XMS12859	Benzo[b]Fluoranthene	SP
1215419013	LABREFQC	XMS12859	Benzo[k]fluoranthene	SP
1632784	1215419013MSD	XMS12859	Benzo[k]fluoranthene	RP
1633244	CCV for HBN 1824852 [XMS/12859	XMS12859	Benzo[b]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.

Print Date: 09/16/2021 1:49:21PM

Laboratory Qualifiers

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

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

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

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

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

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

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
CBPR-SB01-S1	1215384001	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB01-S2	1215384002	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB04-S1	1215384003	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB04-S2	1215384004	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB06-S1	1215384005	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB06-S2	1215384006	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB08-S1	1215384007	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB08-S2	1215384008	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB10-S1	1215384009	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB10-S2	1215384010	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB02-S1	1215384011	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB03-S1	1215384012	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB05-S1	1215384013	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB07-S1	1215384014	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB07-S2	1215384015	08/18/2021	08/23/2021	Soil/Solid (dry weight)
CBPR-SB09-S1	1215384016	08/18/2021	08/23/2021	Soil/Solid (dry weight)
TB-01	1215384017	08/18/2021	08/23/2021	Soil/Solid (dry weight)

Method	Method Description
8270D SIM (PAH)	8270 PAH SIM Semi-Volatiles GC/MS
SW8021B	BTEX 8021 prepped by AK101 Field Prep
AK102	Diesel Range Organics (S)
SM21 2540G	Percent Solids SM2540G
SW8260D	VOC 8260 (S) Field Extracted

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Detectable Results Summary

Client Sample ID: **CBPR-SB01-S2**
Lab Sample ID: 1215384002

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	Benzo[b]Fluoranthene	0.0143J	mg/kg
	Benzo[g,h,i]perylene	0.00878J	mg/kg
	Chrysene	0.00771J	mg/kg
	Fluoranthene	0.0168J	mg/kg
	Phenanthrene	0.00864J	mg/kg
	Pyrene	0.0135J	mg/kg
Semivolatile Organic Fuels	Diesel Range Organics	16.9J	mg/kg

Client Sample ID: **CBPR-SB04-S1**
Lab Sample ID: 1215384003

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	3680	mg/kg

Client Sample ID: **CBPR-SB08-S1**
Lab Sample ID: 1215384007

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	184	mg/kg

Client Sample ID: **CBPR-SB05-S1**
Lab Sample ID: 1215384013

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	51.0	mg/kg

Client Sample ID: **CBPR-SB09-S1**
Lab Sample ID: 1215384016

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	42.6J	mg/kg

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Results of **CBPR-SB01-S1**

Client Sample ID: **CBPR-SB01-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384001
Lab Project ID: 1215384

Collection Date: 08/18/21 09:48
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):89.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	11.1	U	22.2	6.90	mg/kg	1		08/24/21 16:06
Surrogates								
5a Androstane (surr)	93.5		50-150		%	1		08/24/21 16:06

Batch Information

Analytical Batch: XFC16054
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/24/21 16:06
Container ID: 1215384001-A

Prep Batch: XXX45430
Prep Method: SW3550C
Prep Date/Time: 08/24/21 07:10
Prep Initial Wt./Vol.: 30.167 g
Prep Extract Vol: 5 mL

Results of **CBPR-SB01-S1**

Client Sample ID: **CBPR-SB01-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384001
Lab Project ID: 1215384

Collection Date: 08/18/21 09:48
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):89.4
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.00980	U	0.0196	0.00627	mg/kg	1		08/30/21 16:29
Ethylbenzene	0.0196	U	0.0392	0.0141	mg/kg	1		08/30/21 16:29
o-Xylene	0.0196	U	0.0392	0.0143	mg/kg	1		08/30/21 16:29
P & M -Xylene	0.0392	U	0.0784	0.0235	mg/kg	1		08/30/21 16:29
Toluene	0.0196	U	0.0392	0.0122	mg/kg	1		08/30/21 16:29
Xylenes (total)	0.0590	U	0.118	0.0392	mg/kg	1		08/30/21 16:29
Surrogates								
1,4-Difluorobenzene (surr)	87.5		72-119		%	1		08/30/21 16:29

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Analyst: MDT
Analytical Date/Time: 08/30/21 16:29
Container ID: 1215384001-B

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 08/18/21 09:48
Prep Initial Wt./Vol.: 42.007 g
Prep Extract Vol: 29.4491 mL

Results of **CBPR-SB01-S2**

Client Sample ID: **CBPR-SB01-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384002
Lab Project ID: 1215384

Collection Date: 08/18/21 09:55
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):80.7
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	0.0153	U	0.0305	0.00762	mg/kg	1		08/29/21 01:59
2-Methylnaphthalene	0.0153	U	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Acenaphthene	0.0153	U	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Acenaphthylene	0.0153	U	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Anthracene	0.0153	U	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Benzo(a)Anthracene	0.0153	U	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Benzo[a]pyrene	0.0153	U	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Benzo[b]Fluoranthene	0.0143	J	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Benzo[g,h,i]perylene	0.00878	J	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Benzo[k]fluoranthene	0.0153	U	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Chrysene	0.00771	J	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Dibenzo[a,h]anthracene	0.0153	U	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Fluoranthene	0.0168	J	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Fluorene	0.0153	U	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Indeno[1,2,3-c,d] pyrene	0.0153	U	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Naphthalene	0.0122	U	0.0244	0.00610	mg/kg	1		08/29/21 01:59
Phenanthrene	0.00864	J	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Pyrene	0.0135	J	0.0305	0.00762	mg/kg	1		08/29/21 01:59
Surrogates								
2-Methylnaphthalene-d10 (surr)	74.8		58-103		%	1		08/29/21 01:59
Fluoranthene-d10 (surr)	80		54-113		%	1		08/29/21 01:59

Batch Information

Analytical Batch: XMS12859
Analytical Method: 8270D SIM (PAH)
Analyst: LAW
Analytical Date/Time: 08/29/21 01:59
Container ID: 1215384002-A

Prep Batch: XXX45460
Prep Method: SW3550C
Prep Date/Time: 08/28/21 08:43
Prep Initial Wt./Vol.: 22.868 g
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **CBPR-SB01-S2**

Client Sample ID: **CBPR-SB01-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384002
Lab Project ID: 1215384

Collection Date: 08/18/21 09:55
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):80.7
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	16.9	J	24.4	7.57	mg/kg	1		08/24/21 16:16
Surrogates								
5a Androstane (surr)	76.8		50-150		%	1		08/24/21 16:16

Batch Information

Analytical Batch: XFC16054
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/24/21 16:16
Container ID: 1215384002-A

Prep Batch: XXX45430
Prep Method: SW3550C
Prep Date/Time: 08/24/21 07:10
Prep Initial Wt./Vol.: 30.43 g
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **CBPR-SB01-S2**

Client Sample ID: **CBPR-SB01-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384002
Lab Project ID: 1215384

Collection Date: 08/18/21 09:55
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):80.7
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.0189	U	0.0378	0.0117	mg/kg	1		08/27/21 15:57
1,1,1-Trichloroethane	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
1,1,2,2-Tetrachloroethane	0.00189	U	0.00378	0.00117	mg/kg	1		08/27/21 15:57
1,1,2-Trichloroethane	0.000945	U	0.00189	0.000944	mg/kg	1		08/27/21 15:57
1,1-Dichloroethane	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
1,1-Dichloroethene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
1,1-Dichloropropene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
1,2,3-Trichlorobenzene	0.0945	U	0.189	0.0566	mg/kg	1		08/27/21 15:57
1,2,3-Trichloropropane	0.00189	U	0.00378	0.00117	mg/kg	1		08/27/21 15:57
1,2,4-Trichlorobenzene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
1,2,4-Trimethylbenzene	0.0945	U	0.189	0.0566	mg/kg	1		08/27/21 15:57
1,2-Dibromo-3-chloropropane	0.0945	U	0.189	0.0585	mg/kg	1		08/27/21 15:57
1,2-Dibromoethane	0.00142	U	0.00283	0.00142	mg/kg	1		08/27/21 15:57
1,2-Dichlorobenzene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
1,2-Dichloroethane	0.00189	U	0.00378	0.00132	mg/kg	1		08/27/21 15:57
1,2-Dichloropropane	0.00945	U	0.0189	0.00944	mg/kg	1		08/27/21 15:57
1,3,5-Trimethylbenzene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
1,3-Dichlorobenzene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
1,3-Dichloropropane	0.00945	U	0.0189	0.00585	mg/kg	1		08/27/21 15:57
1,4-Dichlorobenzene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
2,2-Dichloropropane	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
2-Butanone (MEK)	0.236	U	0.472	0.147	mg/kg	1		08/27/21 15:57
2-Chlorotoluene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
2-Hexanone	0.114	U	0.227	0.113	mg/kg	1		08/27/21 15:57
4-Chlorotoluene	0.0189	U	0.0378	0.0189	mg/kg	1		08/27/21 15:57
4-Isopropyltoluene	0.0755	U	0.151	0.0755	mg/kg	1		08/27/21 15:57
4-Methyl-2-pentanone (MIBK)	0.236	U	0.472	0.147	mg/kg	1		08/27/21 15:57
Acetone	0.236	U	0.472	0.208	mg/kg	1		08/27/21 15:57
Benzene	0.0118	U	0.0236	0.00736	mg/kg	1		08/27/21 15:57
Bromobenzene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
Bromochloromethane	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
Bromodichloromethane	0.00189	U	0.00378	0.00117	mg/kg	1		08/27/21 15:57
Bromoform	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
Bromomethane	0.0189	U	0.0378	0.0151	mg/kg	1		08/27/21 15:57
Carbon disulfide	0.0945	U	0.189	0.0585	mg/kg	1		08/27/21 15:57
Carbon tetrachloride	0.0118	U	0.0236	0.00736	mg/kg	1		08/27/21 15:57
Chlorobenzene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57

Results of **CBPR-SB01-S2**

Client Sample ID: **CBPR-SB01-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384002
Lab Project ID: 1215384

Collection Date: 08/18/21 09:55
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):80.7
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroethane	0.189	U	0.378	0.117	mg/kg	1		08/27/21 15:57
Chloroform	0.00565	U	0.0113	0.00566	mg/kg	1		08/27/21 15:57
Chloromethane	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
cis-1,2-Dichloroethene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
cis-1,3-Dichloropropene	0.0118	U	0.0236	0.00736	mg/kg	1		08/27/21 15:57
Dibromochloromethane	0.00472	U	0.00944	0.00283	mg/kg	1		08/27/21 15:57
Dibromomethane	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
Dichlorodifluoromethane	0.0945	U	0.189	0.0566	mg/kg	1		08/27/21 15:57
Ethylbenzene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
Freon-113	0.0945	U	0.189	0.0585	mg/kg	1		08/27/21 15:57
Hexachlorobutadiene	0.0189	U	0.0378	0.0117	mg/kg	1		08/27/21 15:57
Isopropylbenzene (Cumene)	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
Methylene chloride	0.0945	U	0.189	0.0585	mg/kg	1		08/27/21 15:57
Methyl-t-butyl ether	0.0945	U	0.189	0.0585	mg/kg	1		08/27/21 15:57
Naphthalene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
n-Butylbenzene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
n-Propylbenzene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
o-Xylene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
P & M -Xylene	0.0472	U	0.0944	0.0283	mg/kg	1		08/27/21 15:57
sec-Butylbenzene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
Styrene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
tert-Butylbenzene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
Tetrachloroethene	0.0118	U	0.0236	0.00736	mg/kg	1		08/27/21 15:57
Toluene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
trans-1,2-Dichloroethene	0.0236	U	0.0472	0.0147	mg/kg	1		08/27/21 15:57
trans-1,3-Dichloropropene	0.0118	U	0.0236	0.00736	mg/kg	1		08/27/21 15:57
Trichloroethene	0.00945	U	0.0189	0.00604	mg/kg	1		08/27/21 15:57
Trichlorofluoromethane	0.0472	U	0.0944	0.0283	mg/kg	1		08/27/21 15:57
Vinyl acetate	0.0945	U	0.189	0.0585	mg/kg	1		08/27/21 15:57
Vinyl chloride	0.000755	U	0.00151	0.000472	mg/kg	1		08/27/21 15:57
Xylenes (total)	0.0710	U	0.142	0.0430	mg/kg	1		08/27/21 15:57
Surrogates								
1,2-Dichloroethane-D4 (surr)	108		71-136		%	1		08/27/21 15:57
4-Bromofluorobenzene (surr)	110		55-151		%	1		08/27/21 15:57
Toluene-d8 (surr)	100		85-116		%	1		08/27/21 15:57

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **CBPR-SB01-S2**

Client Sample ID: **CBPR-SB01-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384002
Lab Project ID: 1215384

Collection Date: 08/18/21 09:55
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):80.7
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS21109
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 08/27/21 15:57
Container ID: 1215384002-B

Prep Batch: VXX37726
Prep Method: SW5035A
Prep Date/Time: 08/18/21 09:55
Prep Initial Wt./Vol.: 43.963 g
Prep Extract Vol: 33.4856 mL

Results of **CBPR-SB04-S1**

Client Sample ID: **CBPR-SB04-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384003
Lab Project ID: 1215384

Collection Date: 08/18/21 10:09
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):86.7
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	0.0720 U		0.144	0.0360	mg/kg	5		08/30/21 15:50
2-Methylnaphthalene	0.0720 U		0.144	0.0360	mg/kg	5		08/30/21 15:50
Acenaphthene	0.0720 U		0.144	0.0360	mg/kg	5		08/30/21 15:50
Acenaphthylene	0.0720 U		0.144	0.0360	mg/kg	5		08/30/21 15:50
Anthracene	0.0720 U		0.144	0.0360	mg/kg	5		08/30/21 15:50
Benzo(a)Anthracene	0.0144 U		0.0288	0.00720	mg/kg	1		08/29/21 02:20
Benzo[a]pyrene	0.0144 U		0.0288	0.00720	mg/kg	1		08/29/21 02:20
Benzo[b]Fluoranthene	0.0144 U		0.0288	0.00720	mg/kg	1		08/29/21 02:20
Benzo[g,h,i]perylene	0.0144 U		0.0288	0.00720	mg/kg	1		08/29/21 02:20
Benzo[k]fluoranthene	0.0144 U		0.0288	0.00720	mg/kg	1		08/29/21 02:20
Chrysene	0.0144 U		0.0288	0.00720	mg/kg	1		08/29/21 02:20
Dibenzo[a,h]anthracene	0.0144 U		0.0288	0.00720	mg/kg	1		08/29/21 02:20
Fluoranthene	0.0144 U		0.0288	0.00720	mg/kg	1		08/29/21 02:20
Fluorene	0.0720 U		0.144	0.0360	mg/kg	5		08/30/21 15:50
Indeno[1,2,3-c,d] pyrene	0.0144 U		0.0288	0.00720	mg/kg	1		08/29/21 02:20
Naphthalene	0.0575 U		0.115	0.0288	mg/kg	5		08/30/21 15:50
Phenanthrene	0.0720 U		0.144	0.0360	mg/kg	5		08/30/21 15:50
Pyrene	0.0144 U		0.0288	0.00720	mg/kg	1		08/29/21 02:20
Surrogates								
2-Methylnaphthalene-d10 (surr)	159	*	58-103		%	5		08/30/21 15:50
Fluoranthene-d10 (surr)	85.4		54-113		%	1		08/29/21 02:20

Batch Information

Analytical Batch: XMS12859
Analytical Method: 8270D SIM (PAH)
Analyst: LAW
Analytical Date/Time: 08/29/21 02:20
Container ID: 1215384003-A

Prep Batch: XXX45460
Prep Method: SW3550C
Prep Date/Time: 08/28/21 08:43
Prep Initial Wt./Vol.: 22.542 g
Prep Extract Vol: 5 mL

Analytical Batch: XMS12861
Analytical Method: 8270D SIM (PAH)
Analyst: CDM
Analytical Date/Time: 08/30/21 15:50
Container ID: 1215384003-A

Prep Batch: XXX45460
Prep Method: SW3550C
Prep Date/Time: 08/28/21 08:43
Prep Initial Wt./Vol.: 22.542 g
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **CBPR-SB04-S1**

Client Sample ID: **CBPR-SB04-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384003
Lab Project ID: 1215384

Collection Date: 08/18/21 10:09
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):86.7
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	3680		22.8	7.08	mg/kg	1		08/24/21 21:42
Surrogates								
5a Androstane (surr)	90.3		50-150		%	1		08/24/21 21:42

Batch Information

Analytical Batch: XFC16054
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/24/21 21:42
Container ID: 1215384003-A

Prep Batch: XXX45430
Prep Method: SW3550C
Prep Date/Time: 08/24/21 07:10
Prep Initial Wt./Vol.: 30.338 g
Prep Extract Vol: 5 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
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Member of SGS Group

Results of **CBPR-SB04-S1**

Client Sample ID: **CBPR-SB04-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384003
Lab Project ID: 1215384

Collection Date: 08/18/21 10:09
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):86.7
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.0168	U	0.0335	0.0104	mg/kg	1		08/27/21 16:14
1,1,1-Trichloroethane	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
1,1,2,2-Tetrachloroethane	0.00168	U	0.00335	0.00104	mg/kg	1		08/27/21 16:14
1,1,2-Trichloroethane	0.000840	U	0.00168	0.000838	mg/kg	1		08/27/21 16:14
1,1-Dichloroethane	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
1,1-Dichloroethene	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
1,1-Dichloropropene	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
1,2,3-Trichlorobenzene	0.0840	U	0.168	0.0503	mg/kg	1		08/27/21 16:14
1,2,3-Trichloropropane	0.00168	U	0.00335	0.00104	mg/kg	1		08/27/21 16:14
1,2,4-Trichlorobenzene	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
1,2,4-Trimethylbenzene	0.0840	U	0.168	0.0503	mg/kg	1		08/27/21 16:14
1,2-Dibromo-3-chloropropane	0.0840	U	0.168	0.0520	mg/kg	1		08/27/21 16:14
1,2-Dibromoethane	0.00126	U	0.00252	0.00126	mg/kg	1		08/27/21 16:14
1,2-Dichlorobenzene	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
1,2-Dichloroethane	0.00168	U	0.00335	0.00117	mg/kg	1		08/27/21 16:14
1,2-Dichloropropane	0.00840	U	0.0168	0.00838	mg/kg	1		08/27/21 16:14
1,3,5-Trimethylbenzene	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
1,3-Dichlorobenzene	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
1,3-Dichloropropane	0.00840	U	0.0168	0.00520	mg/kg	1		08/27/21 16:14
1,4-Dichlorobenzene	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
2,2-Dichloropropane	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
2-Butanone (MEK)	0.209	U	0.419	0.131	mg/kg	1		08/27/21 16:14
2-Chlorotoluene	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
2-Hexanone	0.101	U	0.201	0.101	mg/kg	1		08/27/21 16:14
4-Chlorotoluene	0.0168	U	0.0335	0.0168	mg/kg	1		08/27/21 16:14
4-Isopropyltoluene	0.0670	U	0.134	0.0671	mg/kg	1		08/27/21 16:14
4-Methyl-2-pentanone (MIBK)	0.209	U	0.419	0.131	mg/kg	1		08/27/21 16:14
Acetone	0.209	U	0.419	0.184	mg/kg	1		08/27/21 16:14
Benzene	0.0105	U	0.0210	0.00654	mg/kg	1		08/27/21 16:14
Bromobenzene	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
Bromochloromethane	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
Bromodichloromethane	0.00168	U	0.00335	0.00104	mg/kg	1		08/27/21 16:14
Bromoform	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14
Bromomethane	0.0168	U	0.0335	0.0134	mg/kg	1		08/27/21 16:14
Carbon disulfide	0.0840	U	0.168	0.0520	mg/kg	1		08/27/21 16:14
Carbon tetrachloride	0.0105	U	0.0210	0.00654	mg/kg	1		08/27/21 16:14
Chlorobenzene	0.0210	U	0.0419	0.0131	mg/kg	1		08/27/21 16:14

Results of **CBPR-SB04-S1**

Client Sample ID: **CBPR-SB04-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384003
Lab Project ID: 1215384

Collection Date: 08/18/21 10:09
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):86.7
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroethane	0.168 U		0.335	0.104	mg/kg	1		08/27/21 16:14
Chloroform	0.00505 U		0.0101	0.00503	mg/kg	1		08/27/21 16:14
Chloromethane	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
cis-1,2-Dichloroethene	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
cis-1,3-Dichloropropene	0.0105 U		0.0210	0.00654	mg/kg	1		08/27/21 16:14
Dibromochloromethane	0.00419 U		0.00838	0.00252	mg/kg	1		08/27/21 16:14
Dibromomethane	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
Dichlorodifluoromethane	0.0840 U		0.168	0.0503	mg/kg	1		08/27/21 16:14
Ethylbenzene	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
Freon-113	0.0840 U		0.168	0.0520	mg/kg	1		08/27/21 16:14
Hexachlorobutadiene	0.0168 U		0.0335	0.0104	mg/kg	1		08/27/21 16:14
Isopropylbenzene (Cumene)	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
Methylene chloride	0.0840 U		0.168	0.0520	mg/kg	1		08/27/21 16:14
Methyl-t-butyl ether	0.0840 U		0.168	0.0520	mg/kg	1		08/27/21 16:14
Naphthalene	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
n-Butylbenzene	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
n-Propylbenzene	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
o-Xylene	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
P & M -Xylene	0.0419 U		0.0838	0.0252	mg/kg	1		08/27/21 16:14
sec-Butylbenzene	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
Styrene	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
tert-Butylbenzene	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
Tetrachloroethene	0.0105 U		0.0210	0.00654	mg/kg	1		08/27/21 16:14
Toluene	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
trans-1,2-Dichloroethene	0.0210 U		0.0419	0.0131	mg/kg	1		08/27/21 16:14
trans-1,3-Dichloropropene	0.0105 U		0.0210	0.00654	mg/kg	1		08/27/21 16:14
Trichloroethene	0.00840 U		0.0168	0.00537	mg/kg	1		08/27/21 16:14
Trichlorofluoromethane	0.0419 U		0.0838	0.0252	mg/kg	1		08/27/21 16:14
Vinyl acetate	0.0840 U		0.168	0.0520	mg/kg	1		08/27/21 16:14
Vinyl chloride	0.000670 U		0.00134	0.000419	mg/kg	1		08/27/21 16:14
Xylenes (total)	0.0630 U		0.126	0.0382	mg/kg	1		08/27/21 16:14
Surrogates								
1,2-Dichloroethane-D4 (surr)	114		71-136		%	1		08/27/21 16:14
4-Bromofluorobenzene (surr)	87.2		55-151		%	1		08/27/21 16:14
Toluene-d8 (surr)	96.6		85-116		%	1		08/27/21 16:14

Print Date: 09/16/2021 1:49:26PM

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Results of **CBPR-SB04-S1**

Client Sample ID: **CBPR-SB04-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384003
Lab Project ID: 1215384

Collection Date: 08/18/21 10:09
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):86.7
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS21109
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 08/27/21 16:14
Container ID: 1215384003-B

Prep Batch: VXX37726
Prep Method: SW5035A
Prep Date/Time: 08/18/21 10:09
Prep Initial Wt./Vol.: 42.154 g
Prep Extract Vol: 30.6267 mL

Results of **CBPR-SB04-S2**

Client Sample ID: **CBPR-SB04-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384004
Lab Project ID: 1215384

Collection Date: 08/18/21 10:18
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):83.5
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	11.9	U	23.9	7.40	mg/kg	1		08/25/21 20:26
Surrogates								
5a Androstane (surr)	83.7		50-150		%	1		08/25/21 20:26

Batch Information

Analytical Batch: XFC16061
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/25/21 20:26
Container ID: 1215384004-A

Prep Batch: XXX45438
Prep Method: SW3550C
Prep Date/Time: 08/25/21 07:51
Prep Initial Wt./Vol.: 30.099 g
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **CBPR-SB04-S2**

Client Sample ID: **CBPR-SB04-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384004
Lab Project ID: 1215384

Collection Date: 08/18/21 10:18
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):83.5
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.00995	U	0.0199	0.00636	mg/kg	1		08/30/21 17:23
Ethylbenzene	0.0199	U	0.0398	0.0143	mg/kg	1		08/30/21 17:23
o-Xylene	0.0199	U	0.0398	0.0145	mg/kg	1		08/30/21 17:23
P & M -Xylene	0.0398	U	0.0795	0.0239	mg/kg	1		08/30/21 17:23
Toluene	0.0199	U	0.0398	0.0124	mg/kg	1		08/30/21 17:23
Xylenes (total)	0.0595	U	0.119	0.0398	mg/kg	1		08/30/21 17:23
Surrogates								
1,4-Difluorobenzene (surr)	88.3		72-119		%	1		08/30/21 17:23

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Analyst: MDT
Analytical Date/Time: 08/30/21 17:23
Container ID: 1215384004-B

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 08/18/21 10:18
Prep Initial Wt./Vol.: 50.05 g
Prep Extract Vol: 33.2449 mL

Results of **CBPR-SB06-S1**

Client Sample ID: **CBPR-SB06-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384005
Lab Project ID: 1215384

Collection Date: 08/18/21 10:47
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):64.5
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	15.3	U	30.6	9.49	mg/kg	1		08/25/21 20:36
Surrogates								
5a Androstane (surr)	83.3		50-150		%	1		08/25/21 20:36

Batch Information

Analytical Batch: XFC16061
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/25/21 20:36
Container ID: 1215384005-A

Prep Batch: XXX45438
Prep Method: SW3550C
Prep Date/Time: 08/25/21 07:51
Prep Initial Wt./Vol.: 30.391 g
Prep Extract Vol: 5 mL

Results of **CBPR-SB06-S1**

Client Sample ID: **CBPR-SB06-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384005
Lab Project ID: 1215384

Collection Date: 08/18/21 10:47
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):64.5
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.0203	U	0.0405	0.0130	mg/kg	1		08/30/21 17:41
Ethylbenzene	0.0405	U	0.0811	0.0292	mg/kg	1		08/30/21 17:41
o-Xylene	0.0405	U	0.0811	0.0295	mg/kg	1		08/30/21 17:41
P & M -Xylene	0.0810	U	0.162	0.0487	mg/kg	1		08/30/21 17:41
Toluene	0.0405	U	0.0811	0.0253	mg/kg	1		08/30/21 17:41
Xylenes (total)	0.122	U	0.243	0.0811	mg/kg	1		08/30/21 17:41
Surrogates								
1,4-Difluorobenzene (surr)	87.6		72-119		%	1		08/30/21 17:41

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Analyst: MDT
Analytical Date/Time: 08/30/21 17:41
Container ID: 1215384005-B

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 08/18/21 10:47
Prep Initial Wt./Vol.: 36.185 g
Prep Extract Vol: 37.8487 mL

Results of **CBPR-SB06-S2**

Client Sample ID: **CBPR-SB06-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384006
Lab Project ID: 1215384

Collection Date: 08/18/21 10:58
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):84.9
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	11.6	U	23.2	7.21	mg/kg	1		08/25/21 20:46
Surrogates								
5a Androstane (surr)	95.6		50-150		%	1		08/25/21 20:46

Batch Information

Analytical Batch: XFC16061
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/25/21 20:46
Container ID: 1215384006-A

Prep Batch: XXX45438
Prep Method: SW3550C
Prep Date/Time: 08/25/21 07:51
Prep Initial Wt./Vol.: 30.41 g
Prep Extract Vol: 5 mL

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Results of **CBPR-SB06-S2**

Client Sample ID: **CBPR-SB06-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384006
Lab Project ID: 1215384

Collection Date: 08/18/21 10:58
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):84.9
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.0108	U	0.0215	0.00688	mg/kg	1		08/30/21 18:35
Ethylbenzene	0.0215	U	0.0430	0.0155	mg/kg	1		08/30/21 18:35
o-Xylene	0.0215	U	0.0430	0.0157	mg/kg	1		08/30/21 18:35
P & M -Xylene	0.0430	U	0.0860	0.0258	mg/kg	1		08/30/21 18:35
Toluene	0.0215	U	0.0430	0.0134	mg/kg	1		08/30/21 18:35
Xylenes (total)	0.0645	U	0.129	0.0430	mg/kg	1		08/30/21 18:35
Surrogates								
1,4-Difluorobenzene (surr)	88.5		72-119		%	1		08/30/21 18:35

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Analyst: MDT
Analytical Date/Time: 08/30/21 18:35
Container ID: 1215384006-B

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 08/18/21 10:58
Prep Initial Wt./Vol.: 43.191 g
Prep Extract Vol: 31.5293 mL

Print Date: 09/16/2021 1:49:26PM

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Results of **CBPR-SB08-S1**

Client Sample ID: **CBPR-SB08-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384007
Lab Project ID: 1215384

Collection Date: 08/18/21 11:17
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):69.2
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	184		28.7	8.90	mg/kg	1		08/25/21 20:55
Surrogates								
5a Androstane (surr)	90.4		50-150		%	1		08/25/21 20:55

Batch Information

Analytical Batch: XFC16061
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/25/21 20:55
Container ID: 1215384007-A

Prep Batch: XXX45438
Prep Method: SW3550C
Prep Date/Time: 08/25/21 07:51
Prep Initial Wt./Vol.: 30.179 g
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **CBPR-SB08-S1**

Client Sample ID: **CBPR-SB08-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384007
Lab Project ID: 1215384

Collection Date: 08/18/21 11:17
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):69.2
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.0152	U	0.0304	0.00973	mg/kg	1		08/30/21 18:53
Ethylbenzene	0.0304	U	0.0608	0.0219	mg/kg	1		08/30/21 18:53
o-Xylene	0.0304	U	0.0608	0.0221	mg/kg	1		08/30/21 18:53
P & M -Xylene	0.0610	U	0.122	0.0365	mg/kg	1		08/30/21 18:53
Toluene	0.0304	U	0.0608	0.0190	mg/kg	1		08/30/21 18:53
Xylenes (total)	0.0910	U	0.182	0.0608	mg/kg	1		08/30/21 18:53
Surrogates								
1,4-Difluorobenzene (surr)	87.4		72-119		%	1		08/30/21 18:53

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Analyst: MDT
Analytical Date/Time: 08/30/21 18:53
Container ID: 1215384007-B

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 08/18/21 11:17
Prep Initial Wt./Vol.: 46.833 g
Prep Extract Vol: 39.4186 mL

Results of **CBPR-SB08-S2**

Client Sample ID: **CBPR-SB08-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384008
Lab Project ID: 1215384

Collection Date: 08/18/21 11:58
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):81.6
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	12.1	U	24.2	7.49	mg/kg	1		08/25/21 21:05
Surrogates								
5a Androstane (surr)	91.5		50-150		%	1		08/25/21 21:05

Batch Information

Analytical Batch: XFC16061
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/25/21 21:05
Container ID: 1215384008-A

Prep Batch: XXX45438
Prep Method: SW3550C
Prep Date/Time: 08/25/21 07:51
Prep Initial Wt./Vol.: 30.428 g
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:49:26PM

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Results of **CBPR-SB08-S2**

Client Sample ID: **CBPR-SB08-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384008
Lab Project ID: 1215384

Collection Date: 08/18/21 11:58
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):81.6
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.00855	U	0.0171	0.00548	mg/kg	1		08/30/21 19:11
Ethylbenzene	0.0171	U	0.0342	0.0123	mg/kg	1		08/30/21 19:11
o-Xylene	0.0171	U	0.0342	0.0125	mg/kg	1		08/30/21 19:11
P & M -Xylene	0.0343	U	0.0685	0.0205	mg/kg	1		08/30/21 19:11
Toluene	0.0171	U	0.0342	0.0107	mg/kg	1		08/30/21 19:11
Xylenes (total)	0.0515	U	0.103	0.0342	mg/kg	1		08/30/21 19:11
Surrogates								
1,4-Difluorobenzene (surr)	89		72-119		%	1		08/30/21 19:11

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Analyst: MDT
Analytical Date/Time: 08/30/21 19:11
Container ID: 1215384008-B

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 08/18/21 11:58
Prep Initial Wt./Vol.: 66.723 g
Prep Extract Vol: 37.2799 mL

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **CBPR-SB10-S1**

Client Sample ID: **CBPR-SB10-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384009
Lab Project ID: 1215384

Collection Date: 08/18/21 12:10
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):47.1
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	21.0	U	42.0	13.0	mg/kg	1		08/25/21 21:15
Surrogates								
5a Androstane (surr)	84.4		50-150		%	1		08/25/21 21:15

Batch Information

Analytical Batch: XFC16061
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/25/21 21:15
Container ID: 1215384009-A

Prep Batch: XXX45438
Prep Method: SW3550C
Prep Date/Time: 08/25/21 07:51
Prep Initial Wt./Vol.: 30.35 g
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **CBPR-SB10-S1**

Client Sample ID: **CBPR-SB10-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384009
Lab Project ID: 1215384

Collection Date: 08/18/21 12:10
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):47.1
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.0353	U	0.0707	0.0226	mg/kg	1		08/30/21 19:29
Ethylbenzene	0.0705	U	0.141	0.0509	mg/kg	1		08/30/21 19:29
o-Xylene	0.0705	U	0.141	0.0515	mg/kg	1		08/30/21 19:29
P & M -Xylene	0.142	U	0.283	0.0849	mg/kg	1		08/30/21 19:29
Toluene	0.0705	U	0.141	0.0441	mg/kg	1		08/30/21 19:29
Xylenes (total)	0.212	U	0.424	0.141	mg/kg	1		08/30/21 19:29
Surrogates								
1,4-Difluorobenzene (surr)	87.7		72-119		%	1		08/30/21 19:29

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Analyst: MDT
Analytical Date/Time: 08/30/21 19:29
Container ID: 1215384009-B

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 08/18/21 12:10
Prep Initial Wt./Vol.: 31.168 g
Prep Extract Vol: 41.4984 mL

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **CBPR-SB10-S2**

Client Sample ID: **CBPR-SB10-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384010
Lab Project ID: 1215384

Collection Date: 08/18/21 12:15
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):76.3
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	12.9	U	25.9	8.02	mg/kg	1		08/25/21 21:25
Surrogates								
5a Androstane (surr)	88.2		50-150		%	1		08/25/21 21:25

Batch Information

Analytical Batch: XFC16061
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/25/21 21:25
Container ID: 1215384010-A

Prep Batch: XXX45438
Prep Method: SW3550C
Prep Date/Time: 08/25/21 07:51
Prep Initial Wt./Vol.: 30.399 g
Prep Extract Vol: 5 mL

Results of **CBPR-SB10-S2**

Client Sample ID: **CBPR-SB10-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384010
Lab Project ID: 1215384

Collection Date: 08/18/21 12:15
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):76.3
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.0113	U	0.0225	0.00721	mg/kg	1		08/30/21 19:47
Ethylbenzene	0.0226	U	0.0451	0.0162	mg/kg	1		08/30/21 19:47
o-Xylene	0.0226	U	0.0451	0.0164	mg/kg	1		08/30/21 19:47
P & M -Xylene	0.0451	U	0.0902	0.0270	mg/kg	1		08/30/21 19:47
Toluene	0.0226	U	0.0451	0.0141	mg/kg	1		08/30/21 19:47
Xylenes (total)	0.0675	U	0.135	0.0451	mg/kg	1		08/30/21 19:47
Surrogates								
1,4-Difluorobenzene (surr)	87.1		72-119		%	1		08/30/21 19:47

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Analyst: MDT
Analytical Date/Time: 08/30/21 19:47
Container ID: 1215384010-B

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 08/18/21 12:15
Prep Initial Wt./Vol.: 55.417 g
Prep Extract Vol: 38.1284 mL

Results of **CBPR-SB02-S1**

Client Sample ID: **CBPR-SB02-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384011
Lab Project ID: 1215384

Collection Date: 08/18/21 14:15
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):82.3
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	12.1	U	24.1	7.48	mg/kg	1		08/25/21 21:35
Surrogates								
5a Androstane (surr)	79.9		50-150		%	1		08/25/21 21:35

Batch Information

Analytical Batch: XFC16061
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/25/21 21:35
Container ID: 1215384011-A

Prep Batch: XXX45438
Prep Method: SW3550C
Prep Date/Time: 08/25/21 07:51
Prep Initial Wt./Vol.: 30.234 g
Prep Extract Vol: 5 mL

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Results of **CBPR-SB02-S1**

Client Sample ID: **CBPR-SB02-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384011
Lab Project ID: 1215384

Collection Date: 08/18/21 14:15
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):82.3
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.0102	U	0.0204	0.00654	mg/kg	1		08/30/21 20:05
Ethylbenzene	0.0204	U	0.0409	0.0147	mg/kg	1		08/30/21 20:05
o-Xylene	0.0204	U	0.0409	0.0149	mg/kg	1		08/30/21 20:05
P & M -Xylene	0.0409	U	0.0817	0.0245	mg/kg	1		08/30/21 20:05
Toluene	0.0204	U	0.0409	0.0128	mg/kg	1		08/30/21 20:05
Xylenes (total)	0.0615	U	0.123	0.0409	mg/kg	1		08/30/21 20:05
Surrogates								
1,4-Difluorobenzene (surr)	88.1		72-119		%	1		08/30/21 20:05

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Analyst: MDT
Analytical Date/Time: 08/30/21 20:05
Container ID: 1215384011-B

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 08/18/21 14:15
Prep Initial Wt./Vol.: 50.485 g
Prep Extract Vol: 33.9509 mL

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Results of **CBPR-SB03-S1**

Client Sample ID: **CBPR-SB03-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384012
Lab Project ID: 1215384

Collection Date: 08/18/21 15:05
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):80.2
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	12.4	U	24.9	7.73	mg/kg	1		08/25/21 21:45
Surrogates								
5a Androstane (surr)	80.2		50-150		%	1		08/25/21 21:45

Batch Information

Analytical Batch: XFC16061
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/25/21 21:45
Container ID: 1215384012-A

Prep Batch: XXX45438
Prep Method: SW3550C
Prep Date/Time: 08/25/21 07:51
Prep Initial Wt./Vol.: 30.034 g
Prep Extract Vol: 5 mL

Results of **CBPR-SB03-S1**

Client Sample ID: **CBPR-SB03-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384012
Lab Project ID: 1215384

Collection Date: 08/18/21 15:05
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):80.2
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.0102	U	0.0203	0.00650	mg/kg	1		08/30/21 20:23
Ethylbenzene	0.0203	U	0.0406	0.0146	mg/kg	1		08/30/21 20:23
o-Xylene	0.0203	U	0.0406	0.0148	mg/kg	1		08/30/21 20:23
P & M -Xylene	0.0406	U	0.0812	0.0244	mg/kg	1		08/30/21 20:23
Toluene	0.0203	U	0.0406	0.0127	mg/kg	1		08/30/21 20:23
Xylenes (total)	0.0610	U	0.122	0.0406	mg/kg	1		08/30/21 20:23
Surrogates								
1,4-Difluorobenzene (surr)	88.4		72-119		%	1		08/30/21 20:23

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Analyst: MDT
Analytical Date/Time: 08/30/21 20:23
Container ID: 1215384012-B

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 08/18/21 15:05
Prep Initial Wt./Vol.: 55.235 g
Prep Extract Vol: 35.957 mL

Results of **CBPR-SB05-S1**

Client Sample ID: **CBPR-SB05-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384013
Lab Project ID: 1215384

Collection Date: 08/18/21 15:22
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):85.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	51.0		23.3	7.24	mg/kg	1		08/25/21 21:55
Surrogates								
5a Androstane (surr)	88.3		50-150		%	1		08/25/21 21:55

Batch Information

Analytical Batch: XFC16061
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/25/21 21:55
Container ID: 1215384013-A

Prep Batch: XXX45438
Prep Method: SW3550C
Prep Date/Time: 08/25/21 07:51
Prep Initial Wt./Vol.: 30.077 g
Prep Extract Vol: 5 mL

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Results of **CBPR-SB05-S1**

Client Sample ID: **CBPR-SB05-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384013
Lab Project ID: 1215384

Collection Date: 08/18/21 15:22
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):85.4
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.00810	U	0.0162	0.00518	mg/kg	1		08/30/21 20:42
Ethylbenzene	0.0162	U	0.0324	0.0117	mg/kg	1		08/30/21 20:42
o-Xylene	0.0162	U	0.0324	0.0118	mg/kg	1		08/30/21 20:42
P & M -Xylene	0.0324	U	0.0648	0.0194	mg/kg	1		08/30/21 20:42
Toluene	0.0162	U	0.0324	0.0101	mg/kg	1		08/30/21 20:42
Xylenes (total)	0.0486	U	0.0972	0.0324	mg/kg	1		08/30/21 20:42
Surrogates								
1,4-Difluorobenzene (surr)	86.6		72-119		%	1		08/30/21 20:42

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Analyst: MDT
Analytical Date/Time: 08/30/21 20:42
Container ID: 1215384013-B

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 08/18/21 15:22
Prep Initial Wt./Vol.: 61.291 g
Prep Extract Vol: 33.9197 mL

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **CBPR-SB07-S1**

Client Sample ID: **CBPR-SB07-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384014
Lab Project ID: 1215384

Collection Date: 08/18/21 15:52
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):74.5
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	13.3	U	26.6	8.24	mg/kg	1		08/25/21 22:05
Surrogates								
5a Androstane (surr)	84.7		50-150		%	1		08/25/21 22:05

Batch Information

Analytical Batch: XFC16061
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/25/21 22:05
Container ID: 1215384014-A

Prep Batch: XXX45438
Prep Method: SW3550C
Prep Date/Time: 08/25/21 07:51
Prep Initial Wt./Vol.: 30.284 g
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **CBPR-SB07-S1**

Client Sample ID: **CBPR-SB07-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384014
Lab Project ID: 1215384

Collection Date: 08/18/21 15:52
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):74.5
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.0124	U	0.0247	0.00790	mg/kg	1		08/30/21 20:59
Ethylbenzene	0.0247	U	0.0494	0.0178	mg/kg	1		08/30/21 20:59
o-Xylene	0.0247	U	0.0494	0.0180	mg/kg	1		08/30/21 20:59
P & M -Xylene	0.0494	U	0.0987	0.0296	mg/kg	1		08/30/21 20:59
Toluene	0.0247	U	0.0494	0.0154	mg/kg	1		08/30/21 20:59
Xylenes (total)	0.0740	U	0.148	0.0494	mg/kg	1		08/30/21 20:59
Surrogates								
1,4-Difluorobenzene (surr)	87.6		72-119		%	1		08/30/21 20:59

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Analyst: MDT
Analytical Date/Time: 08/30/21 20:59
Container ID: 1215384014-B

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 08/18/21 15:52
Prep Initial Wt./Vol.: 51.971 g
Prep Extract Vol: 38.2344 mL

Results of **CBPR-SB07-S2**

Client Sample ID: **CBPR-SB07-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384015
Lab Project ID: 1215384

Collection Date: 08/18/21 16:00
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):72.7
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	13.7	U	27.3	8.45	mg/kg	1		08/25/21 22:15
Surrogates								
5a Androstane (surr)	79.2		50-150		%	1		08/25/21 22:15

Batch Information

Analytical Batch: XFC16061
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/25/21 22:15
Container ID: 1215384015-A

Prep Batch: XXX45438
Prep Method: SW3550C
Prep Date/Time: 08/25/21 07:51
Prep Initial Wt./Vol.: 30.29 g
Prep Extract Vol: 5 mL

Results of **CBPR-SB07-S2**

Client Sample ID: **CBPR-SB07-S2**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384015
Lab Project ID: 1215384

Collection Date: 08/18/21 16:00
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):72.7
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.0176	U	0.0353	0.0113	mg/kg	1		08/30/21 21:17
Ethylbenzene	0.0353	U	0.0706	0.0254	mg/kg	1		08/30/21 21:17
o-Xylene	0.0353	U	0.0706	0.0257	mg/kg	1		08/30/21 21:17
P & M -Xylene	0.0705	U	0.141	0.0424	mg/kg	1		08/30/21 21:17
Toluene	0.0353	U	0.0706	0.0220	mg/kg	1		08/30/21 21:17
Xylenes (total)	0.106	U	0.212	0.0706	mg/kg	1		08/30/21 21:17
Surrogates								
1,4-Difluorobenzene (surr)	87.4		72-119		%	1		08/30/21 21:17

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Analyst: MDT
Analytical Date/Time: 08/30/21 21:17
Container ID: 1215384015-B

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 08/18/21 16:00
Prep Initial Wt./Vol.: 33.236 g
Prep Extract Vol: 34.0894 mL

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **CBPR-SB09-S1**

Client Sample ID: **CBPR-SB09-S1**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384016
Lab Project ID: 1215384

Collection Date: 08/18/21 16:20
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):45.9
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	42.6	J	43.3	13.4	mg/kg	1		08/26/21 17:49
Surrogates								
5a Androstane (surr)	79.1		50-150		%	1		08/26/21 17:49

Batch Information

Analytical Batch: XFC16062
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/26/21 17:49
Container ID: 1215384016-A

Prep Batch: XXX45454
Prep Method: SW3550C
Prep Date/Time: 08/26/21 14:30
Prep Initial Wt./Vol.: 30.231 g
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **TB-01**

Client Sample ID: **TB-01**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384017
Lab Project ID: 1215384

Collection Date: 08/18/21 08:30
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.0101	U	0.0201	0.00624	mg/kg	1		08/27/21 15:24
1,1,1-Trichloroethane	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
1,1,2,2-Tetrachloroethane	0.00100	U	0.00201	0.000624	mg/kg	1		08/27/21 15:24
1,1,2-Trichloroethane	0.000505	U	0.00101	0.000503	mg/kg	1		08/27/21 15:24
1,1-Dichloroethane	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
1,1-Dichloroethene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
1,1-Dichloropropene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
1,2,3-Trichlorobenzene	0.0505	U	0.101	0.0302	mg/kg	1		08/27/21 15:24
1,2,3-Trichloropropane	0.00100	U	0.00201	0.000624	mg/kg	1		08/27/21 15:24
1,2,4-Trichlorobenzene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
1,2,4-Trimethylbenzene	0.0505	U	0.101	0.0302	mg/kg	1		08/27/21 15:24
1,2-Dibromo-3-chloropropane	0.0505	U	0.101	0.0312	mg/kg	1		08/27/21 15:24
1,2-Dibromoethane	0.000755	U	0.00151	0.000755	mg/kg	1		08/27/21 15:24
1,2-Dichlorobenzene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
1,2-Dichloroethane	0.00100	U	0.00201	0.000705	mg/kg	1		08/27/21 15:24
1,2-Dichloropropane	0.00505	U	0.0101	0.00503	mg/kg	1		08/27/21 15:24
1,3,5-Trimethylbenzene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
1,3-Dichlorobenzene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
1,3-Dichloropropane	0.00505	U	0.0101	0.00312	mg/kg	1		08/27/21 15:24
1,4-Dichlorobenzene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
2,2-Dichloropropane	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
2-Butanone (MEK)	0.126	U	0.252	0.0785	mg/kg	1		08/27/21 15:24
2-Chlorotoluene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
2-Hexanone	0.0605	U	0.121	0.0604	mg/kg	1		08/27/21 15:24
4-Chlorotoluene	0.0101	U	0.0201	0.0101	mg/kg	1		08/27/21 15:24
4-Isopropyltoluene	0.0403	U	0.0805	0.0403	mg/kg	1		08/27/21 15:24
4-Methyl-2-pentanone (MIBK)	0.126	U	0.252	0.0785	mg/kg	1		08/27/21 15:24
Acetone	0.126	U	0.252	0.111	mg/kg	1		08/27/21 15:24
Benzene	0.00630	U	0.0126	0.00393	mg/kg	1		08/27/21 15:24
Bromobenzene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
Bromochloromethane	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
Bromodichloromethane	0.00100	U	0.00201	0.000624	mg/kg	1		08/27/21 15:24
Bromoform	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
Bromomethane	0.0101	U	0.0201	0.00805	mg/kg	1		08/27/21 15:24
Carbon disulfide	0.0505	U	0.101	0.0312	mg/kg	1		08/27/21 15:24
Carbon tetrachloride	0.00630	U	0.0126	0.00393	mg/kg	1		08/27/21 15:24
Chlorobenzene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24

Results of **TB-01**

Client Sample ID: **TB-01**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384017
Lab Project ID: 1215384

Collection Date: 08/18/21 08:30
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroethane	0.101	U	0.201	0.0624	mg/kg	1		08/27/21 15:24
Chloroform	0.00302	U	0.00604	0.00302	mg/kg	1		08/27/21 15:24
Chloromethane	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
cis-1,2-Dichloroethene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
cis-1,3-Dichloropropene	0.00630	U	0.0126	0.00393	mg/kg	1		08/27/21 15:24
Dibromochloromethane	0.00252	U	0.00503	0.00151	mg/kg	1		08/27/21 15:24
Dibromomethane	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
Dichlorodifluoromethane	0.0505	U	0.101	0.0302	mg/kg	1		08/27/21 15:24
Ethylbenzene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
Freon-113	0.0505	U	0.101	0.0312	mg/kg	1		08/27/21 15:24
Hexachlorobutadiene	0.0101	U	0.0201	0.00624	mg/kg	1		08/27/21 15:24
Isopropylbenzene (Cumene)	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
Methylene chloride	0.0505	U	0.101	0.0312	mg/kg	1		08/27/21 15:24
Methyl-t-butyl ether	0.0505	U	0.101	0.0312	mg/kg	1		08/27/21 15:24
Naphthalene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
n-Butylbenzene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
n-Propylbenzene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
o-Xylene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
P & M -Xylene	0.0251	U	0.0503	0.0151	mg/kg	1		08/27/21 15:24
sec-Butylbenzene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
Styrene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
tert-Butylbenzene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
Tetrachloroethene	0.00630	U	0.0126	0.00393	mg/kg	1		08/27/21 15:24
Toluene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
trans-1,2-Dichloroethene	0.0126	U	0.0252	0.00785	mg/kg	1		08/27/21 15:24
trans-1,3-Dichloropropene	0.00630	U	0.0126	0.00393	mg/kg	1		08/27/21 15:24
Trichloroethene	0.00505	U	0.0101	0.00322	mg/kg	1		08/27/21 15:24
Trichlorofluoromethane	0.0251	U	0.0503	0.0151	mg/kg	1		08/27/21 15:24
Vinyl acetate	0.0505	U	0.101	0.0312	mg/kg	1		08/27/21 15:24
Vinyl chloride	0.000403	U	0.000805	0.000252	mg/kg	1		08/27/21 15:24
Xylenes (total)	0.0377	U	0.0755	0.0229	mg/kg	1		08/27/21 15:24
Surrogates								
1,2-Dichloroethane-D4 (surr)	108		71-136		%	1		08/27/21 15:24
4-Bromofluorobenzene (surr)	97.1		55-151		%	1		08/27/21 15:24
Toluene-d8 (surr)	98.7		85-116		%	1		08/27/21 15:24

Print Date: 09/16/2021 1:49:26PM

J flagging is activated

Results of **TB-01**

Client Sample ID: **TB-01**
Client Project ID: **Cold Bay FF Pipeline Release**
Lab Sample ID: 1215384017
Lab Project ID: 1215384

Collection Date: 08/18/21 08:30
Received Date: 08/23/21 15:18
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS21109
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 08/27/21 15:24
Container ID: 1215384017-A

Prep Batch: VXX37726
Prep Method: SW5035A
Prep Date/Time: 08/18/21 08:30
Prep Initial Wt./Vol.: 49.676 g
Prep Extract Vol: 25 mL

Method Blank

Blank ID: MB for HBN 1824594 [SPT/11357]
Blank Lab ID: 1632131

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215384001, 1215384002, 1215384003, 1215384004, 1215384005, 1215384006, 1215384007, 1215384008, 1215384009, 1215384010, 1215384011, 1215384012, 1215384013, 1215384014, 1215384015, 1215384016

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT11357
Analytical Method: SM21 2540G
Instrument:
Analyst: TMM
Analytical Date/Time: 8/24/2021 5:50:00PM

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Duplicate Sample Summary

Original Sample ID: 1215399001
Duplicate Sample ID: 1632132

Analysis Date: 08/24/2021 17:50
Matrix: Soil/Solid (dry weight)

QC for Samples:

1215384001, 1215384002, 1215384003, 1215384004, 1215384005, 1215384006, 1215384007, 1215384008, 1215384009, 1215384010, 1215384011, 1215384012, 1215384013, 1215384014, 1215384015, 1215384016

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	92.3	92.5	%	0.13	(< 15)

Batch Information

Analytical Batch: SPT11357
Analytical Method: SM21 2540G
Instrument:
Analyst: TMM

Print Date: 09/16/2021 1:49:30PM

Method Blank

Blank ID: MB for HBN 1824799 [VXX/37726]
Blank Lab ID: 1633004

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215384002, 1215384003, 1215384017

Results by **SW8260D**

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

Method Blank

Blank ID: MB for HBN 1824799 [VXX/37726]
Blank Lab ID: 1633004

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215384002, 1215384003, 1215384017

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	Units
Chloroform	0.00300U	0.00600	0.00300	mg/kg
Chloromethane	0.0125U	0.0250	0.00780	mg/kg
cis-1,2-Dichloroethene	0.0125U	0.0250	0.00780	mg/kg
cis-1,3-Dichloropropene	0.00625U	0.0125	0.00390	mg/kg
Dibromochloromethane	0.00250U	0.00500	0.00150	mg/kg
Dibromomethane	0.0125U	0.0250	0.00780	mg/kg
Dichlorodifluoromethane	0.0500U	0.100	0.0300	mg/kg
Ethylbenzene	0.0125U	0.0250	0.00780	mg/kg
Freon-113	0.0500U	0.100	0.0310	mg/kg
Hexachlorobutadiene	0.0100U	0.0200	0.00620	mg/kg
Isopropylbenzene (Cumene)	0.0125U	0.0250	0.00780	mg/kg
Methylene chloride	0.0500U	0.100	0.0310	mg/kg
Methyl-t-butyl ether	0.0500U	0.100	0.0310	mg/kg
Naphthalene	0.0125U	0.0250	0.00780	mg/kg
n-Butylbenzene	0.0125U	0.0250	0.00780	mg/kg
n-Propylbenzene	0.0125U	0.0250	0.00780	mg/kg
o-Xylene	0.0125U	0.0250	0.00780	mg/kg
P & M -Xylene	0.0250U	0.0500	0.0150	mg/kg
sec-Butylbenzene	0.0125U	0.0250	0.00780	mg/kg
Styrene	0.0125U	0.0250	0.00780	mg/kg
tert-Butylbenzene	0.0125U	0.0250	0.00780	mg/kg
Tetrachloroethene	0.00625U	0.0125	0.00390	mg/kg
Toluene	0.0125U	0.0250	0.00780	mg/kg
trans-1,2-Dichloroethene	0.0125U	0.0250	0.00780	mg/kg
trans-1,3-Dichloropropene	0.00625U	0.0125	0.00390	mg/kg
Trichloroethene	0.00500U	0.0100	0.00320	mg/kg
Trichlorofluoromethane	0.0250U	0.0500	0.0150	mg/kg
Vinyl acetate	0.0500U	0.100	0.0310	mg/kg
Vinyl chloride	0.000400U	0.000800	0.000250	mg/kg
Xylenes (total)	0.0375U	0.0750	0.0228	mg/kg
Surrogates				
1,2-Dichloroethane-D4 (surr)	108	71-136		%
4-Bromofluorobenzene (surr)	97.8	55-151		%
Toluene-d8 (surr)	98.6	85-116		%

Method Blank

Blank ID: MB for HBN 1824799 [VXX/37726]
Blank Lab ID: 1633004

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215384002, 1215384003, 1215384017

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	Units

Batch Information

Analytical Batch: VMS21109
Analytical Method: SW8260D
Instrument: VQA 7890/5975 GC/MS
Analyst: S.S
Analytical Date/Time: 8/27/2021 11:01:00AM

Prep Batch: VXX37726
Prep Method: SW5035A
Prep Date/Time: 8/27/2021 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1215384 [VXX37726]
Blank Spike Lab ID: 1633005
Date Analyzed: 08/27/2021 11:18

Matrix: Soil/Solid (dry weight)

QC for Samples: 1215384002, 1215384003, 1215384017

Results by **SW8260D**

Blank Spike (mg/kg)

Parameter	Spike	Result	Rec (%)	CL
1,1,1,2-Tetrachloroethane	0.750	0.786	105	(78-125)
1,1,1-Trichloroethane	0.750	0.752	100	(73-130)
1,1,2,2-Tetrachloroethane	0.750	0.736	98	(70-124)
1,1,2-Trichloroethane	0.750	0.776	104	(78-121)
1,1-Dichloroethane	0.750	0.717	96	(76-125)
1,1-Dichloroethene	0.750	0.707	94	(70-131)
1,1-Dichloropropene	0.750	0.749	100	(76-125)
1,2,3-Trichlorobenzene	0.750	0.662	88	(66-130)
1,2,3-Trichloropropane	0.750	0.725	97	(73-125)
1,2,4-Trichlorobenzene	0.750	0.671	90	(67-129)
1,2,4-Trimethylbenzene	0.750	0.722	96	(75-123)
1,2-Dibromo-3-chloropropane	0.750	0.685	91	(61-132)
1,2-Dibromoethane	0.750	0.811	108	(78-122)
1,2-Dichlorobenzene	0.750	0.710	95	(78-121)
1,2-Dichloroethane	0.750	0.696	93	(73-128)
1,2-Dichloropropane	0.750	0.772	103	(76-123)
1,3,5-Trimethylbenzene	0.750	0.706	94	(73-124)
1,3-Dichlorobenzene	0.750	0.719	96	(77-121)
1,3-Dichloropropane	0.750	0.773	103	(77-121)
1,4-Dichlorobenzene	0.750	0.722	96	(75-120)
2,2-Dichloropropane	0.750	0.775	103	(67-133)
2-Butanone (MEK)	2.25	1.94	86	(51-148)
2-Chlorotoluene	0.750	0.720	96	(75-122)
2-Hexanone	2.25	2.10	93	(53-145)
4-Chlorotoluene	0.750	0.716	96	(72-124)
4-Isopropyltoluene	0.750	0.689	92	(73-127)
4-Methyl-2-pentanone (MIBK)	2.25	2.24	100	(65-135)
Acetone	2.25	1.81	81	(36-164)
Benzene	0.750	0.764	102	(77-121)
Bromobenzene	0.750	0.778	104	(78-121)
Bromochloromethane	0.750	0.767	102	(78-125)
Bromodichloromethane	0.750	0.770	103	(75-127)
Bromoform	0.750	0.790	105	(67-132)
Bromomethane	0.750	0.765	102	(53-143)

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215384 [VXX37726]
Blank Spike Lab ID: 1633005
Date Analyzed: 08/27/2021 11:18

Matrix: Soil/Solid (dry weight)

QC for Samples: 1215384002, 1215384003, 1215384017

Results by **SW8260D**

Blank Spike (mg/kg)

Parameter	Spike	Result	Rec (%)	CL
Carbon disulfide	1.13	0.996	89	(63-132)
Carbon tetrachloride	0.750	0.758	101	(70-135)
Chlorobenzene	0.750	0.740	99	(79-120)
Chloroethane	0.750	0.701	93	(59-139)
Chloroform	0.750	0.761	101	(78-123)
Chloromethane	0.750	0.729	97	(50-136)
cis-1,2-Dichloroethene	0.750	0.726	97	(77-123)
cis-1,3-Dichloropropene	0.750	0.822	110	(74-126)
Dibromochloromethane	0.750	0.822	110	(74-126)
Dibromomethane	0.750	0.758	101	(78-125)
Dichlorodifluoromethane	0.750	0.785	105	(29-149)
Ethylbenzene	0.750	0.712	95	(76-122)
Freon-113	1.13	1.06	94	(66-136)
Hexachlorobutadiene	0.750	0.709	95	(61-135)
Isopropylbenzene (Cumene)	0.750	0.712	95	(68-134)
Methylene chloride	0.750	0.781	104	(70-128)
Methyl-t-butyl ether	1.13	1.11	99	(73-125)
Naphthalene	0.750	0.665	89	(62-129)
n-Butylbenzene	0.750	0.664	89	(70-128)
n-Propylbenzene	0.750	0.696	93	(73-125)
o-Xylene	0.750	0.725	97	(77-123)
P & M -Xylene	1.50	1.38	92	(77-124)
sec-Butylbenzene	0.750	0.658	88	(73-126)
Styrene	0.750	0.744	99	(76-124)
tert-Butylbenzene	0.750	0.702	94	(73-125)
Tetrachloroethene	0.750	0.754	101	(73-128)
Toluene	0.750	0.728	97	(77-121)
trans-1,2-Dichloroethene	0.750	0.733	98	(74-125)
trans-1,3-Dichloropropene	0.750	0.731	97	(71-130)
Trichloroethene	0.750	0.783	104	(77-123)
Trichlorofluoromethane	0.750	1.02	135	(62-140)
Vinyl acetate	0.750	0.751	100	(50-151)
Vinyl chloride	0.750	0.649	87	(56-135)
Xylenes (total)	2.25	2.11	94	(78-124)

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215384 [VXX37726]
Blank Spike Lab ID: 1633005
Date Analyzed: 08/27/2021 11:18

Matrix: Soil/Solid (dry weight)

QC for Samples: 1215384002, 1215384003, 1215384017

Results by **SW8260D**

	Blank Spike (mg/kg)			
Parameter	Spike	Result	Rec (%)	CL
Surrogates				
1,2-Dichloroethane-D4 (surr)	0.750		95	(71-136)
4-Bromofluorobenzene (surr)	0.750		94	(55-151)
Toluene-d8 (surr)	0.750		100	(85-116)

Batch Information

Analytical Batch: **VMS21109**
Analytical Method: **SW8260D**
Instrument: **VQA 7890/5975 GC/MS**
Analyst: **S.S**

Prep Batch: **VXX37726**
Prep Method: **SW5035A**
Prep Date/Time: **08/27/2021 06:00**
Spike Init Wt./Vol.: 0.750 mg/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1633006
MS Sample ID: 1633007 MS
MSD Sample ID: 1633008 MSD

Analysis Date: 08/27/2021 15:57
Analysis Date: 08/27/2021 13:12
Analysis Date: 08/27/2021 13:29
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1215384002, 1215384003, 1215384017

Results by **SW8260D**

		Matrix Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,1,1,2-Tetrachloroethane	0.0114U	0.853	0.925	108	0.853	0.919	108	78-125	0.59	(< 20)
1,1,1-Trichloroethane	0.0142U	0.853	0.874	103	0.853	0.870	102	73-130	0.49	(< 20)
1,1,2,2-Tetrachloroethane	0.00113U	0.853	0.856	100	0.853	0.868	102	70-124	1.40	(< 20)
1,1,2-Trichloroethane	0.000570U	0.853	0.911	107	0.853	0.919	108	78-121	0.84	(< 20)
1,1-Dichloroethane	0.0142U	0.853	0.833	98	0.853	0.830	97	76-125	0.38	(< 20)
1,1-Dichloroethene	0.0142U	0.853	0.823	97	0.853	0.820	96	70-131	0.38	(< 20)
1,1-Dichloropropene	0.0142U	0.853	0.870	102	0.853	0.866	101	76-125	0.52	(< 20)
1,2,3-Trichlorobenzene	0.0570U	0.853	0.825	97	0.853	0.905	106	66-130	9.30	(< 20)
1,2,3-Trichloropropane	0.00113U	0.853	0.890	104	0.853	0.849	100	73-125	4.70	(< 20)
1,2,4-Trichlorobenzene	0.0142U	0.853	0.829	97	0.853	0.871	102	67-129	5.00	(< 20)
1,2,4-Trimethylbenzene	0.0570U	0.853	0.833	98	0.853	0.845	99	75-123	1.50	(< 20)
1,2-Dibromo-3-chloropropane	0.0570U	0.853	0.808	95	0.853	0.839	98	61-132	3.80	(< 20)
1,2-Dibromoethane	0.000855U	0.853	0.946	111	0.853	0.958	112	78-122	1.20	(< 20)
1,2-Dichlorobenzene	0.0142U	0.853	0.831	98	0.853	0.838	98	78-121	0.78	(< 20)
1,2-Dichloroethane	0.00113U	0.853	0.807	95	0.853	0.805	94	73-128	0.25	(< 20)
1,2-Dichloropropane	0.00570U	0.853	0.897	105	0.853	0.898	105	76-123	0.10	(< 20)
1,3,5-Trimethylbenzene	0.0142U	0.853	0.836	98	0.853	0.816	96	73-124	2.40	(< 20)
1,3-Dichlorobenzene	0.0142U	0.853	0.837	98	0.853	0.843	99	77-121	0.74	(< 20)
1,3-Dichloropropane	0.00570U	0.853	0.903	106	0.853	0.905	106	77-121	0.28	(< 20)
1,4-Dichlorobenzene	0.0142U	0.853	0.833	98	0.853	0.842	99	75-120	1.00	(< 20)
2,2-Dichloropropane	0.0142U	0.853	0.911	107	0.853	0.903	106	67-133	0.88	(< 20)
2-Butanone (MEK)	0.142U	2.56	2.23	87	2.56	2.28	89	51-148	2.00	(< 20)
2-Chlorotoluene	0.0142U	0.853	0.832	98	0.853	0.835	98	75-122	0.38	(< 20)
2-Hexanone	0.0680U	2.56	2.43	95	2.56	2.48	97	53-145	2.00	(< 20)
4-Chlorotoluene	0.0114U	0.853	0.817	96	0.853	0.821	96	72-124	0.49	(< 20)
4-Isopropyltoluene	0.0455U	0.853	0.798	94	0.853	0.791	93	73-127	0.79	(< 20)
4-Methyl-2-pentanone (MIBK)	0.142U	2.56	2.62	102	2.56	2.66	104	65-135	1.60	(< 20)
Acetone	0.142U	2.56	2.04	80	2.56	2.09	82	36-164	2.70	(< 20)
Benzene	0.00710U	0.853	0.890	104	0.853	0.887	104	77-121	0.35	(< 20)
Bromobenzene	0.0142U	0.853	0.903	106	0.853	0.906	106	78-121	0.28	(< 20)
Bromochloromethane	0.0142U	0.853	0.889	104	0.853	0.889	104	78-125	0.03	(< 20)
Bromodichloromethane	0.00113U	0.853	0.893	105	0.853	0.893	105	75-127	0.00	(< 20)
Bromoform	0.0142U	0.853	0.930	109	0.853	0.941	110	67-132	1.20	(< 20)
Bromomethane	0.0114U	0.853	0.891	104	0.853	0.877	103	53-143	1.50	(< 20)
Carbon disulfide	0.0570U	1.28	1.16	91	1.28	1.15	90	63-132	0.57	(< 20)
Carbon tetrachloride	0.00710U	0.853	0.877	103	0.853	0.871	102	70-135	0.72	(< 20)
Chlorobenzene	0.0142U	0.853	0.856	100	0.853	0.858	101	79-120	0.27	(< 20)

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Matrix Spike Summary

Original Sample ID: 1633006
MS Sample ID: 1633007 MS
MSD Sample ID: 1633008 MSD

Analysis Date: 08/27/2021 15:57
Analysis Date: 08/27/2021 13:12
Analysis Date: 08/27/2021 13:29
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1215384002, 1215384003, 1215384017

Results by **SW8260D**

		Matrix Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Chloroethane	0.114U	0.853	0.858	101	0.853	0.778	91	59-139	9.80	(< 20)
Chloroform	0.00341U	0.853	0.881	103	0.853	0.881	103	78-123	0.07	(< 20)
Chloromethane	0.0142U	0.853	0.773	91	0.853	0.772	91	50-136	0.15	(< 20)
cis-1,2-Dichloroethene	0.0142U	0.853	0.853	100	0.853	0.859	101	77-123	0.73	(< 20)
cis-1,3-Dichloropropene	0.00710U	0.853	0.963	113	0.853	0.967	113	74-126	0.47	(< 20)
Dibromochloromethane	0.00284U	0.853	0.959	112	0.853	0.968	113	74-126	0.86	(< 20)
Dibromomethane	0.0142U	0.853	0.886	104	0.853	0.889	104	78-125	0.26	(< 20)
Dichlorodifluoromethane	0.0570U	0.853	0.741	87	0.853	0.732	86	29-149	1.30	(< 20)
Ethylbenzene	0.0142U	0.853	0.820	96	0.853	0.820	96	76-122	0.07	(< 20)
Freon-113	0.0570U	1.28	1.22	96	1.28	1.22	96	66-136	0.16	(< 20)
Hexachlorobutadiene	0.0114U	0.853	0.852	100	0.853	0.909	107	61-135	6.40	(< 20)
Isopropylbenzene (Cumene)	0.0142U	0.853	0.821	96	0.853	0.818	96	68-134	0.38	(< 20)
Methylene chloride	0.0570U	0.853	0.856	100	0.853	0.862	101	70-128	0.73	(< 20)
Methyl-t-butyl ether	0.0570U	1.28	1.32	103	1.28	1.32	103	73-125	0.41	(< 20)
Naphthalene	0.0142U	0.853	0.830	97	0.853	0.897	105	62-129	7.70	(< 20)
n-Butylbenzene	0.0142U	0.853	0.762	89	0.853	0.764	90	70-128	0.22	(< 20)
n-Propylbenzene	0.0142U	0.853	0.807	95	0.853	0.805	94	73-125	0.18	(< 20)
o-Xylene	0.0142U	0.853	0.851	100	0.853	0.841	99	77-123	1.10	(< 20)
P & M -Xylene	0.0285U	1.71	1.61	95	1.71	1.61	95	77-124	0.02	(< 20)
sec-Butylbenzene	0.0142U	0.853	0.757	89	0.853	0.757	89	73-126	0.08	(< 20)
Styrene	0.0142U	0.853	0.873	102	0.853	0.875	103	76-124	0.20	(< 20)
tert-Butylbenzene	0.0142U	0.853	0.807	95	0.853	0.807	95	73-125	0.04	(< 20)
Tetrachloroethene	0.00710U	0.853	0.886	104	0.853	0.882	103	73-128	0.45	(< 20)
Toluene	0.0142U	0.853	0.846	99	0.853	0.853	100	77-121	0.84	(< 20)
trans-1,2-Dichloroethene	0.0142U	0.853	0.841	99	0.853	0.826	97	74-125	1.80	(< 20)
trans-1,3-Dichloropropene	0.00710U	0.853	0.858	101	0.853	0.870	102	71-130	1.30	(< 20)
Trichloroethene	0.00570U	0.853	0.906	106	0.853	0.904	106	77-123	0.28	(< 20)
Trichlorofluoromethane	0.0285U	0.853	1.21	142 *	0.853	1.14	134	62-140	5.70	(< 20)
Vinyl acetate	0.0570U	0.853	0.875	103	0.853	0.878	103	50-151	0.39	(< 20)
Vinyl chloride	0.000455U	0.853	0.712	84	0.853	0.703	83	56-135	1.20	(< 20)
Xylenes (total)	0.0427U	2.56	2.47	96	2.56	2.46	96	78-124	0.39	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		0.853	0.809	95	0.853	0.800	94	71-136	1.10	
4-Bromofluorobenzene (surr)		1.42	1.09	77	1.42	1.09	77	55-151	0.03	
Toluene-d8 (surr)		0.853	0.842	99	0.853	0.852	100	85-116	1.10	

Matrix Spike Summary

Original Sample ID: 1633006
MS Sample ID: 1633007 MS
MSD Sample ID: 1633008 MSD

Analysis Date:
Analysis Date: 08/27/2021 13:12
Analysis Date: 08/27/2021 13:29
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1215384002, 1215384003, 1215384017

Results by **SW8260D**

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

Batch Information

Analytical Batch: VMS21109
Analytical Method: SW8260D
Instrument: VQA 7890/5975 GC/MS
Analyst: S.S
Analytical Date/Time: 8/27/2021 1:12:00PM

Prep Batch: VXX37726
Prep Method: Vol. Extraction SW8260 Field Extracted L
Prep Date/Time: 8/27/2021 6:00:00AM
Prep Initial Wt./Vol.: 43.96g
Prep Extract Vol: 25.00mL

Print Date: 09/16/2021 1:49:37PM

Method Blank

Blank ID: MB for HBN 1824862 [VXX/37733]
Blank Lab ID: 1633309

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215384001, 1215384004, 1215384005, 1215384006, 1215384007, 1215384008, 1215384009, 1215384010, 1215384011, 1215384012, 1215384013, 1215384014, 1215384015

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	0.00625U	0.0125	0.00400	mg/kg
Ethylbenzene	0.0125U	0.0250	0.00900	mg/kg
o-Xylene	0.0125U	0.0250	0.00910	mg/kg
P & M -Xylene	0.0250U	0.0500	0.0150	mg/kg
Toluene	0.0125U	0.0250	0.00780	mg/kg
Xylenes (total)	0.0375U	0.0750	0.0250	mg/kg
Surrogates				
1,4-Difluorobenzene (surr)	87.5	72-119		%

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Instrument: Agilent 7890 PID/FID
Analyst: MDT
Analytical Date/Time: 8/30/2021 12:53:00PM

Prep Batch: VXX37733
Prep Method: SW5035A
Prep Date/Time: 8/30/2021 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215384 [VXX37733]
Blank Spike Lab ID: 1633310
Date Analyzed: 08/30/2021 11:41

Spike Duplicate ID: LCSD for HBN 1215384 [VXX37733]
Spike Duplicate Lab ID: 1633311
Matrix: Soil/Solid (dry weight)

QC for Samples: 1215384001, 1215384004, 1215384005, 1215384006, 1215384007, 1215384008, 1215384009, 1215384010, 1215384011, 1215384012, 1215384013, 1215384014, 1215384015

Results by **SW8021B**

	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1.25	1.39	111	1.25	1.35	108	(75-125)	2.80	(< 20)
Ethylbenzene	1.25	1.33	106	1.25	1.27	102	(75-125)	4.20	(< 20)
o-Xylene	1.25	1.25	100	1.25	1.19	96	(75-125)	4.90	(< 20)
P & M -Xylene	2.50	2.62	105	2.50	2.50	100	(80-125)	4.60	(< 20)
Toluene	1.25	1.36	108	1.25	1.31	105	(70-125)	3.70	(< 20)
Xylenes (total)	3.75	3.87	103	3.75	3.70	99	(78-124)	4.70	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	1.25		94	1.25		98	(72-119)	3.90	

Batch Information

Analytical Batch: **VFC15786**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890 PID/FID**
Analyst: **MDT**

Prep Batch: **VXX37733**
Prep Method: **SW5035A**
Prep Date/Time: **08/30/2021 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

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Matrix Spike Summary

Original Sample ID: 1633317
MS Sample ID: 1633318 MS
MSD Sample ID: 1633319 MSD

Analysis Date: 08/30/2021 16:29
Analysis Date: 08/30/2021 16:47
Analysis Date: 08/30/2021 17:05
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1215384001, 1215384004, 1215384005, 1215384006, 1215384007, 1215384008, 1215384009, 1215384010, 1215384011, 1215384012, 1215384013, 1215384014, 1215384015

Results by **SW8021B**

		Matrix Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	0.00745U	1.49	1.72	116	1.49	1.69	114	75-125	1.70	(< 20)
Ethylbenzene	0.0149U	1.49	1.63	110	1.49	1.59	107	75-125	2.30	(< 20)
o-Xylene	0.0149U	1.49	1.53	103	1.49	1.49	100	75-125	2.30	(< 20)
P & M -Xylene	0.0297U	2.98	3.21	108	2.98	3.13	105	80-125	2.40	(< 20)
Toluene	0.0149U	1.49	1.71	115	1.49	1.67	112	70-125	2.20	(< 20)
Xylenes (total)	0.0447U	4.46	4.74	106	4.46	4.63	104	78-124	2.40	(< 20)
Surrogates										
1,4-Difluorobenzene (surr)		1.49	1.37	92	1.49	1.42	95	72-119	3.00	

Batch Information

Analytical Batch: VFC15786
Analytical Method: SW8021B
Instrument: Agilent 7890 PID/FID
Analyst: MDT
Analytical Date/Time: 8/30/2021 4:47:00PM

Prep Batch: VXX37733
Prep Method: AK101 Extraction (S)
Prep Date/Time: 8/30/2021 6:00:00AM
Prep Initial Wt./Vol.: 42.01g
Prep Extract Vol: 25.00mL

Print Date: 09/16/2021 1:49:43PM

Method Blank

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

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215384001, 1215384002, 1215384003

Results by **AK102**

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

Batch Information

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

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

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1215384 [XXX45430]
Blank Spike Lab ID: 1631926
Date Analyzed: 08/24/2021 14:37

Spike Duplicate ID: LCSD for HBN 1215384 [XXX45430]
Spike Duplicate Lab ID: 1631927
Matrix: Soil/Solid (dry weight)

QC for Samples: 1215384001, 1215384002, 1215384003

Results by **AK102**

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

Batch Information

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

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

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Method Blank

Blank ID: MB for HBN 1824587 [XXX/45438]
Blank Lab ID: 1632093

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215384004, 1215384005, 1215384006, 1215384007, 1215384008, 1215384009, 1215384010, 1215384011, 1215384012, 1215384013, 1215384014, 1215384015

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/kg
Surrogates				
5a Androstane (surr)	97	60-120		%

Batch Information

Analytical Batch: XFC16061
Analytical Method: AK102
Instrument: Agilent 7890B F
Analyst: IVM
Analytical Date/Time: 8/25/2021 7:56:00PM

Prep Batch: XXX45438
Prep Method: SW3550C
Prep Date/Time: 8/25/2021 7:51:55AM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1215384 [XXX45438]
Blank Spike Lab ID: 1632094
Date Analyzed: 08/25/2021 20:06

Spike Duplicate ID: LCSD for HBN 1215384 [XXX45438]
Spike Duplicate Lab ID: 1632095
Matrix: Soil/Solid (dry weight)

QC for Samples: 1215384004, 1215384005, 1215384006, 1215384007, 1215384008, 1215384009, 1215384010, 1215384011, 1215384012, 1215384013, 1215384014, 1215384015

Results by **AK102**

	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	667	684	103	667	680	102	(75-125)	0.50	(< 20)
Surrogates									
5a Androstane (surr)	16.7		99	16.7		99	(60-120)	0.63	

Batch Information

Analytical Batch: **XFC16061**
Analytical Method: **AK102**
Instrument: **Agilent 7890B F**
Analyst: **IVM**

Prep Batch: **XXX45438**
Prep Method: **SW3550C**
Prep Date/Time: **08/25/2021 07:51**
Spike Init Wt./Vol.: 667 mg/kg Extract Vol: 5 mL
Dupe Init Wt./Vol.: 667 mg/kg Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1824668 [XXX/45454]
Blank Lab ID: 1632415

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215384016

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/kg
Surrogates				
5a Androstane (surr)	96.9	60-120		%

Batch Information

Analytical Batch: XFC16062
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: IVM
Analytical Date/Time: 8/26/2021 5:20:00PM

Prep Batch: XXX45454
Prep Method: SW3550C
Prep Date/Time: 8/26/2021 2:30:38PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:49:54PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215384 [XXX45454]
Blank Spike Lab ID: 1632416
Date Analyzed: 08/26/2021 17:30

Spike Duplicate ID: LCSD for HBN 1215384 [XXX45454]
Spike Duplicate Lab ID: 1632417
Matrix: Soil/Solid (dry weight)

QC for Samples: 1215384016

Results by **AK102**

	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	667	656	98	667	679	102	(75-125)	3.40	(< 20)
Surrogates									
5a Androstane (surr)	16.7		96	16.7		102	(60-120)	5.80	

Batch Information

Analytical Batch: **XFC16062**
Analytical Method: **AK102**
Instrument: **Agilent 7890B R**
Analyst: **IVM**

Prep Batch: **XXX45454**
Prep Method: **SW3550C**
Prep Date/Time: **08/26/2021 14:30**
Spike Init Wt./Vol.: 667 mg/kg Extract Vol: 5 mL
Dupe Init Wt./Vol.: 667 mg/kg Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1824746 [XXX/45460]
Blank Lab ID: 1632781

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215384002, 1215384003

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

Parameter	Results	LOQ/CL	DL	Units
1-Methylnaphthalene	0.0125U	0.0250	0.00625	mg/kg
2-Methylnaphthalene	0.0125U	0.0250	0.00625	mg/kg
Acenaphthene	0.0125U	0.0250	0.00625	mg/kg
Acenaphthylene	0.0125U	0.0250	0.00625	mg/kg
Anthracene	0.0125U	0.0250	0.00625	mg/kg
Benzo(a)Anthracene	0.0125U	0.0250	0.00625	mg/kg
Benzo[a]pyrene	0.0125U	0.0250	0.00625	mg/kg
Benzo[b]Fluoranthene	0.0125U	0.0250	0.00625	mg/kg
Benzo[g,h,i]perylene	0.0125U	0.0250	0.00625	mg/kg
Benzo[k]fluoranthene	0.0125U	0.0250	0.00625	mg/kg
Chrysene	0.0125U	0.0250	0.00625	mg/kg
Dibenzo[a,h]anthracene	0.0125U	0.0250	0.00625	mg/kg
Fluoranthene	0.0125U	0.0250	0.00625	mg/kg
Fluorene	0.0125U	0.0250	0.00625	mg/kg
Indeno[1,2,3-c,d] pyrene	0.0125U	0.0250	0.00625	mg/kg
Naphthalene	0.0100U	0.0200	0.00500	mg/kg
Phenanthrene	0.0125U	0.0250	0.00625	mg/kg
Pyrene	0.0125U	0.0250	0.00625	mg/kg
Surrogates				
2-Methylnaphthalene-d10 (surr)	84	58-103		%
Fluoranthene-d10 (surr)	84.7	54-113		%

Batch Information

Analytical Batch: XMS12859
Analytical Method: 8270D SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: LAW
Analytical Date/Time: 8/28/2021 9:32:00PM

Prep Batch: XXX45460
Prep Method: SW3550C
Prep Date/Time: 8/28/2021 8:43:26AM
Prep Initial Wt./Vol.: 22.5 g
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:49:58PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215384 [XXX45460]
Blank Spike Lab ID: 1632782
Date Analyzed: 08/28/2021 21:53

Matrix: Soil/Solid (dry weight)

QC for Samples: 1215384002, 1215384003

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

Blank Spike (mg/kg)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	0.111	0.0916	83	(43-111)
2-Methylnaphthalene	0.111	0.0925	83	(39-114)
Acenaphthene	0.111	0.0907	82	(44-111)
Acenaphthylene	0.111	0.0945	85	(39-116)
Anthracene	0.111	0.0943	85	(50-114)
Benzo(a)Anthracene	0.111	0.0884	80	(54-122)
Benzo[a]pyrene	0.111	0.0890	80	(50-125)
Benzo[b]Fluoranthene	0.111	0.0923	83	(53-128)
Benzo[g,h,i]perylene	0.111	0.0890	80	(49-127)
Benzo[k]fluoranthene	0.111	0.0926	83	(56-123)
Chrysene	0.111	0.0915	82	(57-118)
Dibenzo[a,h]anthracene	0.111	0.0924	83	(50-129)
Fluoranthene	0.111	0.0904	81	(55-119)
Fluorene	0.111	0.0943	85	(47-114)
Indeno[1,2,3-c,d] pyrene	0.111	0.0909	82	(49-130)
Naphthalene	0.111	0.0888	80	(38-111)
Phenanthrene	0.111	0.0942	85	(49-113)
Pyrene	0.111	0.0898	81	(55-117)
Surrogates				
2-Methylnaphthalene-d10 (surr)	0.111		81	(58-103)
Fluoranthene-d10 (surr)	0.111		79	(54-113)

Batch Information

Analytical Batch: **XMS12859**
Analytical Method: **8270D SIM (PAH)**
Instrument: **SVA Agilent 780/5975 GC/MS**
Analyst: **LAW**

Prep Batch: **XXX45460**
Prep Method: **SW3550C**
Prep Date/Time: **08/28/2021 08:43**
Spike Init Wt./Vol.: 0.111 mg/Kg Extract Vol: 5 mL
Dupe Init Wt./Vol.: Extract Vol:

Print Date: 09/16/2021 1:50:00PM

Matrix Spike Summary

Original Sample ID: 1215419013
MS Sample ID: 1632783 MS
MSD Sample ID: 1632784 MSD

Analysis Date: 08/28/2021 22:14
Analysis Date: 08/28/2021 22:34
Analysis Date: 08/28/2021 22:55
Matrix: Soil/Solid (dry weight)

QC for Samples: 1215384002, 1215384003

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

		Matrix Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1-Methylnaphthalene	0.0138U	0.123	0.113	92	0.120	0.104	87	43-111	8.00	(< 20)
2-Methylnaphthalene	0.0138U	0.123	0.115	93	0.120	0.107	88	39-114	7.00	(< 20)
Acenaphthene	0.0138U	0.123	0.113	92	0.120	0.104	86	44-111	7.80	(< 20)
Acenaphthylene	0.0138U	0.123	0.117	96	0.120	0.108	89	39-116	8.30	(< 20)
Anthracene	0.0138U	0.123	0.121	99	0.120	0.109	90	50-114	10.30	(< 20)
Benzo(a)Anthracene	0.0243J	0.123	0.156	107	0.120	0.126	84	54-122	21.10 *	(< 20)
Benzo[a]pyrene	0.0383	0.123	0.178	114	0.120	0.137	82	50-125	25.60 *	(< 20)
Benzo[b]Fluoranthene	0.0606	0.123	0.204	117	0.120	0.162	84	53-128	23.00 *	(< 20)
Benzo[g,h,i]perylene	0.0397	0.123	0.159	97	0.120	0.127	72	49-127	22.40 *	(< 20)
Benzo[k]fluoranthene	0.0180J	0.123	0.146	104	0.120	0.123	87	56-123	17.30	(< 20)
Chrysene	0.0420	0.123	0.178	111	0.120	0.142	83	57-118	22.00 *	(< 20)
Dibenzo[a,h]anthracene	0.00779J	0.123	0.115	87	0.120	0.102	78	50-129	10.90	(< 20)
Fluoranthene	0.0504	0.123	0.203	125 *	0.120	0.157	88	55-119	25.80 *	(< 20)
Fluorene	0.0138U	0.123	0.114	93	0.120	0.107	89	47-114	5.90	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0328	0.123	0.157	101	0.120	0.125	76	49-130	23.10 *	(< 20)
Naphthalene	0.0111U	0.123	0.110	90	0.120	0.101	84	38-111	8.10	(< 20)
Phenanthrene	0.0183J	0.123	0.140	100	0.120	0.125	88	49-113	12.20	(< 20)
Pyrene	0.0496	0.123	0.201	124 *	0.120	0.153	86	55-117	26.80 *	(< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		0.123	0.109	89	0.120	0.101	84	58-103	8.30	
Fluoranthene-d10 (surr)		0.123	0.110	90	0.120	0.100	83	54-113	9.70	

Batch Information

Analytical Batch: XMS12859
Analytical Method: 8270D SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: LAW
Analytical Date/Time: 8/28/2021 10:34:00PM

Prep Batch: XXX45460
Prep Method: Sonication Extr Soil 8270 PAH SIM 5ml
Prep Date/Time: 8/28/2021 8:43:26AM
Prep Initial Wt./Vol.: 22.51g
Prep Extract Vol: 5.00mL

Print Date: 09/16/2021 1:50:02PM

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1215384

Pt#369369 NV

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

Section 1

CLIENT: Susitna Environmental

CONTACT: Russ Beck | PHONE #: 907-903-6760

PROJECT NAME: ~~FF~~ Cold Bay Pipeline Release | PROJECT/ PWSID/ PERMIT#:

REPORTS TO: Russ Beck | E-MAIL: rbeck@susitnaco.com | Profile #:

INVOICE TO: Russ Beck | QUOTE #: | P.O. #:

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Comp Grab MI (Multi-Incremental)	Analysis* DRO	8021 BTEX MeOH	PAHs MeOH	VOCs							REMARKS/LOC ID
1 A-B	CBPR-SB01-S1	8/18/21	0948	S	2	G	X	X									
2 A-B	CBPR-SB01-S2		0955	S	2	G	X		X	X							
3 A-B	CBPR-SB04-S1		1009	S	2	G	X		X	X							
4 A-B	CBPR-SB04-S2		1018	S	2	G	X	X									
5 A-B	CBPR-SB06-S1		1047	S	2	G	X	X									
6 A-B	CBPR-SB06-S2		1058	S	2	G	X	X									
7 A-B	CBPR-SB08-S1		1117	S	2	G	X	X									
8 A-B	CBPR-SB08-S2		1158	S	2	G	X	X									
9 A-B	CBPR-SB10-S1		1210	S	2	G	X	X									
10 A-B	CBPR-SB10-S2		1215	S	2	G	X	X									

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

Section 3 — Preservative

Section 4 — DOD Project? Yes No | Data Deliverable Requirements:

Cooler ID:

Requested Turnaround Time and/or Special Instructions:

Section 5

	Date	Time	
Relinquished By: (1)	8/23/21	15:17	Received By:
Relinquished By: (2)			Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	8/23/21	1518	Received For Laboratory By: MA

Temp Blank °C: cooler temp: 4.3 023 or Ambient [ ]

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Delivery Method: Hand Delivery [ ] Commerical Delivery [ ]

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SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1215384

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

Section 1

CLIENT: Susitna Environmental
CONTACT: Russ Beck
PHONE #:
PROJECT NAME: Cold Bay FF Pipeline Release
PROJECT/ PWSID/ PERMIT#:
REPORTS TO: Russ Beck
E-MAIL: r.beck@susitna.com
Profile #: 907-903-6760
INVOICE TO: Russ Beck
QUOTE #:
P.O. #:

Section 3 — Preservative

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Comp Grab MI (Multi-incremental)	Analysis*: DRO	BTEX	VOCs	NaOH	MeOH	NOTE: *The following analyses require specific method and/or compound list: BTEX, Metals, PFAS
(11) A-B	CBPR-SB02-S1	8/18/21	14:15	S	2	G	X	X				REMARKS/LOC ID
(12) A-B	CBPR-SB03-S1		1505	S	2	G	X	X				
(13) A-B	CBPR-SB05-S1		1522	S	2	G	X	X				
(14) A-B	CBPR-SB07-S1		1552	S	2	G	X	X				
(15) A-B	CBPR-SB07-S2		1600	S	2	G	X	X				
(16) A	CBPR-SB09-S1		1620	S	1	G	X					
(17) A	TB-01		0830	S	1	G			X			

Section 5

	Date	Time	
Relinquished By: (1)	8/23/21	15:17	Received By:
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received For Laboratory By:

Section 4 — DOD Project? Yes No
Cooler ID:

Data Deliverable Requirements:

Requested Turnaround Time and/or Special Instructions:

Temp Blank °C: _____ or Ambient [ ]

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Delivery Method: Hand Delivery[ ] Commerical Delivery [ ]

http://www.sgs.com/terms-and-conditions

SGS

e-Sample Receipt Form

SGS Workorder #: **1215384**

1 2 1 5 3 8 4

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		Yes — Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	Hand Carried
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
	N/A	**Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 4.3 °C Therm. ID: D23
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		
If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC informatio		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	No	Clarification for BTEX received
	N/A	***Exemption permitted for metals (e.g,200.8/6020B).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	Yes	

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

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1215384001-A	No Preservative Required	OK			
1215384001-B	Methanol field pres. 4 C	OK			
1215384002-A	No Preservative Required	OK			
1215384002-B	Methanol field pres. 4 C	OK			
1215384003-A	No Preservative Required	OK			
1215384003-B	Methanol field pres. 4 C	OK			
1215384004-A	No Preservative Required	OK			
1215384004-B	Methanol field pres. 4 C	OK			
1215384005-A	No Preservative Required	OK			
1215384005-B	Methanol field pres. 4 C	OK			
1215384006-A	No Preservative Required	OK			
1215384006-B	Methanol field pres. 4 C	OK			
1215384007-A	No Preservative Required	OK			
1215384007-B	Methanol field pres. 4 C	OK			
1215384008-A	No Preservative Required	OK			
1215384008-B	Methanol field pres. 4 C	OK			
1215384009-A	No Preservative Required	OK			
1215384009-B	Methanol field pres. 4 C	OK			
1215384010-A	No Preservative Required	OK			
1215384010-B	Methanol field pres. 4 C	OK			
1215384011-A	No Preservative Required	OK			
1215384011-B	Methanol field pres. 4 C	OK			
1215384012-A	No Preservative Required	OK			
1215384012-B	Methanol field pres. 4 C	OK			
1215384013-A	No Preservative Required	OK			
1215384013-B	Methanol field pres. 4 C	OK			
1215384014-A	No Preservative Required	OK			
1215384014-B	Methanol field pres. 4 C	OK			
1215384015-A	No Preservative Required	OK			
1215384015-B	Methanol field pres. 4 C	OK			
1215384016-A	No Preservative Required	OK			
1215384017-A	Methanol field pres. 4 C	OK			

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition

Container Condition Glossary

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

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

APPENDIX G

Photographic Log

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Pipeline Release Site Characterization

Photo 1: LIF/UVOST drilling, approximate location of UV-02. View West

Photo 2: LIF/UVOST drilling. View South

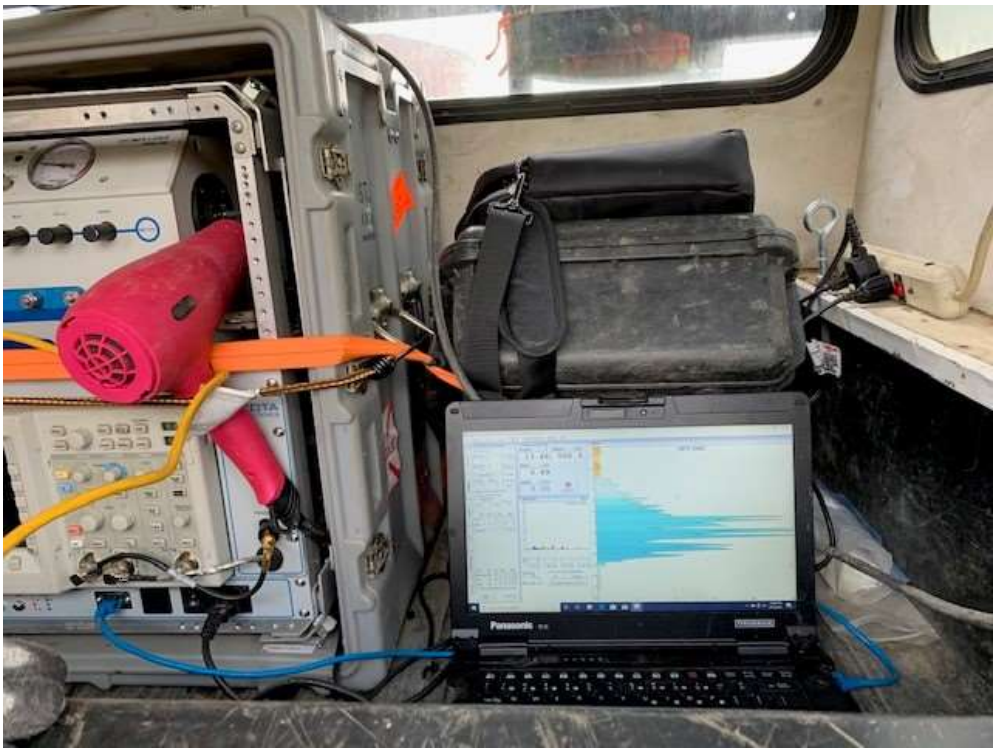

Photo 3: Example of the Real-time data output from the LIF/UVOST.

Photo 4: Possible volcanic layers observed from 6.5 to 7 feet bgs in SB-10.