SITE ASSESSMENT REPORT
9209/9211 SHARON STREET
JUNEAU AK

AUGUST 8, 2017

Prepared for:

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1.0 EXECUTIVE SUMMARY

In November 2006, faulty plumbing caused the release of an estimated 30 gallons of home heating fuel from an above ground tank located at 9211 Sharon Street, a duplex. In December 2006, the property owner Neil Atkinson retained ***NORTECH*** to conduct spill response and remediation activities at the Site. ***NORTECH*** conducted a Site Assessment at 9211 Sharon Street in November 2007. Laboratory results indicated Site soils were impacted above Alaska Department of Environmental Conservation's (ADEC) Method II Cleanup Levels for Migration to Groundwater. Nutrient addition ports were installed in order to treat the impacted soils.

In December 2008, an additional 200 gallons was released from a above ground home heating oil tank at 9209 Sharon Street, the duplex unit adjoining 9211 Sharon Street. ***NORTECH*** conducted a Site Assessment of 9209 and 9211 Sharon Street in June 2009. Site Assessment activities indicated 250 cubic yards of soils had been impacted by the December 2008 spill and an additional 75 cubic yards of soil remained impacted from the November 2006 heating oil release. Nutrient addition ports were installed to treat the impacted soils at 9209 Sharon Street. The ADEC approved treatment of the impacted soils by means of high nitrogen fertilizer. Soils have been treated using RegenOx® for the past year. Treatment of soils during non-freezing months and annual sampling began in 2009.

Laboratory samples collected during November 2014 Annual Sampling activities indicated that soils associated with the 9211 Sharon Street spill had been remediated and DRO concentrations were below ADEC Method II Migration to Water Cleanup Levels. The ADEC agreed that continued sampling at 9211 Sharon Street was not necessary. Treatment via high nitrogen fertilizer and annual sampling continued at 9209 Sharon Street.

On June 9, 2017, ***NORTECH*** personnel Jennifer Stoutamore arrived 9209 Sharon Street to conduct annual sampling activities. Five soil borings were advanced in areas that had been previously sampled in order to compare past results to current laboratory findings. No diesel odors were present at the Site and no signs of distressed vegetation were observed. Two samples were sent to SGS Laboratories for analysis of DRO. Laboratory results indicate that DRO concentrations within sampled soils range from non-detect to 381 mg/Kg two feet bgs. In 2014, DRO concentrations at this location and depth had laboratory results of 4,950 mg/Kg.

Based on the concentration and depth of the remaining impacted soils, ***NORTECH*** is requesting a designation of No Further Action be applied to the Site.

2.0 BACKGROUND

In November 2006, faulty plumbing caused the release of an estimated 30 gallons of home heating fuel from an above ground tank located at 9211 Sharon Street. The ground was frozen at the time of the release and some of the fuel surfaced under the crawlspace of the duplex. In December 2006, the property owner Neil Atkinson retained ***NORTECH*** to conduct spill response and remediation activities at the Site. Spill response efforts included collecting spilled product within the duplex's crawl space with sorbent pads, using fans and commercial deodorizer to minimize diesel odors within the residence, and adding 100 pounds of high nitrogen fertilizer to treat the spill affected area of the crawlspace.

NORTECH conducted a Site Assessment of 9211 Sharon Street in November 2007. Site activities indicated soils had been impacted from a depth of 18 inches below ground surface (bgs) to the depth of groundwater (40 inches bgs). Laboratory samples indicated contamination

in the area was above ADEC Method II Migration to Groundwater Cleanup levels (DRO = 5,450 mg/Kg). Nutrient addition ports were installed and the area treated with high nitrogen fertilizer.

In December 2008, an additional 200 gallons was released from a above ground home heating oil tank at 9209 Sharon Street, the duplex unit adjoining 9211 Sharon Street. ***NORTECH*** conducted a Site Assessment of 9209 and 9211 Sharon Street in June 2009. Site Assessment activities indicated 250 cubic yards of soils had been impacted by the December 2008 spill and an additional 75 cubic yards of soil remained impacted from the November 2006 heating oil release. Nutrient addition ports were installed to treat the impacted soils at 9209 Sharon Street. The ADEC approved treatment of the impacted soils by means of high nitrogen fertilizer. After treating with high nitrogen fertilizer for seven years, Mr. Atkinson switched to treating soils using RegenOx® during the past year for a total of eight years of treatment. Treatment of soils during non-freezing months and annual sampling began in 2009. In 2015, the ADEC determined further sampling of the 9211 Sharon Street portion of the Site was not necessary after laboratory results indicated DRO concentrations in the soils at two feet bgs were below laboratory detection levels.

2.1 Site Location

The Site consists of a residential duplex building located at 9209 and 9211 Sharon Street in Juneau Alaska. The legal description of the Site is Smith Park III BL 4 LT 3 parcel #5B2501150030. The Site is developed with a single story, wooden residential duplex structure, and a garage. The site is connected to city water and sewer services. Two ASTs are located on Site, one on the west side of the duplex and the second on the east side of the duplex.

2.2 Site Climate

Juneau has a maritime climate (Koppen Cfb) marked by relatively long and cold winters and mild summers. Juneau has an average yearly low temperature of 36° F, with an average low of 24° F in January. The yearly average high temperature is 48.1° F, with an average high of 63° F in August. Juneau has an average yearly temperature of 42° F, and receives an average equivalent rainfall of 62 inches of precipitation a year.

2.3 Site Geology

The City and Borough of Juneau is located within the Juneau gold belt. The Juneau gold belt is an extensive gold-laden area that was mined from 1869-1944, characterized as a narrow strip of land lying between salt water and the Coast Range's high diorite peaks. Native soils within the Mendenhall Valley area consist of alluvial deposits of silty sand and gravel from the nearby Mendenhall River. Most of this area has been developed over a muskeg that has had the trees cut and stumps and roots buried. Local fill was used to level developed areas.

Site specific soils consist of silty sand to depths of four feet. Glacial till is present below the silty sand layer. Due to the presence of mature trees at the Site, extensive root systems are also present at the Site.

2.4 Site Groundwater and Surface water

An impermeable silt layer at a depth of about four feet is widely distributed in the Juneau and Douglas area. This layer supports a perched water table which is influenced by precipitation

and runoff. Groundwater in the vicinity of the Mendenhall River is characterized by permeable silty sands and gravels down to the depth of the deeper groundwater table.
Surface water is prevalent in the Juneau and Douglas area. The Mendenhall River is the largest surface body of water within the Mendenhall Valley area. The Mendenhall River is a glacial river that reaches from Mendenhall Glacier to the Mendenhall Wetlands. Many rain fed ephemeral and glacial fed streams are also present in the general area.

During the 2009 Site Assessment, groundwater was encountered at 40 inches bgs. The nearest body of surface water to the Site is the Mendenhall River, 1,400 feet north of the Site.

2.5 Site History

The Site was added to the ADEC Contaminated Sites Database on January 3, 2012. In September 2015, the ADEC closed the western portion (9211 Sharon Street) of the Site as DRO concentrations were below laboratory detection limits and ADEC Method II Migration to Groundwater Cleanup Levels.

3.0 CURRENT FIELD ACTIVITIES

NORTECH personnel Jennifer Stoutamore arrived on Site on June 9, 2017 to conduct annual sampling activities at 9209 Sharon Street. Soil borings were field screened using the headspace method and a photoionization device (PID). Field screening was conducted in accordance with the *ADEC Field Sampling Guidance* dated March 2016 (FSG) and ***NORTECH's*** standard methodologies (Appendix 3).

NORTECH advanced two soil borings near the unit's AST. PID readings at two feet indicated soils were below ADEC Method II Migration to Groundwater Cleanup Levels in S3, and above cleanup levels in S4. An additional three soil borings were advanced to determine the extent of the currently impacted soils.

NORTECH collected laboratory samples from soil borings S3 and S4 at a depth of two feet bgs. Soil from S4 at a depth of two feet bgs had been submitted as a laboratory sample in 2014 and was above ADEC Cleanup Levels. Soil Borings S3 and S4 are located near the AST (Figure 3 Appendix 1) and due to their location, were considered the mostly likely to remain impacted. ***NORTECH*** collected the samples into clean, laboratory supplied jars. Each sample was given a unique identifier and placed on ice for transport to SGS Anchorage under proper laboratory chain of custody procedures. ***NORTECH*** included applicable quality control samples, including a blind field duplicate, trip blank, and temperature blank. In order to stay consistent with past sampling events, ***NORTECH*** submitted samples for analysis of DRO only.

4.0 LABORATORY SAMPLES

NORTECH collected laboratory samples from two locations (soil borings S3 and S4). S4 was sampled at a depth of two feet bgs and submitted as a laboratory sample in 2014. Laboratory samples from current annual sampling efforts were collected from a depth of two feet bgs to remain consistent. Laboratory samples were collected in general accordance with Section 3.5.3 of the FSG.

Sample analysis was completed by SGS Laboratory in Anchorage, Alaska, which is an ADEC approved laboratory as specified in 18 AAC 78.800 – 18 AAC 78.810. Laboratory samples were collected into laboratory supplied clean glassware and immediately preserved if applicable.

Samples were given unique identification numbers for tracking purposes, placed on ice in an ice chest and shipped directly to SGS Laboratories in Anchorage, Alaska under proper laboratory chain of custody requirements. Laboratory samples were analyzed for DRO only in order to remain consistent with past sampling events. ADEC Method II Migration to Groundwater Cleanup Levels are applicable to this Site. Laboratory results for soil borings S3 and S4 for both 2014 and 2017 are shown in Table 1.

Table 1
2014 and 2017 Laboratory Results

DRO (mg/Kg)	ADEC Cleanup Levels (mg/Kg)	S3[1]	S4	S30[1]
2014	230	-	**4950**	-
2017		10.7 U	**381**	7.27 J

[1] Denotes a 2017 duplicate pair
J Analyte not detected above the LOQ and quantity is an estimate
U Analyte not detected above the laboratory detection limit
Shaded Analyte detected above the LOQ
BOLD Analyte detected in concentrations above ADEC Cleanup Levels

4.1 Quality Control Summary

The goal of the project was to produce data of adequate quality for comparison to 18 AAC 75 Method 2 cleanup levels. The primary tool used to assess the quality of the data was the ADEC Lab Data Review Checklist (LDRC). A LDRC was completed for each individual laboratory work order and is included in Appendix 6.

Quality assurance and quality control (QA/QC) tools used for this project included a laboratory blind duplicate soil sample, a trip blank, and a temperature blank. ***NORTECH*** collected laboratory blind duplicate soil samples at a frequency of one for every 10 laboratory soil samples per Site. The SGS laboratory report case narrative was reviewed against the ADEC LDRC for potential laboratory quality control (QC) issues, and none were found that affected the quality or usability of the data.

Precision, expressed as the relative percent difference (RPD) between field duplicate sample results, is an indication of consistency in sampling, sample handling, preservation, and laboratory analysis. The RPD for the duplicate sample pair (S3 and S30) could not be calculated as DRO concentrations in sample S3 were below laboratory detection limits.

NORTECH conducted an additional QC check comparing the PQL and laboratory detection limits (DL) with ADEC cleanup values. Laboratory PQL and DL were below ADEC Method II Cleanup Levels for Migration to Groundwater.

The data quality review for this sampling event indicates there are no data quality issues associated with the laboratory reports. The data quality of the report is adequate and results can be used to characterize contaminant concentrations at the Site. The data quality issues associated with this report, if any, are further discussed in the LDRC.

5.0 ANALYSIS AND DISCUSSION

Laboratory results for DRO in S4 were 4950 mg/Kg in 2014 and have dropped to 381 mg/Kg in 2017. Although S4 still contains DRO concentrations above cleanup levels, S3 (located on the

opposite side of the tank) has DRO concentrations below both ADEC Cleanup Levels and the laboratory detection limit.
The 2009 Site Assessment report estimated 250 cubic yards of soils were impacted from the heating oil release at 9209 Sharon Street. Based on 2017 field screening and laboratory results, ***NORTECH*** estimates 4.6 cubic yards of impacted soils remain on-Site. According to field screening results, impacted soils are present at depths of two feet bgs.

Excavation of the remaining impacted soils is not feasible. Multiple mature spruce trees are located in the backyard and surround the impacted area. In order to excavate impacted soils, the trees and their entire root systems would need to be removed prior to excavation activities.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on Site observations, field screening results, and laboratory results, ***NORTECH*** makes the following conclusions:

- In 2006, an estimated 30 gallons of home heating oil was released from an AST at 9211 Sharon Street
- In 2007 ***NORTECH*** conducted a Site Assessment of 9211 Sharon Street
    - Laboratory results indicated DRO concentrations of 5,450 mg/Kg
    - Nutrient addition ports were installed
- In 2008, and estimated 200 gallons of home heating oil was released from an AST at 9209 Sharon Street
- In 2009 ***NORTECH*** conducted a Site Assessment of 9209 Sharon Street and a second Site Assessment of 9211 Sharon Street
    - 9209 Sharon Street
        - 250 cubic yards of soil were impacted by the spill
        - Nutrient ports were installed
    - 9211 Sharon Street
        - 75 cubic yards of soil remained impacted from the 2006 heating release.
- In 2009 ADEC approved
    - treatment in place via addition of high nitrogen fertilizer for both 9209 and 9211 Sharon Street
    - annual sampling of both areas
- 2014 Laboratory Results indicated that DRO concentrations at 9211 Sharon Street were below ADEC Method II Migration to Groundwater Cleanup Levels
    - ADEC determined continued sampling at 9211 Sharon Street was not necessary
- 2014 Laboratory results indicated soil boring S4 (9209 Sharon Street) had DRO concentrations of 4,950 mg/Kg at two feet below ground surface
- 2017 Laboratory results from samples collected at 9209 Sharon Street indicate at two feet below ground surface
    - soils within S3 (Figure 3 Appendix 1) are below ADEC Method II Migration to Groundwater Cleanup Levels
    - DRO concentrations in S4 have dropped to 380 mg/Kg (Figure 3, Appendix 1)
    - An estimated 4.6 cubic yards of impacted soil remain on Site
        - Impacted soils occur at depths of two feet below ground surface
- Impacted soils at 9209 Sharon Street have been treated via addition of high nitrogen fertilizer during non-freezing months for 7 consecutive years
- Impacted soils have been treated with RegenOx for the past year

Based on the length of treatment, the limited volume of remaining impacted soils, DRO concentrations of impacted soils, and the depth at which contamination is present, ***NORTECH*** requests a designation of No Further Action for the entire Site (both 9209 and 9211 Sharon Street).

7.0 LIMITATIONS

While ***NORTECH*** believes that the activities and methods described in this Site Assessment Report were appropriate, reasonable alternative field procedures may have been utilized to perform the activities necessary under this contract. Alternative procedures may have been necessary based on changes that occurred on the site, unforeseen site conditions, and/or changes in ADEC requirements. If necessary, alternative methodologies utilized by ***NORTECH*** were appropriate, safe, within industry standards, and approved by ADEC as necessary.

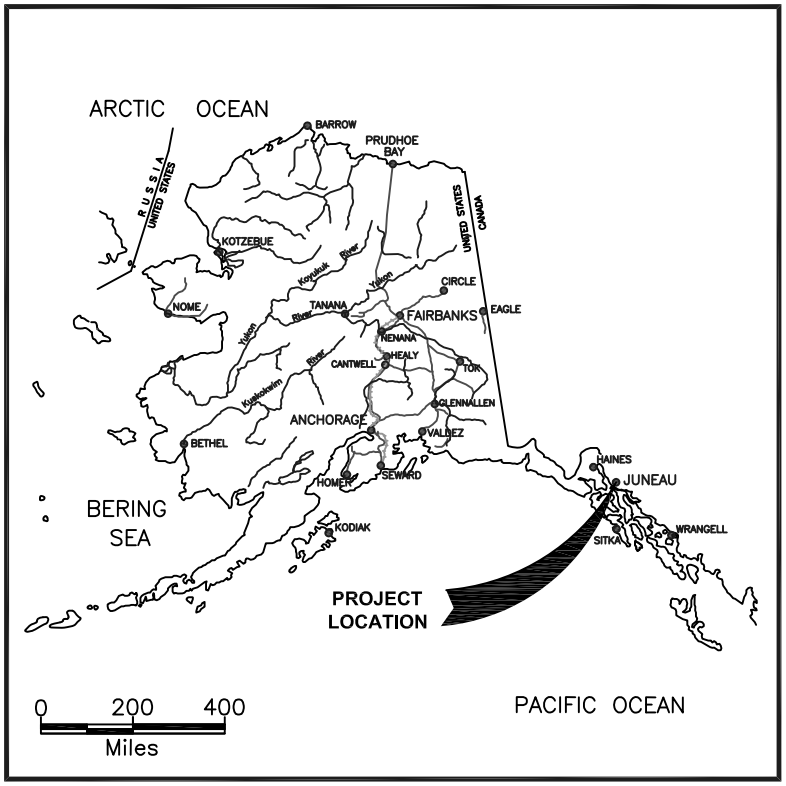
8.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

Jennifer Stoutamore
Staff Professional

Reviewed by:

Jason Ginter, PMP
Principal, Juneau Technical Manager

Appendix 1
Figures



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Location Map
9209 and 9211 Sharon Street
Juneau, Alaska

SCALE: 1"=1 Mile	FIGURE: 1
DESIGN: JLS	
DRAWN: KAT	
PROJECT NO: 17-1043	
DWG: 171043a(01)	
DATE: 8/4/2017	

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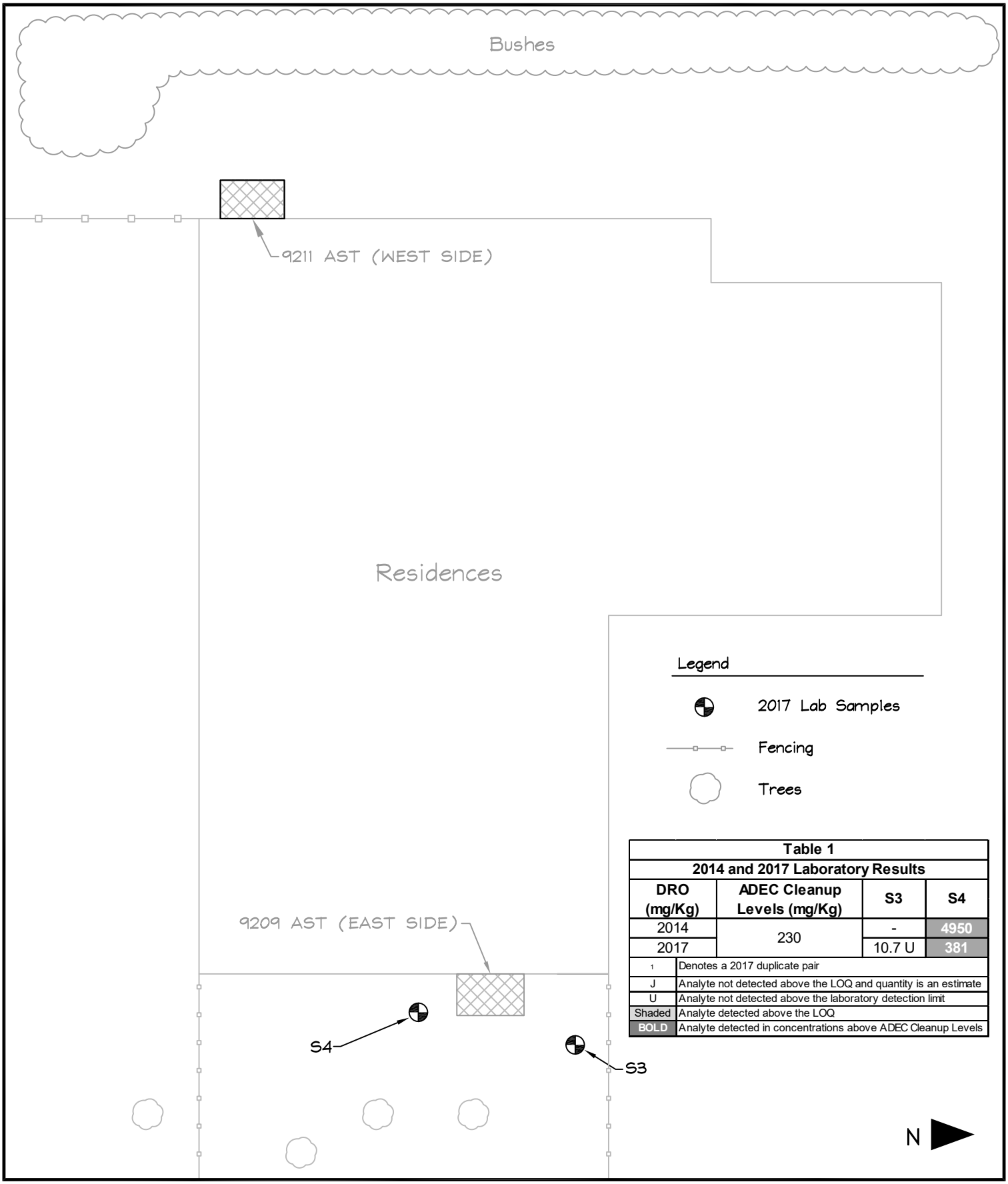
Vicinity Map
9209 and 9211 Sharon Street
Juneau, Alaska

SCALE: 1" = 100'	FIGURE: 2
DESIGN: JLS	
DRAWN: KAT	
PROJECT NO: 17-1043	
DWG: 171043a(02)	
DATE: 8/4/2017	



Legend

- 2017 Lab Samples
- Fencing
- Trees

Table 1			
2014 and 2017 Laboratory Results			
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1	Denotes a 2017 duplicate pair		
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2017 Site Map & Sampling Locations
9209 and 9211 Sharon Street
Juneau, Alaska

SCALE: 1" = 10'	FIGURE: 3
DESIGN: JLS	
DRAWN: FCW/KT	
PROJECT NO: 17-1043	
DWG: 171043a(03)	
DATE: 8/4/2017	

Appendix 2
Site Photographs

Photo 1: *Overview of backyard and current AST at 9209 Sharon Street. Note the mature spruce tree on the right of the photograph.*

Photo 2: *Examples of nutrient addition ports near current AST.*

Photo 3: *Location of soil boring S3 in relation to nutrient ports and the AST.*

Photo 4: *Location of soil boring S4 in relation to nutrient ports and the AST.*

Appendix 3
NORTECH Standard Methodologies

NORTECH Standard Field Screening and Laboratory Sampling Procedures and Methodologies

Field Screening Approaches and Locations

Field screening will be conducted in general accordance with Section III of the ADEC *Field Sampling Guidance* (FSG), dated March 2016, at known and suspect locations of contamination. Field screening will be conducted to delineate the extent of contamination and to identify confirmation laboratory sampling locations. All field screening samples collected will be disposed of at the work site on the day of testing.

Excavation and Surface Area Field Screening

For assessment of surface areas and excavations, field screening will be conducted using a sampling grid established in each area/excavation to be screened. For excavations or surface areas greater than 250 square feet, the number of screening samples will be no less than 10 for the initial 250 square feet and at least 1 per each additional 100 square feet. For areas less than 250 square feet, sampling will be undertaken on a smaller grid and the number of screening samples for less than 250 square feet will be no less than 5. In excavations, sidewall sampling will be conducted as directed in the FSG Table 2B below.

ADEC Table 2B
Surface/Excavation Base and Excavation Sidewall Soil Sample Collection Guide

By surface area (square feet)	Number of Screening Samples	Associated Number of Laboratory Samples
0-50	5	1
51-124	5	2
125-250	1 per 25 sq ft	2
More than 250	10 plus 1 per additional 100 sq ft, or as the CSP determines necessary	2 samples, plus one sample for each additional 250 square feet, or portion thereof, or as the CSP determines necessary.
Excavation sidewalls	For each excavation sidewall, 1 per 10 square feet (depth and length), or portion thereof, with field screening sample collection focused on soil horizon(s) demonstrated as most likely to be contaminated.**	Minimum 1 per each sidewall, plus one additional sample for each sidewall over 250 total square feet (depth and length); or portion therefore at the highest field screening reading in all soil horizons; or as the CSP determines necessary. For example, a 12' x 30' sidewall [360 square feet total] would require 2 laboratory sidewall samples.**

**Field screening samples and laboratory samples are to be collected within a soil horizon at the area most likely to be contaminated, such as on top of confining layers, at the base of porous layers, at the ground water interface, or along any other preferential pathways identified in the field. Sidewalls of 2 feet or less in depth must have field screening and laboratory samples collected in accordance with Table 2B.

Screening samples will be collected in the established sampling area(s) and be of quantity of no less than directed in the FSG for the respective surface area. In the event that screening results indicate contamination remaining in an area, additional screening will be conducted outward to delineate the extents of contamination. The new delineated area will be subject to FSG Table 2B and the respective number of field screens defined above. For smaller areas, the grid interval may be further reduced, but the number of field screens not to be below the ADEC FSG. If obvious contamination is observed, then specific nodes may be excluded to protect the field screening equipment.

In addition to the grid sampling, spot field screening may be conducted in areas where observable contamination is present between the grid intervals and/or identified areas of high potential for contamination. All personnel working at the site will be instructed to notify the environmental screener and/or excavation equipment operator in the event that they observe potential contamination at the site through visual or olfactory cues. Any newly identified potential contamination areas will be field screened upon observation.

Soil Boring Field Screening

Field screening of soil collected from subsurface soil borings will be conducted in general accordance with the FSG. A minimum of one sample will be collected for field screening from each five (5) foot interval of a soil boring. Additional field screening frequencies may be used as appropriate for Site conditions.

Typically, soil borings are advanced into the subsurface soil environment and representative samples are collected using one of the following methodologies:

- Hollow stem augers via rotary drilling rigs
- Samples collected by split-spoon sampler driven in advance of the augers
- Direct push soil Borings
    - Continuous Core sampling tube driven into the soil
- Hand auger borings
    - Manually advancing a bucket type sampling tube into the soil formation

In each method, discrete, undisturbed soil sample(s) are collected from the soil borings for field screening and/or soil sampling. Upon retrieval, the soil material is inspected for visual and olfactory indications of contamination and a representative sample is sequestered for field screening/sampling. Relevant information including sample depth, soil type, soil moisture or saturation and visual or olfactory indications of contamination are recorded in the field notes and/or on boring logs.

In general, soil boring locations are determined based on known or suspected areas of contamination. Typically, a grid will be established at a Site and soil borings will be placed at grid nodes. If surface or subsurface obstructions prevent sampling on a grid node, the nearest accessible point to an existing grid node will be used. If indications of contamination are noted in a soil boring, additional borings may be advanced outward from the area of contamination to define the limits of contamination. The size of a given

sampling grid and the outward step-out distance is often-site specific and determined in the field based on observed conditions.

Stockpile Field Screening

NORTECH will also conduct field screening on suspect and known contaminated stockpiles to determine appropriate laboratory sampling locations if present at the Site. If necessary for disposal, this work will be undertaken in accordance with the ADEC 2016 FSG, which indicates one field screening sample to be collected for every 10 cubic yards of material for small stockpiles. If necessary, this will be undertaken during a single screening and sampling event at the end of the excavation activities when all suspect and known contaminated material has been identified and excavated. Laboratory sampling as described below will be necessary prior to disposal of any contaminated stockpiled soil materials.

POL Field Screening Equipment Description

A Hand Held Air Monitor/Photoionization Detector (PID) will be the instrument used to field screen the soils for POL contamination. The PID is the field-screening instrument of choice as field screening with a PID allows for semi-quantitative real time (10 minutes) analysis as compared to some of the other field screening methods that either use qualitative analysis or are more sensitive to temperature, humidity and hydrocarbon concentration variations.

Additionally, the PID is intrinsically safe and approved for use in Class 1, Division 2, Groups A, B, C, & D Hazardous Locations and is rugged in construction. Headspace field screening by a PID involves measuring the concentration of vapors generated by the POL contaminants in soil. The PID yields semi-quantitative concentrations for soil gas in reference to a certified isobutylene gas standard. Important specifications of the PID are as follows:

Instrument:	RAE Systems PID
Detection Limit:	0.1 ppm
Response Time:	Less than 5 seconds
Calibration:	Certified Isobutylene Standard (nominal 100 ppm)
Operating Temperature Range:	32 to 105ºF (0 to 40ºC)

POL Field Screening Methods

Headspace Monitoring

The headspace method of field screening will be used in general accordance with Section III of the ADEC *Field Sampling Guidance* (FSG) dated March 2016. Headspace screening consists of partially (33%-50%) filling a clean re-sealable bag with freshly uncovered soils to be field screened. The total capacity of the bag will not be less than
8 ounces (approximately 250 ml) and the bag will not be so large as to allow vapor diffusion and stratification effects which would significantly affect the sample. The tools used will be either disposable or stainless steel trowels or spoons. Plastic tools will not be used. If the tools are reused they will be cleaned and decontaminated in accordance with the FSG.

The re-sealable bag will be closed and headspace vapors are allowed to develop for at least 10 minutes and not more than one hour. The bag will be agitated at the beginning and end of the headspace development period for 15 seconds. The soil and headspace will be tested and developed at a temperature of at least 40 degrees F (5 degrees C). A small opening will be made in the top of the bag and the PID probe will be inserted into the bag. Headspace vapors will be drawn from the center of the space above the soils and analyzed by the PID for total volatile organic compounds. In accordance with the FSG, the highest PID reading from each sample will recorded in the project field notes for inclusion in the final report.

Calibration will be performed in accordance with the manufacturer's specifications. In the event that background air contamination is encountered, it will be zeroed out by performing the calibration in an alternate location without contamination, or by utilizing uncontaminated calibration air. The calibration of the PID will be checked at the beginning and end of each day and at least every four hours during continuous use. Calibration and calibration checks ***NORTECH*** will also be recorded in the field log.

POL Contamination Level Classification

Headspace field screening is a method of quickly assessing total volatile organic contaminant concentrations in the field without the need for laboratory results. However, a correlation between PID field screening results and laboratory results is generally site specific. Analysis of the data set generally shows a good relationship between PID and laboratory results. PID results at this site more than 20 ppm almost always exceed the ADEC cleanup levels.

It should be noted that a PID may yield different responses based on various factors including: the soil matrix being tested, soil moisture content, and the volatility of contaminants that may be present. Based on the available data and past experience, for the purpose of this investigation the following contamination level classifications will be used:

- PID screening results between 0-20 ppm will be considered as clean.

- PID screening results >20 will be considered above background concentrations
  - Surface soil material will be manually or mechanically excavated to apparent clean limits through subsequent field screening
  - Or will require laboratory analysis to confirm that no contamination is present above the established cleanup concentrations.

Hydrothermally Induced Iridescent Optroscopy (HIIO) – Hot Water Sheen Test

NORTECH also uses the hot water sheen test (known as Hydrothermally Induced Iridescent Optroscopy) to corroborate and supplement the PID results and visual and olfactory observations of specific soils. Many older spills have lost most of the volatile organic compounds (VOCs) that are detected by the PID. However, petroleum contamination may still be present in the materials that can be detected during laboratory analysis. Furthermore, in areas which receive significant rainfall, saturated soil conditions often exist that can negatively impact a PID and lead to less reliable field screening results. Through experience use, the HIOO method may often provide a more reliable indication of contamination in wet and cool conditions particularly if weathered DRO and RRO are the contaminants of concern.

The general methodology is to partially fill a small stainless steel bowl with suspect soil and slowly add hot water to the bowl and note any sheen that appears on the water surface. Then the water and soil are agitated and the surface is evaluated again. The bowl is then decontaminated for reuse. This procedure is fairly subjective, but is a reasonable indicator of the presence or absence of petroleum contamination.

Typical results are rainbow sheen, a white wispy sheen, a blocky sheen or no sheen. These specific indications provide a subjective analysis about the suspected contamination. For example, fresh releases have a vibrant rainbow of colors, while older weathered releases are generally dull (white) and wispy. In addition, natural organics (biogenic origin) display a blocky pattern and tend to fracture while petroleum contamination does not.

This procedure is fairly subjective, but is a reasonable indicator of the presence or absence of petroleum contamination and, with experience, may be loosely correlated with analytical results. Typically, a trace sheen (<20% coverage in the bowl) is near or below the standard ADEC cleanup level. Greater than 20% coverage or the presence of small globules indicates higher concentrations. Appearance can also provide specific indications about the suspected contamination. For example, fresh releases have a vibrant rainbow of colors, while older weathered releases are generally dull and have limited colors. Also, natural organics and/or glacial silt in the sample can create the appearance of weathered petroleum, but these can be distinguished by closer inspection and visible particles or fracturing of the surface sheen.

Laboratory Sampling Procedures

NORTECH will collect all laboratory soil and groundwater samples in accordance with the ADEC *Draft Field Sampling Guidance,* dated March 2016.

Excavation and Surface Area Sampling

Soil sampling from surface areas and excavations will be collected in accordance with ADEC Table 2B summarized below. Table 2B directs associated number of laboratory samples to be collected based on surface area and linear feet of excavation sidewalls. Laboratory samples will be taken from locations of the highest field screening results, and will be collected of freshly exposed undisturbed soils.

ADEC Table 2B
Surface/Excavation Base and Excavation Sidewall Soil Sample Collection Guide

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More than 250	10 plus 1 per additional 100 sq ft, or as the CSP determines necessary	2 samples, plus one sample for each additional 250 square feet, or portion thereof, or as the CSP determines necessary.
Excavation sidewalls	For each excavation sidewall, 1 per 10 square feet (depth and length), or portion thereof, with field screening sample collection focused on soil horizon(s) demonstrated as most likely to be contaminated.**	Minimum 1 per each sidewall, plus one additional sample for each sidewall over 250 total square feet (depth and length); or portion therefore at the highest field screening reading in all soil horizons; or as the CSP determines necessary. For example, a 12' x 30' sidewall [360 square feet total] would require 2 laboratory sidewall samples.**

**Field screening samples and laboratory samples are to be collected within a soil horizon at the area most likely to be contaminated, such as on top of confining layers, at the base of porous layers, at the ground water interface, or along any other preferential pathways identified in the field. Sidewalls of 2 feet or less in depth must have field screening and laboratory samples collected in accordance with Table 2B.

Soil Stockpile Sampling

For contaminated stockpiles that require characterization for disposal purposes, ADEC FSG provides Table 2A, shown below, as a guide for excavated soil sample collection. Table 2A will be followed for excavated soils in stockpiles, except where the overburden soil or stockpile has been demonstrated to be clean. Contaminated stockpiles will be sampled at a representative location identified by headspace field screening of the stockpile (the location yielding the highest recorded screening values) as described in the FSG.

ADEC Table 2A
Excavated Soil Sample Collection Guide:

By Volume (cubic yards)	Number of Screening Samples	Associated Number of Laboratory Samples
0-10	5	1
11-50	5	2
51-100	1 per 10 cy	3
More than 100	1 per 10 cy, or as the ADEC determines necessary	3 samples, plus one (1) sample for each additional 200 cubic yards, or portion thereof or as the ADEC determines necessary.

Subsurface Soil Boring Sampling

Laboratory soil samples from soil borings will be obtained directly from the sampling equipment used to collect the sample (split-spoon, continuous-core tube or hand auger bucket). The number of soil samples collected from a given soil boring is determined based on numerous factors including the type of investigation, subsurface strata present, depth of the boring and presence of groundwater.

In general, soil samples will be collected from the depth interval with the highest potential for contamination based on field screening results. Additional soil samples may also be collected from unique soil strata, from below the depth of apparent contamination to define vertical extents of a plume, or at the groundwater interface as appropriate to the objectives of the investigation.

Groundwater Sampling

Laboratory samples obtained from monitoring wells will be collected subsequent to well development and appropriate purging. Prior to sampling, the depth to static groundwater and total depth of the well will be measured, and a well volume will be calculated. A minimum of three well volumes will then be purged from each well prior to sampling. Well purging and groundwater sample collection will be accomplished using a peristaltic pump using low-flow techniques. Clean dedicated sample tubing will be installed for use in each well.

Laboratory Sample Collection Methodologies

All project samples (soil and groundwater) will be collected using clean or disposable sampling tools. All non-disposable sampling tools/equipment will be de-contaminated prior to re-use. De-contamination will be accomplished by removing any bulk soil and/or residue from the sampling equipment with a brush, cleaning the equipment in an Alconox soap solution, and rinsing the equipment with clean distilled water.

All soil and groundwater samples will be in order of volatility with the most volatile samples (GRO, BTEX and VOCs) collected first. All samples will be collected directly into clean glassware provided by the laboratory, and immediately placed in a cooler with ice prior to transportation under chain-of-custody to the laboratory. Each sample will be assigned a unique sample ID.

NORTECH will follow the ADEC FSG Table 3 – *Minimum Quality Control Requirements* for the collection of field duplicate(s) and sample Trip Blanks. A minimum of one duplicate sample will be collected for each ten samples submitted to the laboratory for each sample matrix (soil and water) and for target analysis. A minimum of one trip blank will be submitted to the laboratory for each matrix sampled (soil and water) and per each cooler containing volatile samples submitted to the laboratory.

Appendix 4
Laboratory Report

Laboratory Report of Analysis

To: Nortech
5438 Shaune Drive Suite B
Juneau, AK 99801
(907)586-6813

Report Number: **1173251**

Client Project: **14-1157 Atkinson**

Dear Jen Stoutamore,

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 Victoria 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.

Victoria Pennick Date
Project Manager
Victoria.Pennick@sgs.com

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

Case Narrative

SGS Client: **Nortech**
SGS Project: **1173251**
Project Name/Site: **14-1157 Atkinson**
Project Contact: **Jen Stoutamore**

Refer to sample receipt form for information on sample condition.

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

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Laboratory Qualifiers

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

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

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

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

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
CZ-S3	1173251001	06/09/2017	06/12/2017	Soil/Solid (dry weight)
CZ-S30	1173251002	06/09/2017	06/12/2017	Soil/Solid (dry weight)
CZ-S4	1173251003	06/09/2017	06/12/2017	Soil/Solid (dry weight)

Method	Method Description
AK102	Diesel Range Organics (S)
SM21 2540G	Percent Solids SM2540G

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Detectable Results Summary

Client Sample ID: **CZ-S30**
Lab Sample ID: 1173251002
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	7.27J	mg/Kg

Client Sample ID: **CZ-S4**
Lab Sample ID: 1173251003
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	381	mg/Kg

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Results of **CZ-S3**

Client Sample ID: **CZ-S3**
Client Project ID: **14-1157 Atkinson**
Lab Sample ID: 1173251001
Lab Project ID: 1173251

Collection Date: 06/09/17 08:20
Received Date: 06/12/17 16:22
Matrix: Soil/Solid (dry weight)
Solids (%):92.9
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	10.7	U	21.3	6.60	mg/Kg	1		06/23/17 00:59
Surrogates								
5a Androstane (surr)	76.7		50-150		%	1		06/23/17 00:59

Batch Information

Analytical Batch: XFC13457
Analytical Method: AK102
Analyst: KMD
Analytical Date/Time: 06/23/17 00:59
Container ID: 1173251001-A

Prep Batch: XXX37679
Prep Method: SW3550C
Prep Date/Time: 06/22/17 18:08
Prep Initial Wt./Vol.: 30.356 g
Prep Extract Vol: 1 mL

Print Date: 06/23/2017 4:40:38PM

J flagging is activated

Results of **CZ-S30**

Client Sample ID: **CZ-S30**
Client Project ID: **14-1157 Atkinson**
Lab Sample ID: 1173251002
Lab Project ID: 1173251

Collection Date: 06/09/17 08:25
Received Date: 06/12/17 16:22
Matrix: Soil/Solid (dry weight)
Solids (%):92.9
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	7.27	J	21.5	6.65	mg/Kg	1		06/23/17 01:09
Surrogates								
5a Androstane (surr)	81		50-150		%	1		06/23/17 01:09

Batch Information

Analytical Batch: XFC13457
Analytical Method: AK102
Analyst: KMD
Analytical Date/Time: 06/23/17 01:09
Container ID: 1173251002-A

Prep Batch: XXX37679
Prep Method: SW3550C
Prep Date/Time: 06/22/17 18:08
Prep Initial Wt./Vol.: 30.104 g
Prep Extract Vol: 1 mL

Print Date: 06/23/2017 4:40:38PM

J flagging is activated

Results of **CZ-S4**

Client Sample ID: **CZ-S4**
Client Project ID: **14-1157 Atkinson**
Lab Sample ID: 1173251003
Lab Project ID: 1173251

Collection Date: 06/09/17 09:10
Received Date: 06/12/17 16:22
Matrix: Soil/Solid (dry weight)
Solids (%):85.7
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	381		92.7	28.7	mg/Kg	4		06/23/17 01:19
Surrogates								
5a Androstane (surr)	106		50-150		%	4		06/23/17 01:19

Batch Information

Analytical Batch: XFC13457
Analytical Method: AK102
Analyst: KMD
Analytical Date/Time: 06/23/17 01:19
Container ID: 1173251003-A

Prep Batch: XXX37679
Prep Method: SW3550C
Prep Date/Time: 06/22/17 18:08
Prep Initial Wt./Vol.: 30.217 g
Prep Extract Vol: 1 mL

Print Date: 06/23/2017 4:40:38PM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1761655 [SPT/10190]
Blank Lab ID: 1392241

Matrix: Soil/Solid (dry weight)

QC for Samples:
1173251001, 1173251002, 1173251003

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT10190
Analytical Method: SM21 2540G
Instrument:
Analyst: FDR
Analytical Date/Time: 6/20/2017 7:52:00PM

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Duplicate Sample Summary

Original Sample ID: 1173226009
Duplicate Sample ID: 1392242
QC for Samples:
1173251001, 1173251002, 1173251003

Analysis Date: 06/20/2017 19:52
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	57.4	59.6	%	3.70	(< 15)

Batch Information

Analytical Batch: SPT10190
Analytical Method: SM21 2540G
Instrument:
Analyst: FDR

Print Date: 06/23/2017 4:40:40PM

Duplicate Sample Summary

Original Sample ID: 1173272011
Duplicate Sample ID: 1392243
QC for Samples:
1173251001, 1173251002, 1173251003

Analysis Date: 06/20/2017 19:52
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	79.2	78.7	%	0.63	(< 15)

Batch Information

Analytical Batch: SPT10190
Analytical Method: SM21 2540G
Instrument:
Analyst: FDR

Print Date: 06/23/2017 4:40:40PM

Method Blank

Blank ID: MB for HBN 1761780 [XXX/37679]
Blank Lab ID: 1392784

Matrix: Soil/Solid (dry weight)

QC for Samples:
1173251001, 1173251002, 1173251003

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
5a Androstane (surr)	69.7	60-120		%

Batch Information

Analytical Batch: XFC13457
Analytical Method: AK102
Instrument: Agilent 7890B F
Analyst: KMD
Analytical Date/Time: 6/22/2017 10:53:00PM

Prep Batch: XXX37679
Prep Method: SW3550C
Prep Date/Time: 6/22/2017 6:08:47PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

Print Date: 06/23/2017 4:40:43PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1173251 [XXX37679]
Blank Spike Lab ID: 1392785
Date Analyzed: 06/22/2017 23:03

Spike Duplicate ID: LCSD for HBN 1173251 [XXX37679]
Spike Duplicate Lab ID: 1392786
Matrix: Soil/Solid (dry weight)

QC for Samples: 1173251001, 1173251002, 1173251003

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	167	137	82	167	143	86	(75-125)	4.30	(< 20)
Surrogates									
5a Androstane (surr)	3.33	96.1	96	3.33	96.5	97	(60-120)	0.44	

Batch Information

Analytical Batch: **XFC13457**
Analytical Method: **AK102**
Instrument: **Agilent 7890B F**
Analyst: **KMD**

Prep Batch: **XXX37679**
Prep Method: **SW3550C**
Prep Date/Time: **06/22/2017 18:08**
Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL

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SGS

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CHAIN OF CUSTODY RECORD

1173251

www.sgs.com

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

Page 1 of 1

Section 1

CLIENT: NORTECH

CONTACT: Jen Stoutamore PHONE NO: 586-6813

PROJECT NAME: Atkinson PROJECT/ PWSID/ PERMIT#: 14-1157

REPORTS TO: Jen Stoutamore E-MAIL: jstoutamore@nortechengr.com

INVOICE TO: NORTECH QUOTE #: P.O. #: 14-1157

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	Section 3 # CONTAINERS	Section 3 Type C = COMP G = GRAB MI = Multi Incre-mental Soils	Preservative DRO									REMARKS/ LOC ID
DA	CZ-S3	06/09/17	08:20	Soil	1	G	X									
2A	CZ-S30	06/09/17	08:25	Soil	1	G	X									
3A	CZ-S4	06/09/17	~~08:30~~ 09:10	Soil	1	G	X									
	Temp blank															

Section 5

Relinquished By: (1)	Date	Time	Received By:
Jennifer Stoutamore	6/12/17	09:45	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date 6/12/17	Time 10:22	Received For Laboratory By:

Section 4

DOD Project? Yes No

Cooler ID:

Data Deliverable Requirements: Standard

Requested Turnaround Time and/or Special Instructions: Standard

Temp Blank °C: 4.9 #012 or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

027 JNU 1942 9594 027-1942 9594

Shipper's Name and Address	Shipper's Account Number	Not Negotiable
Nortech 2400 College Rd Fairbanks, AK 99709 USA Tel: 9074525688	27442126076 Customer's ID Number 10588	**Air Waybill** Issued By Alaska AIR CARGO P.O. BOX 68900 SEATTLE, WA 98168 800-225-2752 ALASKA[illegible]M
Consignee's Name and Address	**Consignee's Account Number**	**Also notify**
SGS North America Inc 200 W Potter Drive Anchorage, AK 99518 USA Tel: 9075622343	27400215947	1173251
Issuing Carrier's Agent and City		**Accounting Information** 10588
		Nortech 2400 College Rd Fairbanks, AK 99709 USA SRN/14-1157 GoldStreak
Agent's IATA Code	**Account No.**	
Airport of Departure (Addr. of First Carrier) and Requested Routing		
Juneau		

To	By First Carrier	To / By	To / By	Currency		WT/VAL		Other		Declared Value For Carriage	Declared Value For Customs
ANC	Alaska Airlines			USD	PX	X		X		NVD	NCV

Airport of Destination	Flight/Date	Flight/Date	Amount of Insurance
Anchorage	AS 065/12		XXX

Handling Information
CHILL

SCI

No of Pieces	Gross Weight	kg lb	Commodity Item No.	Chargeable Weight	Rate / Charge	Total	Nature and Quantity of Goods (Incl. Dimensions or Volume)
1	6.0	L		6.0		AS AGREED	SOIL SAMPLE Dims: 10 x 7 x7 x 1 GSX PER
1	6.0					AS AGREED	Volume: 0.284

Prepaid	Weight Charge	Collect	Other Charges
AS AGREED			XBC 0.00
Valuation Charge			
Tax			
Total Other Charges Due Agent			
Total Other Charges Due Carrier			
Total Prepaid	Total Collect		
AS AGREED			

Shipper certifies that the particulars on the face hereof are correct and that **insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations. I consent to the inspection of this cargo.**

For: Nortech

Signature of Shipper or his Agent

☒ THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS

☐ THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS

Executed On (Date)	at (Place)	Signature of Issuing Carrier or its Agent
12 Jun 2017 09:49	Juneau	Alaska Airlines

027-1942 9594

Alert Expeditors Inc. **#374738**

Citywide Delivery • 440-3351
8421 Flamingo Drive • Anchorage, Alaska 99502

Date 6 12 17

From Nortech

To SGS

Collect ☐	Prepay ☐ Account ☐	Advance Charges ☐
Job #	PO#	

1 @ 6

1173251

19429594

Shipped Signature

Total Charge

Received By:

e-Sample Receipt Form

SGS Workorder #: **1173251**

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		N/A Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Yes	1-f
COC accompanied samples?	Yes	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 4.9 °C Therm. ID: 12
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)? **Note: If times differ <1hr, record details & login per COC.	Yes	
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	Yes	
		***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	N/A	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	

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

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1173251001-A	No Preservative Required	OK			
1173251002-A	No Preservative Required	OK			
1173251003-A	No Preservative Required	OK			

Container Condition Glossary

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

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM- The container was received damaged.
FR- The container was received frozen and not usable for Bacteria or BOD analyses.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

Appendix 5
Laboratory Data Review Checklist

Laboratory Data Review Checklist

Completed by:	Jennifer Stoutamore		
Title:	Environmental Scientist	Date:	Aug 3, 2017
CS Report Name:		Report Date:	Jun 23, 2017
Consultant Firm:	NORTECH		
Laboratory Name:	SGS	Laboratory Report Number:	1173251
ADEC File Number:	1513.38.087	ADEC RecKey Number:	Not Assigned

1. Laboratory

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

(●) Yes ( ) No ( ) NA (Please explain.) Comments:

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

( ) Yes ( ) No (●) NA (Please explain) Comments:

Sample was not transferred

2. Chain of Custody (COC)

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

(●) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(●) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

(●) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Sample condition documented and all sample conditions "okay"

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

No discrepancies found

e. Data quality or usability affected? (Please explain)

Comments:

Data quality and usability not affected

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

No discrepancies, errors, or QC failures were found

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

No Corrective Actions needed

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

Comments:

Data quality and usability not affected

5. Samples Results

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

e. Data quality or usability affected? (Please explain)

Comments:

Data quality and usability not affected

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

iii. If above PQL, what samples are affected? Comments:

Results less than PQL

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

○ Yes ○ No ◉ NA (Please explain) Comments:

No samples affected, all results less than PQL

v. Data quality or usability affected? (Please explain) Comments:

Data quality and usability not affected

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

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

Metals/inorganic analysis not requested

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

Comments:

All %R and RPDs within QC criteria

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

○ Yes ○ No ◉ NA (Please explain) Comments:

All %R and RPDs within QC criteria

vii. Data quality or usability affected? (Please explain) Comments:

Data quality and usability not affected

c. Surrogates - Organics Only

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

○ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

All surrogate recoveries within QC criteria

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

Comments:

Data quality and usability not affected

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

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

○ Yes ○ No ◉ NA (Please explain.) Comments:

No volatile analysis requested

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 ◉ NA (Please explain.) Comments:

No volatile analysis requested

iii. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain.) Comments:

No volatile analysis requested

iv. If above PQL, what samples are affected?

Comments:

No volatile analysis requested

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability not affected

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

○ Yes ○ No ◉ NA (Please explain) Comments:

Duplicate samples were below the LOQ and RPD could not be calculated

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

○ Yes ◉ No ○ NA (Please explain) Comments:

LOQs were similar between samples, data quality and usability not affected

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ NA (Please explain) Comments:

Equipment Blank not included

i. All results less than PQL?

○ Yes ○ No ○ NA (Please explain) Comments:

Equipment Blank not included

ii. If above PQL, what samples are affected?

Comments:

Equipment Blank not included

iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

J and U flags were present, defined, and appropriate

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