UNDERGROUND STORAGE TANK SAMPLING AND ANALYSIS/QUALITY ASSURANCE PROJECT PLAN GRAYLING NATIVE STORE BLOCK 22, LOT 3 GRAYLING, ALASKA

September 14, 2023

Prepared for:
Yukon River Inter-Tribal Watershed Council

Prepared by:

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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
BTEX	benzene, toluene, ethylbenzene, xylenes
COCs	contaminants of concern
CSP	Contaminated Sites Program
CSM	Conceptual Site Model
cy	cubic yards
DL	detection limit
DQOs	data quality objectives
DRO	diesel range organics
EDB	ethylene dibromide
EPA	Environmental Protection Agency
FSG	2021 ADEC Field Sampling Guidance
GRO	gasoline range organics
IDW	investigation-derived waste
LDRC	Laboratory Data Review Checklist
LOQ	limit of quantitation
NVG	Native Village of Grayling
%	percent
PAHs	polycyclic aromatic hydrocarbons
PID	photoionization detector
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
QEP	Qualified Environmental Professional
RI	release investigation
RPD	relative percent difference
SA	site assessment
SGS	SGS North America, Inc.
UST	underground storage tank
VOCs	volatile organic compounds
WP	work plan
YRITWC	Yukon River Inter-tribal Watershed Council

1.0 TITLE AND APPROVAL PAGE

9/14/2023

Signature Date

Jordan Finney, Yukon River Inter-Tribal Watershed Council, Project Manager

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Cindy Fields, EPA Region 10, EPA Project Quality Assurance Manager

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Kelly Ireland, DEC Contaminated Sites Program, Project Manager

September 14, 2023

Signature Date

John Carnahan, ***NORTECH***, Inc., Project Manager

2.0 INTRODUCTION

This brownfield site-specific quality assurance project plan (SSQAPP) was prepared by ***NORTECH*** for conducting soil sampling, field screening and laboratory analysis during an underground storage tank (UST) assessment, and release investigation associated with a former aboveground storage tank (AST) farm. This work is being completed for the Yukon River Inter-tribal Watershed Council (YRITWC), who has contracted ***NORTECH***, Inc., to prepare a work plan (WP) for a Release Investigation (RI) associated with two Underground Storage Tanks (USTs) situated adjacent to the store in Grayling, Alaska (the Site).

This UST RI WP describes the methodology and procedures for evaluating the extent of subsurface impacts associated with all USTs, decommissioned ASTs and releases associated with their use and management on the Site. The USTs will not be decommissioned as part of this effort. Samples will be collected from near surface to an estimated 10 feet using local excavation equipment. Reporting will be designed to document the estimated extent of subsurface impacts and provide remedial action alternatives.

2.1 Project Organization and Lines of Authority

The project contact information and responsible parties are outlined below:

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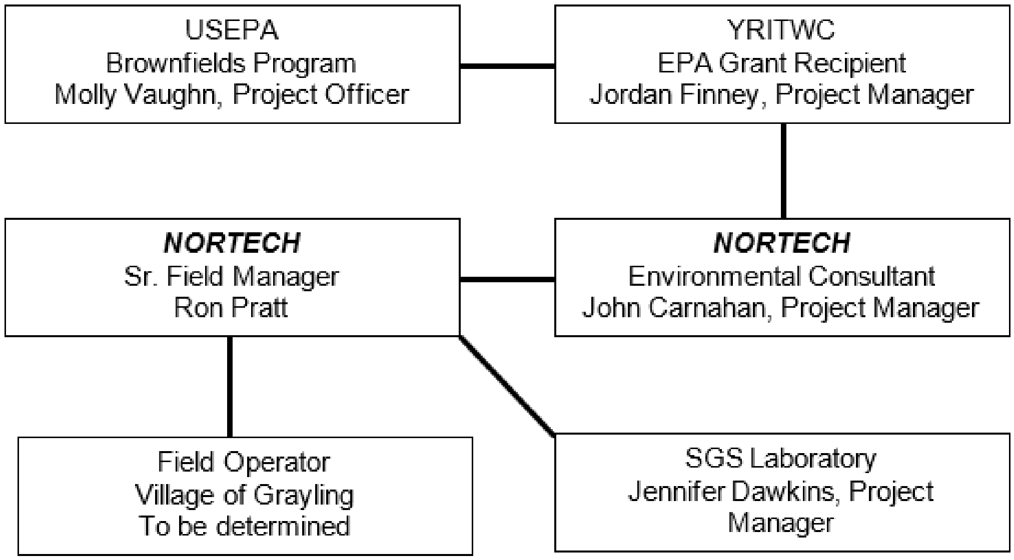
2.2 Organization Structure

Organization Chart



3.0 PROBLEM DEFINITION

The USTs are assumed to have had releases associated with the use or management of the tanks and/or piping, or from tanks and piping previously decommissioned as part of an Aboveground Storage Tank (AST) system. This assessment is designed to help determine the extent of subsurface impacts associated with the USTs and the former ASTs and provide information to determine the necessary future management requirements to address formal closure of the Site.

The existing site conditions may include contamination that exceeds regulatory cleanup requirements while at the same time pose little risk to users of a site or the environment. However, it is also possible that site conditions appear to pose little or no risk, but impacts could be present to an unsuspecting public through contaminated groundwater, or an intrusion of petroleum vapors into indoor air space.

Assessment activities associated with regulated underground storage tanks (USTs) have specific requirements as determined by 18 AAC 78.090, Site Characterization and Assessment. Since previous investigations have indicated that a release may be associated with the Site, this assessment will address the requirements of 18 AAC 78.235, Release Investigating, of which the investigation sample requirements are prescribed in the regulations, depending on whether the tanks will be closed in place or removed, and if contamination is identified.

4.0 DATA QUALITY OBJECTIVES

The project data quality objectives (DQOs) focus on producing adequate data to confirm if the existing USTs and associated AST farm have contaminated the surrounding soil (and GW, if appropriate). DQOs are also intended to enable a revised conceptual site model (CSM) and identify potentially complete exposure pathways from the contamination in soil, whether indoor air is a potential concern, and whether groundwater is likely to be impacted and resulting in a potential exposure. Groundwater is unlikely to be encountered as part of this investigation.

The soil results will be compared to the ADEC Method Two Cleanup Levels for the Under 40-inch zone as defined in 18 AAC 75.341 Tables B1 and B2 (soil) as amended through November 18, 2021. The results will be used to assess whether Site COCs exist and whether they pose a potential threat to human health under different exposure pathways.

DQO's for the project are summarized below:

- The main objective is to estimate the extent of petroleum releases across the site such that an evaluation of practical cleanup approaches can be completed
  - Data collection will be limited by the capacity of the available equipment
  - Assessment time will be limited to between one and three days
- Questions that should be addressed include:
  - What are the sizes of the buried USTs?
  - What is the extent of petroleum impacts at the site?
  - Are there any immediate risks to human health and/or environment?
  - What are the concentrations in proximity to occupied buildings?
  - What are potential offsite receptors?
  - What are reasonable approaches to managing identified contamination?
- Information necessary to address questions include:
  - Review of historical information in the records
  - Collection of near- and sub-surface soil data (field screening and analytical) to address extent of impacts
  - Visual observations and interviews with local residents to determine historical site use and potential known spills
  - Depending on the field observations, photoionization detector (PID) readings and/or samples may be collected from trenches adjacent to occupied buildings to west and east
- The area to be investigated is estimated to not exceed 0.1 acre
  - The surface evaluation will be limited to the area between the Native Store Warehouse to west, the Tribal Hall to east, and to a distance north and south that are adequate to encompass the former AST farm, fuel management area, and extent of potential releases
- Equipment will include excavator owned and managed by the Grayling Tribal Council, sufficient to collect samples at depth, with only discrete samples collected
- Field personnel will advance the trench excavation investigation based on positive field screening results, in an effort to determine lateral extents (and depth of impacts to the extent that equipment can accommodate)
  - The number of trenches will be modified based on the field observations, with an estimate of 8 to 10 trenches at a minimum
  - Near-surface screening/sampling with shovels may be completed to determine if surface releases are evident
- Laboratory sampling will be used to confirm the presence of contamination in locations, and calibrate field screening results
  - Laboratory samples will be submitted from samples with the highest PID results
  - Laboratory samples will be submitted from samples representing some average PID results

5.0 SAMPLING DESIGN

5.1 Chemicals of Concern

The following summarizes the potential chemicals of concern (COCs) for this project based on the type of site to be evaluated, and the included number of samples that are budgeted as part of this effort:

Table 1 - Potential Chemicals of Concern
(For Diesel and Gasoline Tanks)

Analyte	Method	Included # Samples
RRO	AK 103	20
DRO	AK 102	20
GRO	AK 101	20
VOCs	EPA 8260D	10
SVOCs	EPA 8270E	10
PAHs (10%)	EPA 8270E-SIM	2
EDB	EPA 8260D	2
Total Lead	EPA 6010D	10
MTBE	EPA 8260D	2
Duplicates	Various	10% of primary samples

5.2 Sampling Strategy

Soil samples will be collected as part of trenching activities (field screening and laboratory) and will be collected as grab samples (not composited) within a soil horizon at the area most likely to be contaminated, such as on top of confining layers, at the base of more porous layers, at the GW interface (not expected to be encountered), or along any other preferential pathways identified in the field. Locations of samples will be marked in the field and documented in drawings.

Soil samples are the only sampled collected for laboratory analysis, and will be collected from the near surface, and at the depth of onsite equipment from soil extracted from holes or trenches. Samples will be required associated with each UST location, based on size and aerial extent of the surface overlying the tanks. Additionally, samples should be collected from other locations at the site as review and site conditions warrant. The following are areas that are likely to require sampling:

- UST locations
- All former AST locations
- The fuel dispenser station
- Pipelines running to and from the dispenser and tanks (remaining onsite)
- Stockpile locations (current or past)
- Areas known to have stored drums (targeting fuel storage as indicated)

An estimate of the sample locations and type is provided in Figure 3, in Appendix 1. In addition, ***NORTECH*** will be prepared to do preliminary screening for volatile vapors in any buildings located adjacent to soil that has indicated an elevated level of volatile readings.

Subsurface sampling of the site will likely be limited to less than 10 feet, unless the equipment is capable of deeper depths, and contamination is evident. Samples will be collected adjacent to the USTs as well as beneath former AST and pipeline locations. Additional trenching may be advanced radially away from signs of release or toward the edge of the property. Multiple excavations, potentially in a modified grid fashion if needed, can be used to obtain soil samples, and determine whether contaminated soil appears to be present. Confirmation soil testing can be used and compared to field screen results to provide a qualitative evaluation of concentrations in many locations. Samples collected for laboratory analysis use for delineation purposes should be limited to areas designed to determine either maximum contamination levels, to determine “clean” areas, or for comparing to field screening results in order to provide an increased understanding of average field screening results across the site.

5.3 Excavation and Soil Management

NORTECH proposes to investigate impacted soils at the Site via excavation of soils using a backhoe provided by Grayling Tribal Council. Hand tools may be used as necessary to advance holes for sampling in areas where heavy equipment is not safe or appropriate (e.g., around utilidors, pipes, or adjacent to structures, as appropriate). ***NORTECH*** will field screen soils during excavation in order to guide the direction and depth of soil excavation. ***NORTECH*** will collect soil field screening samples from both clean and impacted soils in accordance with ***NORTECH***’s standard operating procedure, and at the estimated number of samples summarized in the work plan.

All excavations will extend to the extent practicable with the available equipment and soil will be removed and stockpiled adjacent to each trench on 6-mil liner. Initial exploration will begin by removing soil overlying each UST to determine the ends of the tanks. Once this is determined, additional trenching along the sides and ends can be completed. This will also allow a better assessment of the size of the tanks.

Exploration trenches will be advanced within 5 feet of the edge of each tank, surrounding each tank system. Field screening samples will be collected from the soil as it is removed to determine the approximate range of concentrations with depth. The final samples selected for laboratory analyses will include the samples with the greatest field screening reading in the trench, or the sample from the base of the excavation.

After collection of field screening and laboratory samples from the final limits of the excavation, the excavation will be backfilled even to the surrounding ground surface using the same material from the excavation, returning it to the approximate depth from which it was removed. No open holes will remain on the Site.

5.4 Investigative Derived Waste Management

No investigative derived waste (IDW) waste will be generated as part of this field effort. All used liner, and disposable sampling equipment supplies will be double-bagged and disposed of with other nonhazardous waste in a trash receptacle.

5.5 Documentation and Reporting

Staff will document all field readings, observations and sample locations in a logbook designated for this project. The field book will be a bound book permanently assigned to this project. ***NORTECH*** will also use field forms for safety and a camera to document site conditions and complement the reporting. All logbooks and field form entries should be printed legibly using ink and a copy of the entries will be included with the reporting. All field forms will be completed in full on a daily basis as appropriate.

5.6 Data Verification

Following completion of all fieldwork and laboratory analysis, a summary report will be prepared. The report will be a concise summary of the methods, findings, conclusions and recommendations of this investigation. All laboratory data and field data will be evaluated by ***NORTECH*** using standard methodology for verification, including DEC's *Laboratory Data Review Checklist* (LDRC). ***NORTECH*** will issue an opinion regarding data quality objectives and data usability. Data quality issues (if any) will be discussed and their potential effect on the findings, conclusions and recommendations will be discussed.

5.7 Schedule

Following work plan finalization, field work planning and preparations will begin. It is anticipated that the field work will be completed in September 2023, with reporting to follow within 45 to 60 days, depending on the return of laboratory analysis results. All work is anticipated to be completed before December 30, 2023.

6.0 SAMPLING AND ANALYTICAL METHOD REQUIREMENTS

Table 2 - Estimated Number of Screening and Laboratory Samples

Location	Rationale	# PID Field Screening	Analyses	# of Lab Samples
Tank 4 Sidewalls	Per regulation for in-place closure for tank < 250 sf	4	GRO, BTEX, PAH, Lead (naphthalene)	2
Tank 5 Sidewalls	Per regulation for in-place closure for tank < 250 sf	4	GRO, BTEX, PAH, Lead (naphthalene)	2
Visible pipelines	Every 20 feet, if present	2 - 4	GRO, BTEX, PAH, Lead (naphthalene)	1-2
Dispensing area	Per regulation and to evaluate releases during refueling (located just south of tanks)	2	GRO, BTEX, PAH, Lead (naphthalene)	2
AST Farm area, Delineation areas	Evaluate the extent of previously identified releases. Estimate 8 trenches to be advanced	16 - 32	DRO/RRO, GRO/BTEX, PAH	6
Additional areas of concern/ extra samples	Expand the area of assessment to meet the needs of the project objectives	8	TBD EDB, Lead, MTBE	TBD

Note: Additional field screening and sampling will be predicated on the results of field screening and additional trenching to delineate the extent of potential subsurface impacts. Samples for EDB and MTBE will be limited to 2 samples from areas with elevated field screening results adjacent to buried gasoline tanks.

Table 3 - Analytical SOP Requirements Tables
Sample Collection Reference Guide – Soil, Sediment, Sludge, Fill Material

Parameter	Analytical Method[1]	Container Description (Minimum)[a.]	Preservation/Holding Times
Gasoline Range Organics**	AK101*	4 oz. amber glass, TLS	Methanol preservative, 0º to 6ºC / 28 days
Diesel Range Organics	AK102*	4 oz. amber glass, TLC	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
Residual Range Organics	AK103*	4 oz. amber glass, TLC	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) [4]	8021B or 8260D	4 oz. amber glass, TLS	Methanol preservative, 0º to 6ºC / 14 days
Volatile Organic Compounds (VOCs)[4]	8260D	4 oz. amber glass, TLS	Methanol preservative, 0º to 6ºC / 14 days
Volatile Aliphatic and Aromatic Petroleum Hydrocarbons (VPH)	NWTPH-GX	4 oz. amber glass, TLS	Methanol preservative, 0º to 6ºC / 14 days
Extractable Aliphatic and Aromatic Petroleum Hydrocarbons (EPH)	NWTPH-Dx	4 oz. amber glass, TLS	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
Dibromomethane 1-,2-	8011 or 504.1 or 8260D	4 oz. amber glass, TLS	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
Semi-volatile Organic Compounds (SVOC)	8270E	4 oz. amber glass, TLC	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
Polynuclear Aromatic Hydrocarbons (PAH)[2]	8270E or 8310	4 oz. amber glass, TLC	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
Metals †	6010D or 6020B or 7000 series	100mL Wide mouth HDPE or amber glass jar[3], TLC	None / 6[7] months

Notes:
Several of the 7000 series methods have been deleted from SW846 but these methods may still be approved in a CSP site-specific work plan. Check the laboratory's approval status. The sampling and analysis of soil parameters for alternative cleanup level calculations is discussed in CSP technical memos located here: http://dec.alaska.gov/spar/csp/guidance_forms/csguidance.htm.
a. Clear glass may be substituted for amber if samples are protected from exposure to light.
[1]Unless otherwise noted, all preparation and analytical methods refer to the most current of EPA's Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846.
[2]Naphthalene can be analyzed by 8021B or 8260D if naphthalene is the only PAH contaminant of concern.
[3]HDPE, High Density Polyethylene or amber glass sample collection bottles, certified clean for trace metals analysis.
[4]May be analyzed out of AK101 methanol preserved sample.
[5]PCBs must be prepared using extraction method 3540C or 3550C.
[6]High temperature sample preparation techniques by EPA Method SW-846 may be required to improve the recovery and achieve lower detection limits.
[7]If bioassays or toxicity testing is to be conducted with metals, then anoxia may need to be maintained, and analyses should occur within 24 hours after sample collection, unless the test method dictates otherwise. Consult the CSP Project Manager for more project specific guidance.
8Sampling and preservation considerations are discussed in a ITRC fact sheet located here: http://dec.alaska.gov/spar/csp/guidance_forms/csguidance.htm.
[†]Hexavalent Chromium can be analyzed with EPA methods 7199 (modified) or 7196A.

Table derived from 2019 ADEC Field Sampling Guidance

7.0 METHODOLOGY

NORTECH will complete this assessment work in accordance with the following:

- AAC 78.090 Site Assessment (September 2019)
- AAC 75.335 Site Characterization (November 2021)
- ADEC *Field Sampling Guidance* (FSG) (January 2022)
- ***NORTECH*** PID Field Screening Standardized Methodology (June 2019)
- ADEC *Underground Storage Tanks Procedures Manual Guidance for Treatment of Petroleum-Contaminated Soil and Water and Standard Sampling Procedures* dated (March 22 2017)
- This RI WP (following approval)

Work will be completed by ***NORTECH*** staff professionals meeting ADEC requirements as Qualified Environmental Professionals (QEPs). Field screening and laboratory sampling methods will be in general accordance with the UST Procedures Manual, the FSG and the WP. All samples will be collected by a DEC QEP as defined in 18 AAC 75. Laboratory sampling will include field duplicates and other quality assurance/quality control (QA/QC) samples as outlined in Section 4.5.2 below.

7.1 Laboratory

By regulation, any laboratory analysis of soil, air, or water required under the Division of Spill Prevention and Response must be conducted by a laboratory approved under the Laboratory Approval Program (CS-LAP). SGS Laboratory and the analysis methods to be employed as part of this effort have been approved by the CS-LAP.

7.2 Standard Methods Employed

The following is a summary of the ***NORTECH*** field methods and standard methodologies to be employed during this work. ***NORTECH*** methods to be referenced during this work:

- Soil Sampling Collection Field Procedure – Grayling Native Store
- Equipment Decontamination Field Procedure (v.1)
- PID Field Screening Standardized Methodology
- Standardized Methodology Regulated UST Closure Procedures (v. 4)
- Laboratory Sampling Plan Standardized Methodology (v.4a)

Copies are included in Appendix 2.

7.3 Quality Control Measures

All sampling and field screening activities will be performed using standard industry methods and practices. The selected laboratory is a DEC-certified laboratory and will employ all QA criteria throughout each analysis.

Additionally, all sampling and field screening methods will be performed using tools and instruments that are either single use (disposable) or are free of contamination and will not contribute to false readings in the field or in the laboratory. Field instruments (PID) will be calibrated on a periodic basis in accordance with the procedures manual and the SOP and documented in a field record or logbook. Calibration will be performed in accordance with the manufacturer's specifications. If 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 will also be recorded in the field log.

7.3.1 Quality Control Samples

Required QA/QC will include:

- 10% laboratory blind field duplicate soil & GW samples (with a minimum of one per day)
- Five % laboratory supplied soil & GW trip blank (with a minimum of one per matrix)
- Five % equipment blank (GW)

Results of field duplicate pairs are a QC check on field sampling techniques and laboratory error. 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. Another QC check will be to compare the laboratory limit of quantitation (LOQ) and the lab detection limit (DL) with ADEC cleanup levels.

7.3.2 Laboratory Field Evaluation

The primary tool used to assess data quality will be the ADEC Laboratory Data Review Checklist (LDRC). A LDRC will be completed for each laboratory work order and included in the report with the laboratory reports. The laboratory report case narrative will be reviewed against the ADEC LDRC for potential laboratory QA/QC issues.

7.3.3 Quality Assurance Reporting

QA assessment is a two-step process:

- The first step is to assess the quality of the data generated and to identify and summarize any quality control problems noted after the data and field notes are reviewed.
- The second step is to determine whether or not the quality of the data is sufficient for the intended purpose.

This two-step process will be discussed and summarized in the report along with a concise QA assessment narrative. All laboratory results, including laboratory quality control (QC) sample results, will be reviewed and evaluated for quality and usability. This QA assessment summary will include a discussion of any effects on data quality and/or usability due to field sampling and laboratory quality control discrepancies. The assessment of data quality, at a minimum, will describe the following five (5) parameters for all analytical results with respect to the impact that any discrepancies have on the quality of the data.

1. Precision
    a. Field duplicate(s) - minimum of 1 per every 10 field samples for each matrix sampled, for each target analyte.
    b. Laboratory sample duplicates and/or spike duplicates (Laboratory control samples or matrix spikes).
2. Accuracy
    a. Laboratory QC samples percent recoveries– spikes (laboratory control samples and/or Matrix Spikes).
    b. Surrogate percent recoveries.
3. Representativeness
    a. Degree to which data characterizes actual site conditions.
    b. Consistency with conceptual site model (CSM) and project objectives in the approved work plan.
4. Comparability (if applicable)
    a. Field screening vs. laboratory data correlation.
    b. Standard methods, procedures, quantitation units, and reporting formats between lab reports and between laboratories, if more than one used.
5. Sensitivity and Quantitation Limits
    a. Analytes with limits of detection (LOD) or limits of quantitation (LOQ) greater than the regulatory cleanup levels and/or project required goals.
    b. Blank results (trip blank and method blanks) less than LOD or LOQ.

Once the quality of the data is determined, the data will be evaluated for usability by considering whether data meets project DQO's defined in the work plan. Furthermore, the usability assessment should provide an evaluation of suitability of the data for decision making purposes. All types of data (e.g. sampling, on-site analytical, off-site laboratory) are relevant to the usability assessment.

During this evaluation, the percentage of data that is usable or non-rejected versus the total number of results is quantified. There is an 85% minimum goal for usable data. The usability assessment should be discussed in the QA assessment summary. Laboratory analytical results that have been qualified or rejected should be reported in the following way:

- Biased or rejected should be identified and discussed in the QA assessment summary.
- Laboratory data that is rejected should not be shown in report tables or discussed in the report results.
- Laboratory data that is qualified should be listed with a qualifying flag in the report tables and narrative.

Additionally, analytes that are not detected, but have laboratory quantitation limits greater than the CS program-approved cleanup levels should also be identified in the report tables and text. If corrective actions were taken to address the usability of the data, this will be explained in the QA assessment summary.

7.4 Minimum Quality Assurance Parameters

Minimum Field QC Samples	Applicability	Allowable Tolerance
Field Duplicate (Minimum of 1 per every 10 field samples for each matrix sampled for each target analyte, minimum of 1)	All soil and water samples	Relative percent differences (RPD) less than: 30% water, 50% soil
Decontamination or Equipment Blank (1 per set of 20 similar samples, minimum of one)	Per project specifications	Less than the practical quantitation limit
Trip Blank – Water (1 trip blank per analysis and cooler)	All water samples being analyzed for GRO, BTEX, or VOC	Less than the practical quantitation limit
VOC Trip Blank – Soil (1 trip blank per preservation method per set of 20; a minimum of 1 per analysis and cooler)	All soil samples being analyzed for GRO, BTEX, or VOC	Less than the practical quantitation limit
Temperature Blank or Cooler Temperature (minimum 1 per cooler)	All soil and water samples	Less than 6 °C
Field Blank (1 per set of 20, minimum of 1)	Per project specifications. Used for highly contaminated sites with VOC	Less than the practical quantitation limit

7.5 Laboratory Control Samples

- One per 20 LCS/LCSD required per AK methods, LCS required per SW846
- One LCS and one sample duplicate reported per matrix, analysis and 20 samples
- Percent recoveries for AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages
- Relative percent differences (RPD) reported less than method or laboratory limits and project specified objectives, if applicable. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)
- Matrix and matrix spike duplicates required per matrix and 20 samples and meet analysis-specific criteria
- Surrogates reported for organic analysis and within target %R (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

- Trip blanks and field blanks collected, analyzed and reported

7.6 Field Duplicate Samples

Field duplicates provide a measure of the precision of the sampling process and sample heterogeneity and thus are an important quality control parameter to evaluate. A minimum of one field duplicate will be collected for every 10 field samples for each matrix sampled and for each target analyte. Field duplicates will be collected from locations of known or suspected contamination, and duplicate soil samples will be collected in the same manner and at the same time and location as the primary sample. For a sampling occurring over multiple days, all field duplicates will be collected in one day and the goal should be to collect field duplicates over multiple field days.

Field duplicates will be:

- Submitted as blind samples to the approved laboratory for analysis;
- Given unique sample numbers (or names) and sample collection time; and
- Adequately documented in the field record or logbook.

Field duplicate results should be used to calculate and report a precision value for field sampling quality control according to the following equation:

$$RPD\ (\%) = \left| \frac{\mathrm{R_1} - \mathrm{R_2}}{\frac{(\mathrm{R_1} + \mathrm{R_2})}{2}} \right| \times 100$$

Where:

R1 = Sample Concentration
R2 = Field Duplicate Concentration
An exceedance of the allowable tolerance limits suggests that the precision of the sampling effort is insufficient. Inadequate precision could be due to various issues including poor sampling methodology.

8.0 REPORTING

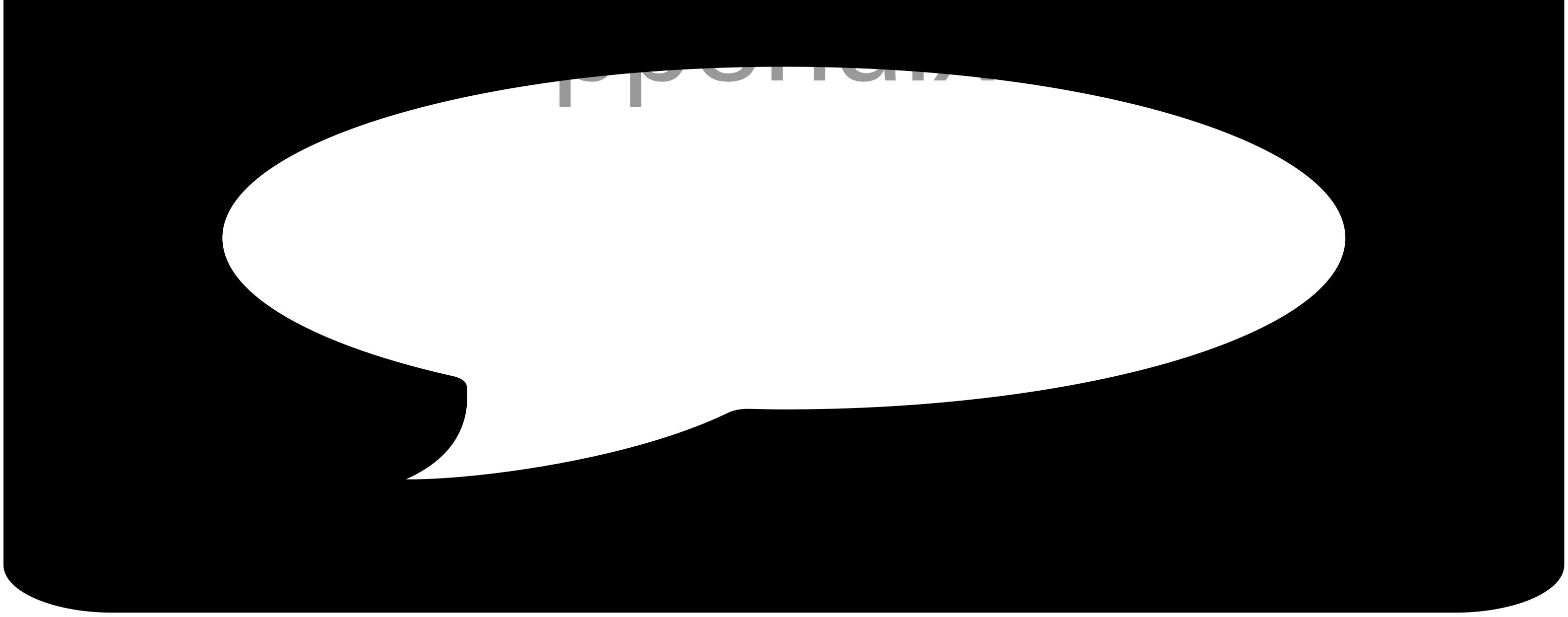
NORTECH will provide draft and final copies of the Release Investigation reports for review by YRITWC, DEC and the community of Grayling. The reports will meet the requirements of DEC UST site assessment (18 AAC 78.090) and release investigation (18 AAC 78.235) requirements. Level II data deliverables will be requested from SGS. Each laboratory analytical report generated for the field assessment will be reviewed by ***NORTECH*** and DEC Laboratory Data Quality Review checklists will be prepared for each. A copy of each laboratory report and completed checklist will be included in the final report appendices.

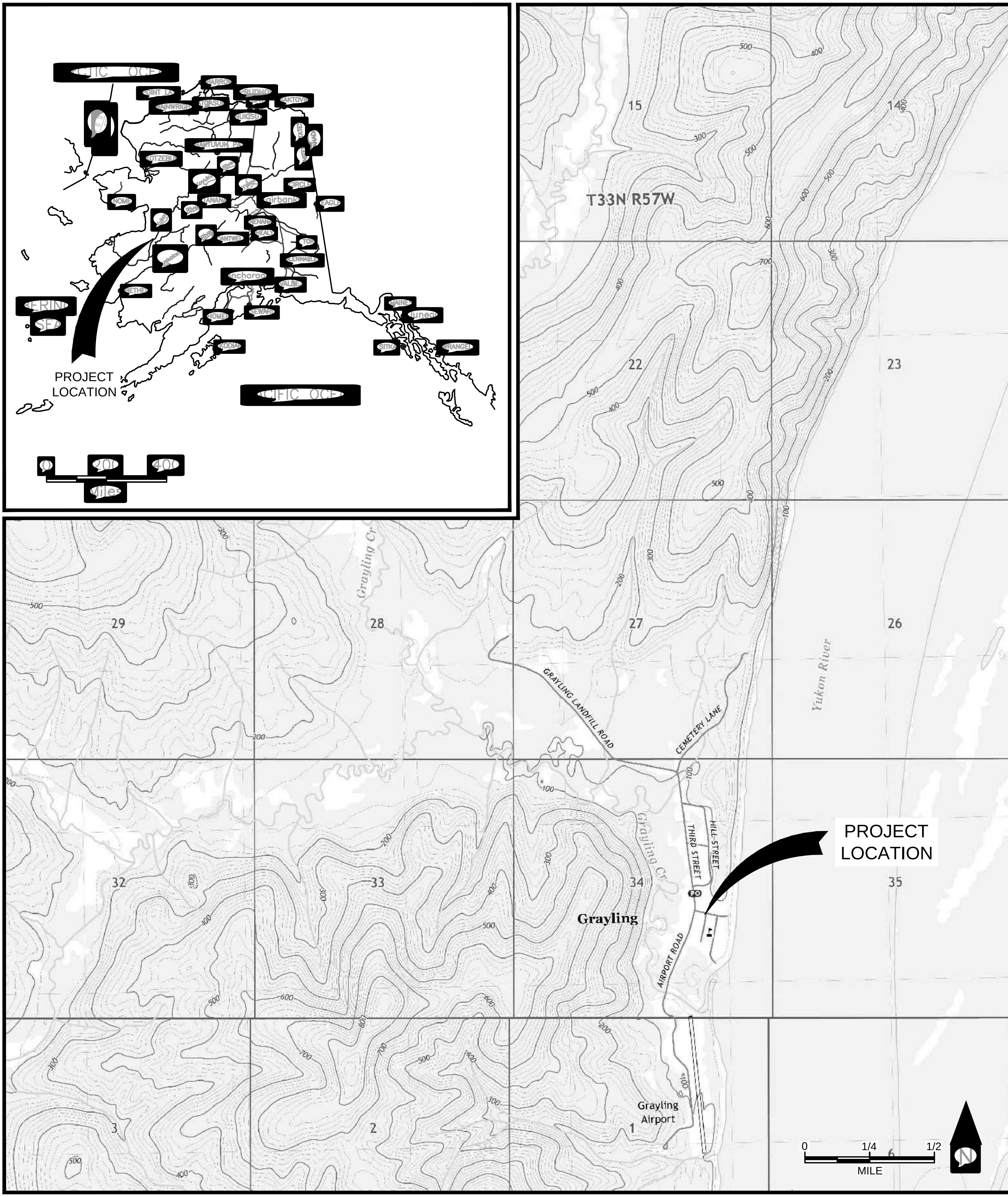
The reports will be presented to all parties in complied PDF format and will generally adhere to the DEC recommended elements of a complete characterization report.

- Cover page and QEP documentation
- Table of contents
- Summary of acronyms and abbreviations
- Executive summary
- Introduction to the site and known history

- Tank owner and site information
- A summary of all field work and sample locations
- Analytical data results, observations, and findings
- Recommendations for remedial techniques that may be applied
- Proposed cleanup levels for the site
- A quality assurance summary of the data, including the LDRC form
- Conclusions and recommendations for further action, as appropriate
- Appropriate tables, figures, and photographs
- All necessary appendices to meet regulatory reporting requirements

In addition, ***NORTECH*** will complete the '*Site Assessment and Release Investigation Summary* Form' and include it with the report. It was also requested that the EPA's '*All Appropriate Inquiries Rule: Reporting Requirements Checklist for Assessment Grant Recipients,'* be completed as well. (These forms are included in Appendix 3 of the Work Plan). This will be included in the reporting. We will also coordinate with YRITWC and stakeholders to determine how the findings intersect with the future use of the site. This may include a discussion of closing the tanks in place, removal, construction on or adjacent to the site, or providing further insight as to long-term management requirements.





NORTECH ENVIRONMENT, ENERGY, HEALTH & SAFETY CONSULTANTS 2400 College Road, Fairbanks, AK. 99709, 907-452-5688 3105 Lakeshore Dr., Anchorage, AK. 99517 907-222-2445 5438 Shaune Dr., Juneau, AK. 99801 907-586-6813	Location Map Native Store UST Investigation Grayling, Alaska	SCALE: As Shown DESIGN: JBC DRAWN: SPH	FIGURE: 1
		PROJECT NO: 23-1009	
		DWG: 231009(gray)a	
		DATE: 07/26/2023	

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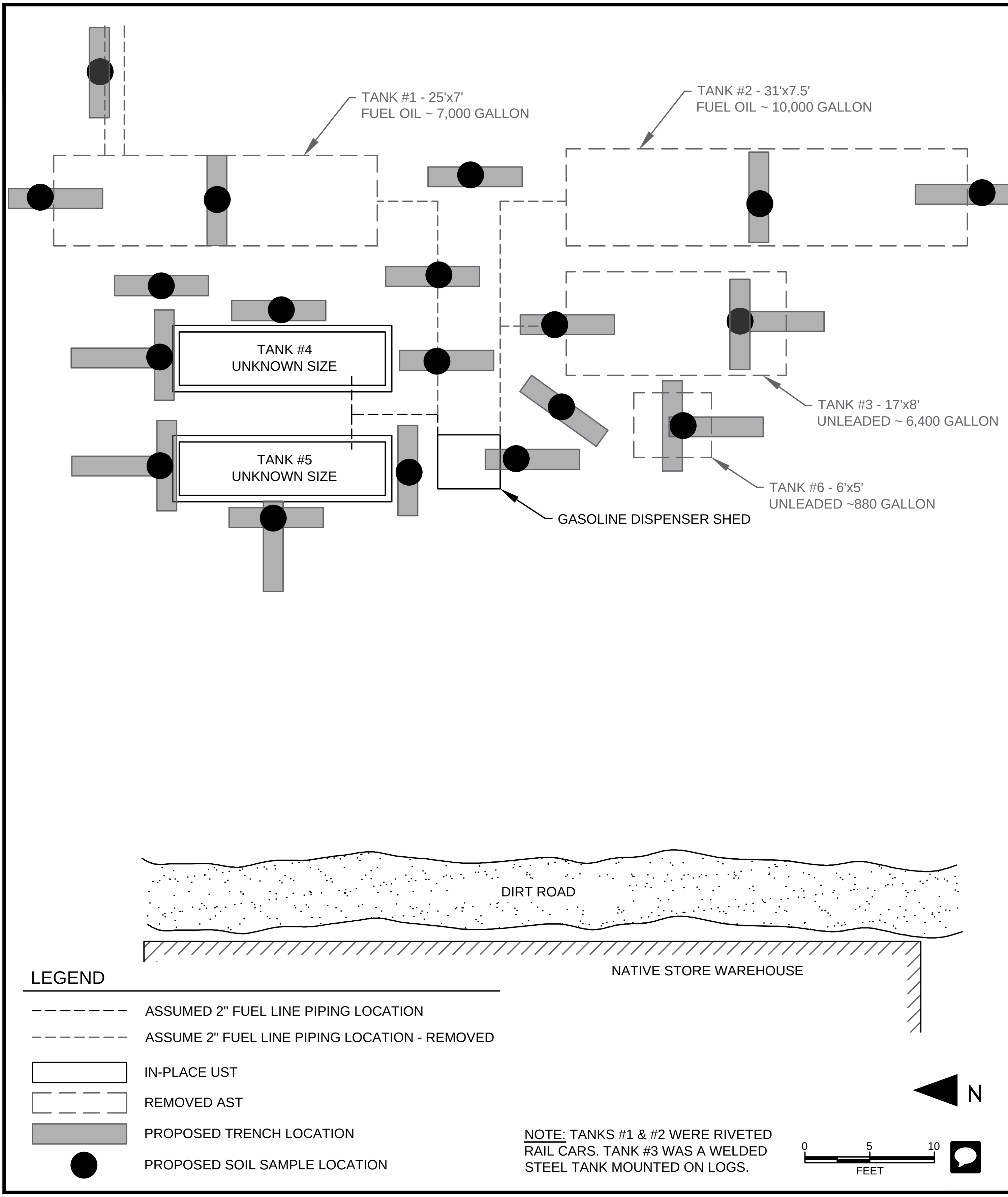
Village Map

Native Store UST Investigation

Grayling, Alaska

SCALE: As Shown		FIGURE: 2
DESIGN: JBC		
DRAWN: SPH		
PROJECT NO:	23-1009	
DWG:	231009(gray)a	
DATE:	07/26/2023	



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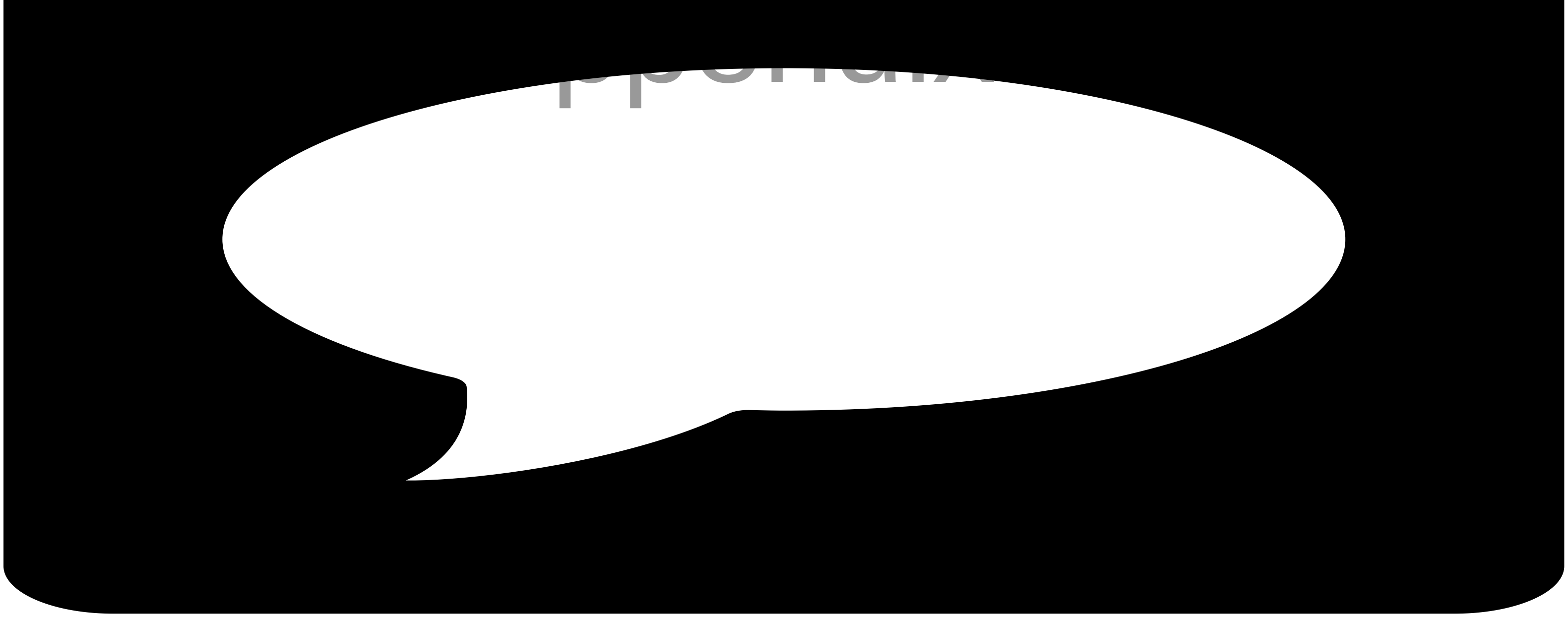
Site Map and Proposed Trenching & Sample Locations

Native Store UST Investigation

Grayling, Alaska

SCALE:	As Shown	FIGURE: 3
DESIGN:	JBC	
DRAWN:	SPH	
PROJECT NO:	23-1009	
DWG:	231009(gray)a	
DATE:	07/26/2023	



SOIL SAMPLE COLLECTION
Field Procedure – Grayling Native Store
Version 1.0
May 16, 2023

This document describes general and specific procedures, methods and considerations to be used and observed when collecting soil samples for field screening or laboratory analysis. It is the intent of this Field Procedure to meet the requirements of current *ADEC Field Sampling Guidance* at the time of sampling.

Objectives

- Provide for the collection of the most representative soil sample for laboratory analyses.

Associated Methods and Materials

1. Field documentation sheets as appropriate (Safety Meeting, Purge Data Sheet, COC, etc.)
2. Field sampling kit (tools, decontamination equipment, replacement parts, etc.)

Equipment

1. Sampling tools as appropriate for the sampling approach (Field Sampling Kit)
2. Appropriate Personal Protective Equipment for site conditions

Procedures

1. Precautions for Trace Contaminant Soil Sampling

a. A clean pair of new, non-powdered, disposable gloves will be worn each time a different sample is collected, and the gloves should be donned immediately prior to sampling. The gloves should not come in contact with the media being sampled and should be changed any time during sample collection when their cleanliness is compromised.

b. Sample containers with samples suspected of containing high concentrations of contaminants shall be handled and stored separately.

c. All background samples shall be segregated from obvious high-concentration or waste samples. Sample collection activities shall proceed progressively from the least suspected contaminated area to the most suspected contaminated area. Samples of waste or highly contaminated media must not be placed in the same ice chest as environmental (i.e., containing low contaminant levels) or background samples.

d. If possible, one member of the field sampling team should take all the notes and photographs, fill out tags, etc., while the other member(s) collect the samples.

e. Samplers must use new, verified/certified-clean disposable or non-disposable equipment cleaned according to decontamination procedures (Field Proc. No. 2), for collection of samples for trace metals or organic compound analyses.

2. Homogenization

a. If sub-sampling of the primary sample is to be performed in the laboratory, transfer the entire primary sample directly into an appropriate, labeled sample container(s). Proceed to step (d).

b. If sub-sampling the primary sample in the field or compositing multiple primary samples in the field, place the sample into a stainless-steel container and mix thoroughly. Each aliquot of a composite sample should be of the same approximate volume.

c. All soil samples must be thoroughly mixed to ensure that the sample is as representative as possible of the sample media. Samples for VOC analysis are not homogenized. The most common method of mixing is referred to as quartering. The quartering procedure should be performed as follows:

   i. The material in the sample pan should be divided into quarters and each quarter should be mixed individually.

   ii. Two quarters should then be mixed to form halves.

   iii. The two halves should be mixed to form a homogenous matrix.

d. Place the sample into an appropriate, labeled container(s) by using the alternate shoveling method and secure the cap(s) tightly. The alternate shoveling method involves placing a spoonful of soil in each container in sequence and repeating until the containers are full or the sample volume has been exhausted. Threads on the container and lid should be cleaned to ensure a tight seal when closed.

3. **'Dressing' Soil Surfaces** - Any time a vertical or near vertical surface is sampled, such as achieved when shovels or similar devices are used for subsurface sampling, the surface should be dressed (scraped) to remove smeared soil to allow for sample collection of no less than 6 inches, but preferably 12 inches. This is necessary to minimize the effects of contaminant migration interferences due to smearing of material from other levels.

4. **Soil Sample Collection for Volatile Organic Compounds (VOC) Analysis** - If samples are to be analyzed for VOCs, they will be collected in a manner that minimizes disturbance of the sample. Samples for VOC analysis are not homogenized. Preservatives may be required for some samples with certain variations of Method 5035. Consult the method or the principal analytical chemist to determine if preservatives are necessary.

   Core type samplers are preferred to reduce loss of volatiles during sampling. A stainless-steel spoon or scoop may also be used. The sampling tools will be called out in the field sampling work plan.

   a. Collection of AK101 or VOC samples – VOCs will be preserved in the field with methanol.

      i. Dress the sampling area to enable collection of samples at a depth of 6 -12 inches below present exposed face.

      ii. Collect a minimum of 25 grams of soil with minimum disturbance directly into tared 4-oz or larger jar with a Teflon®-lined septum fused to the lid. Interim storage/containers (e.g., re-sealable polyethylene bags) are not allowed.

      iii. Immediately after collection, if the jars are not pre-preserved with methanol, carefully add 25-mL aliquot of methanol (methanol must include a surrogate for method AK101) until the sample is submerged and then seal the lid on the jar. This step must be completed as quickly as possible, within approximately 10 seconds of placing the soil in the sample jar.

iv. For low level VOC analysis, place a five-gram soil sample into a 40 mL vial with 10 mL of deionized water. Quickly brush any soil off the vial threads and immediately seal the vial and freeze the sample to less than 0˚C. The sample vial should be placed on its side while being frozen and transported to the laboratory.

v. Do not place tape, including evidence tape, on the sample container directly.

vi. Cool and retain samples at less than 6ºC except for frozen low-level VOC samples.

vii. Collect a sample of the same material from the same location in an unpreserved jar for percent moisture determination.

viii. Collect appropriate field and laboratory quality control samples (see workplan for sampling requirements).

ix. Collect sample parameters in the following order:

1. Volatile Organic Compounds (VOCs, AK101 GRO, BTEX),
2. Semi-volatile organic compounds (SVOCs); including pesticides, herbicides, DRO, RRO, and PCBs,
3. Total Organic Carbon (TOC), and
4. Metals.

x. Soils that are frozen in-situ (< -7˚C) may not be required to be preserved immediately for VOC analysis as specified above. In these cases, the soil must be maintained frozen (< -7˚C) in appropriate containers and sub-sampled and preserved as soon as practical. The soil must not be thawed prior to sub-sampling and preservation. Sub-sampling and preservation must follow the procedure specified above.

5. **Manual Sampling Methods** – These methods are used primarily to collect surface soil samples (within 2 feet of surface). Remove near surface matted root zone, gravel, concrete, etc., prior to sample collection.

a. Spoons/Scoops – May be used for to depths of approximately 6 inches from the exposed area. The use a core sampler may preclude volatile loss when sampling for volatiles.

b. Hand Augers - Hand augers may be used to advance boreholes and collect soil samples in the surface and shallow subsurface intervals. Typically, 4-inch stainless steel auger buckets with cutting heads are used. The bucket is advanced by simultaneously pushing and turning using an attached handle with extensions (if needed).

i. Surface soil sampling – Advance bucket to appropriate depth, remove and transfer contents to homogenization container, unless sampling for volatiles whereby the sample is collected directly from the auger bucket and retained in accordance with volatile sampling procedures.

ii. Subsurface soil sampling - Auger holes are advanced one bucket at a time until the sample depth is achieved. When the sample depth is reached, the bucket used to advance the hole is removed and a clean bucket is attached. The clean auger bucket is then placed in the hole and filled with soil to make up the sample and removed. Transfer contents to homogenization container, unless sampling for volatiles whereby the sample is collected directly from the auger bucket and retained in accordance with volatile sampling procedures.

6. **Backhoe Sampling Method** – Backhoes may be used in the collection of surface and shallow subsurface soil samples. The trenches created by excavation with a backhoe offer the capability of collecting samples from very specific intervals and allow visual correlation with vertically and horizontally adjacent material. If possible, the sample should be collected without entering the trench or excavation. Samples may be obtained from the trench wall or they may be obtained directly from the bucket at the surface. The following sections describe various techniques for safely collecting representative soil samples with the aid of a backhoe.
    a. **Scoop and Bracket Method** - If a sample interval is targeted from the surface, it can be sampled using a stainless-steel scoop and connecting bracket.
        i. First a scoop and bracket are affixed to a length of conduit or extension pole and is lowered into the backhoe pit.
        ii. Use the scoop and scrape away the soil comprising the surface of the excavated wall to a sampling depth of 6 – 12 inches. This material likely represents soil that has been smeared by the backhoe bucket from adjacent material.
        iii. After the smeared material has been scraped off, the original stainless-steel scoop is removed and a clean stainless-steel scoop is placed on the bracket.
        iv. Use the clean scoop to remove sufficient volume of soil from the excavation wall to make up the required sample volume.
    b. **Direct from Bucket Method** - It may be effective to collect soil samples directly from the backhoe bucket at the surface. To ensure representativeness, it is important to <u>dress</u> the surface to be sampled by scraping off any smeared material that may cross-contaminate the sample prior to sample collection. Remove 6 – 12 inches of surface cover prior to sample collection. Collect sample parameters in the following order:
        i. Volatile Organic Compounds (VOCs, AK101 GRO, BTEX),
        ii. Semi-volatile organic compounds (SVOCs); including pesticides, herbicides, DRO, RRO, and PCBs,
        iii. Total Organic Carbon (TOC), and
        iv. Metals.
7. **Direct Push Sampling Methods** – For the collection of samples within a thin-walled liner. Ensure that the surface is free of concrete, gravel, asphalt prior to sample collection.
    a. Special Considerations
        i. Liners are available in brass, stainless steel, cellulose acetate butyrate (CAB), polyethylene terephthalate glycol (PETG), polyvinyl chloride (PVC) and Teflon®. For most field investigations, the standard polymer liner material for a sampling tool will be acceptable. When the study objectives require very low reporting levels or unusual contaminants of concern, the use of more inert liner materials such as Teflon® or stainless steel may be necessary and will be identified in the field sampling plan.

ii. Core catchers may be necessary to use if the material being sampled lacks cohesiveness. The suitability of the material will be evaluated prior to use.

iii. The cutting shoe and piston rod point must be decontaminated between each sample location using the appropriate field decontamination procedure. Additional components of the sample barrel, rods, drive head may be subject to an abbreviated cleaning to remove loose material between boreholes.

iv. Boreholes must be decommissioned after completion using 30% solids bentonite grout or pellets, poured from the surface and hydrated in lifts.

b. Large Bore Sampler

i. A solid barrel direct push sampler equipped with a piston-rod point assembly used primarily for collection of depth-discrete subsurface soil samples. The sample barrel is approximately 30-inches (762 mm) long and has a 1.5-inch (38 mm) outside diameter. The LB® sampler is capable of recovering a discrete sample core 22 inches x 1.0 inch (559 mm x 25 mm) contained inside a removable liner. The resultant sample volume is a maximum of 283 mL

ii. After the LB® sample barrel is equipped with the cutting shoe and liner, the piston-rod point assembly is inserted, along with the drive head and piston stop assembly. The assembled sampler is driven to the desired sampling depth, at which time the piston stop pin is removed, freeing the push point. The LB® sampler is then pushed into the soil a distance equal to the length of the LB® sample barrel. The probe rod string, with the LB® sampler attached, is then removed from the subsurface. After retrieval, the LB® sampler is then removed from the probe rod string. The drive head is then removed to allow removal of the liner and soil sample.

c. Macro-Core Soil Sampler

i. The Macro-Core® (MC) sampler is a solid barrel direct push sampler equipped with a piston-rod point assembly used primarily for collection of either continuous or depth-discrete subsurface soil samples. The standard MC® sampler has an assembled length of approximately 52 inches (1321 mm) with an outside diameter of 2.2 inches (56 mm). The MC® sampler is capable of recovering a discrete sample core 45 inches x 1.5 inches (1143 mm x 38 mm) contained inside a removable liner. The resultant sample volume is a maximum of 1300 mL. The MC® sampler may be used in either an open-tube or closed-point configuration.

d. Dual Tube Soil Sampling

i. The Dual Tube 21 allows for collecting continuous core samples of unconsolidated materials from within a sealed outer casing of 2.125-inch (54 mm) OD probe rod. The samples are collected within a liner that is threaded onto the leading end of a string of 1.0-inch diameter probe rod. Collected samples have a volume of up to 800 mL in the form of a 1.125-inch x 48-inch (29 mm x 1219 mm) core. Use of this method allows for collection of a continuous core inside a cased hole, minimizing or preventing cross-contamination between different intervals during sample collection. The outer casing is advanced, one core length at a time, with only the inner probe rod and core being removed and replaced between samples. If the sampling zone of interest begins at some depth below ground surface, a solid drive tip must be used to drive the dual tube assembly and core to its initial sample depth.

8. **Split Spoon Sampling/Drill Rig Methods** – Split spoons are split cylindrical barrels that are threaded on each end. The leading end is held together with a beveled threaded collar that functions as a cutting shoe. The other end is held together with a threaded collar that serves to attach the spoon to the string of drill rod.

   A drill rig is used to advance a borehole to the target depth. The drill string is then removed and a standard split spoon is attached to a string of drill rod. Split spoons used for soil sampling must be constructed of stainless steel and are typically 2.0-inches OD (1.5-inches ID) and 18-inches to 24-inches in length. Other diameters and lengths are common and may be used if constructed of the proper material. The following general procedures are used to obtain the sample.

   a. After the spoon is attached to the string of drill rod, it is lowered into the borehole.
   b. The safety hammer is then used to drive the split spoon into the soil at the bottom of the borehole.
   c. After the split spoon has been driven into the soil, filling the spoon, it is retrieved to the surface, where it is removed from the drill rod string and opened for sample acquisition.
   d. Disregard the top 3 inches of the sample, and collect potential samples from individual layers, or across length of exposed core, depending on field work plan objectives.
   e. Collect field screening samples in similar manner order to record associated PID readings.
   f. Discard samples not submitted for laboratory analyses.

References

1. 18 AAC 75 Oil and Other Hazardous Substances Pollution Control (November 2021)
2. 18 AAC 78 Underground Storage Tanks (September 2019)
3. ADEC Division of Spill Prevention and Response, Contaminated Sites Program, Field Sampling Guidance (January 2022)
4. ADEC Underground Storage Tanks Procedures Manual Guidance for Treatment of Petroleum-Contaminated Soil and Water and Standard Sampling Procedures (March 2017)
5. Region 4 USEPA Science and Ecosystems Support Division, Operating Procedure, Soil Sampling, SESDPROC-300-R3 (August 2014)

Attachments

1. Sample Collection Reference Guide – Soil, Sediment, Sludge, Fill Material

Analytical SOP Requirements Tables
Sample Collection Reference Guide – Soil, Sediment, Sludge, Fill Material

Parameter	Analytical Method[1]	Container Description (Minimum) [Clear glass may be substituted for amber if samples are protected from exposure to light]	Preservation/ Holding Time
Gasoline Range Organics**	AK101*	4 oz. amber glass, TLS	Methanol preservative, 0º to 6ºC / 28 days
Diesel Range Organics	AK102*	4 oz. amber glass, TLC	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
Residual Range Organics	AK103*	4 oz. amber glass, TLC	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)[4]	8021B or 8260D	4 oz. amber glass, TLS	Methanol preservative, 0º to 6ºC / 14 days
Volatile Organic Compounds (VOCs)[4]	8260D	4 oz. amber glass, TLS	Methanol preservative, 0º to 6ºC / 14 days
Volatile Aliphatic and Aromatic Petroleum Hydrocarbons (VPH)	NWTPH-GX	4 oz. amber glass, TLS	Methanol preservative, 0º to 6ºC / 14 days
Extractable Aliphatic and Aromatic Petroleum Hydrocarbons (EPH)	NWTPH-Dx	4 oz. amber glass, TLS	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
Dibromomethane 1,2-	8011 or 504.1 or 8260D	4 oz. amber glass, TLS	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
1,4-Dioxane[6]	8260D or 8260B	4 oz. amber glass, TLS	Methanol preservative, 0º to 6ºC / 14 days
Semi-volatile Organic Compounds (SVOC)	8270E	4 oz. amber glass, TLC	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
Polynuclear Aromatic Hydrocarbons (PAH)[2]	8270E or 8310	4 oz. amber glass, TLC	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
Fraction Organic Carbon	Lloyd-Kahn or 9060 or mod Walkley- Black	4 oz. amber glass, TLC	0º to 6ºC /14 days
Pesticides	8081B or 8270E	4 oz. amber glass, TLC	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
Herbicides	8151A	4 oz. amber glass, TLC	0º to 6ºC / 14 days to extraction, 40 days to analysis of extract
Polychlorinated Biphenyls (PCBs)[5]	8082A	4 oz. amber glass, TLC	0º to 6ºC /None, 40 days to analysis of extract (recommended)
Per-and Polyfluoroalkyl Substances (PFAS)	Consult with CS Program for Method, Container, and Holding Times[8]		

Parameter	Analytical Method[1]	Container Description (Minimum) [Clear glass may be substituted for amber if samples are protected from exposure to light]	Preservation/ Holding Time
Metals †	6010D or 6020B or 7000 series	100mL Wide mouth HDPE or amber glass jar[3], TLC	None / 6[7] months

Notes:
Several of the 7000 series methods have been deleted from SW846 but these methods may still be approved in a CSP site-specific work plan. Check the laboratory's approval status. The sampling and analysis of soil parameters for alternative cleanup level calculations is discussed in CSP technical memos located here: http://dec.alaska.gov/spar/csp/guidance_forms/csguidance.htm.

[1]Unless otherwise noted, all preparation and analytical methods refer to the most current of EPA's Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846.

[2]Naphthalene can be analyzed by 8021B or 8260D if naphthalene is the only PAH contaminant of concern.

[3]HDPE, High Density Polyethylene or amber glass sample collection bottles, certified clean for trace metals analysis.

[4]May be analyzed out of AK101 methanol preserved sample.

[5]PCBs must be prepared using extraction method 3540C or 3550C.

[6]High temperature sample preparation techniques by EPA Method SW-846 may be required to improve the recovery and achieve lower detection limits.

[7]If bioassays or toxicity testing is to be conducted with metals, then anoxia may need to be maintained, and analyses should occur within 24 hours after sample collection, unless the test method dictates otherwise. Consult the CSP Project Manager for more project specific guidance.

8Sampling and preservation considerations are discussed in a ITRC fact sheet located here: http://dec.alaska.gov/spar/csp/guidance_forms/csguidance.htm.

†Hexavalent Chromium can be analyzed with EPA methods 7199 (modified) or 7196A.

Table derived from 2019 ADEC Field Sampling Guidance

EQUIPMENT DECONTAMINATION
Field Procedure No. 2
Version 1.0
March 10, 2021

When possible, sufficient equipment should be transported to the field so that the investigation may be completed without decontamination. When not possible, this document describes general and specific procedures, methods and considerations to be used and observed when cleaning and decontaminating sampling equipment during the course of field investigation and remedial actions. Prior to mobilization to a site, it is expected that the types of contaminants have been evaluated to determine appropriate field cleaning and decontamination activities necessary. It is the intent of this Field Procedure to meet the requirements of current *ADEC Field Sampling Guidance* at the time of sampling.

Objectives

- Provide for the safe and efficient cleaning and decontamination of equipment in the field.
- Prevent potential for cross contamination during field activities.
- Prevent the transfer of site contamination to an offsite area through implementation of proper field cleaning techniques.

Associated Methods and Materials

1. Field Documentation
2. Field documentation sheets as appropriate (Safety Meeting, Purge Data Sheet, COC, etc.)

Equipment

1. Field sampling kit (tools, decontamination equipment, replacement parts, etc.)
2. Safety kit (phone, gloves, goggles, hard hat if appropriate, emergency medical kit, etc.)

Procedure

1. **Decontamination Areas**
    a. Select an appropriate area to conduct decontamination activities, such as sampling and drilling equipment, that is presumed free of contamination.
    b. A temporary pad Use a liner placed below the decontamination area if water used in decontamination processes is not to be captured in other containers.
    c. Water should be removed from the pad frequently.
    d. The decontamination area should be deactivated upon completion of project, and the ground surface inspected, and sampled if there is indication of materials leaking through the pad.
2. **Sampling Devices used during/for Collection of Trace Organic and Inorganic Compounds**
    The following procedures should be used for sampling equipment or components of equipment that come into contact with the sample (i.e., water level indicators, interface probes).
    a. An optional detergent wash step may be useful to remove gross dirt and soil (i.e., Liquinox OR Simple Green).

b. Clean with tap water and detergent using brush, if necessary, to remove particulate matter and surface films.

c. Rinse thoroughly with tap water.

d. Rinse thoroughly with organic-free or deionized water and place on foil-wrapped surface to dry.

e. Wrap dry equipment with aluminum foil or bag in clean plastic.

3. Down Hole Pump Equipment

a. Purge Pump Cleaning for Sampling Groundwater

   i. Disconnect and discard previously used sample tubing and remove check valve tubing adapters and clean separately using brush, detergent and tap water, followed with deionized water rinse.

   ii. Prepare and Prepare and fill three containers large enough to hold the pump and one to two liters of solution. An array of 2’ long 2” PVC pipes with bottom caps is a common arrangement. The solutions should be changed at least daily and contain the following decontamination solutions:

      a. Container #1, a tap water/detergent washing solution. An additional pre-wash container of Liquinox® may be used;

      b. Container #2, a tap water rinsing solution; and

      c. Container #3, a deionized or organic-free water final rinsing solution.

      d. Choice of detergent and final rinsing solution for all steps in this procedure is dependent upon project objectives (analytes and compounds of interest).

   iii. Place pump in Container #1 and circulate detergent water through pump, then turn pump off.

   iv. Place pump in Container #2 and circulate tap water through pump, then turn pump off.

   v. Place pump in Container #3 and circulate de-ionized water through pump, then turn pump off.

   vi. Disconnect power and removed pump, and rinse exterior and interior of pump with fresh deionized water.

   vii. Decontaminate power lead by washing with detergent and water, followed by tap water and deionized water rinses.

   viii. Reassemble check valve and tubing adapters to pump, using Teflon tape to prevent galling of threads.

   ix. Place pump and reel in clean plastic bag until next use.

b. Peristaltic Pumps

   i. All pump equipment is either dedicated to a site or discarded. No decontamination of equipment is anticipated.

c. Other Pumps

i. Individual pumps may require specific techniques not documented in this Field Method. In those instances, the variance will be documented in the sampling plan associated with the use, until such time that this method is revised.

4. Downhole Drilling Equipment General Requirements

a. A steam cleaner or high-pressure hot water washer capable of generating 2500 pounds per square inch (psi) and producing hot water and/or steam, with a detergent compartment is preferred.

b. All equipment arriving at a site must have been properly cleaned prior to arriving onsite.

c. Daily inspections are necessary to ensure that oils, grease and hydraulic fluids are not leaking.

5. Field Decontamination of Drilling Equipment

a. Wash with tap water and detergent, using a brush if necessary to remove particulate material and surface films. Steam cleaning with detergent may alternatively be used, including interior of hollow-stem augers.

b. Drilling equipment that is cleaned should be stored on racks or clean plastic sheeting.

c. Rinse all augers, rods, screens, and split-spoon samplers with tap water.

6. **Field Decontamination of Direct Push Equipment**

a. All equipment that encounters sample media should be cleaned per Section 2 - Sampling devices used for trace organic and inorganic compounds.

b. All equipment that does not encounter the sample media and is cleaned in the field for reuse can be cleaned in general accordance with Section 5 - Field Decontamination of Drilling Equipment.

c. Stainless steel SP15/16 well screens require special care as the narrow slots are difficult to clean under even controlled circumstances and galvanic corrosion can release chrome from the screen surface. As soon as possible after retrieval, the screen slots should be sprayed from the outside to break loose as much material as possible before it can dry in place. To prevent galvanic corrosion, the screens must be segregated from the sampler sheaths, drive rods, and other carbon steel during return transport from the field.

References

1. 18 AAC 75 Oil and Other Hazardous Substances Pollution Control, as amended through October 27, 2018.
2. ADEC Division of Spill Prevention and Response, Contaminated Sites Program, Field Sampling Guidance, October 2019.
3. USEPA Region 4 Operating Procedure, Field Equipment Cleaning and Decontamination, SESDPROC-205-R3, December 18, 2015.

PID FIELD SCREENING STANDARDIZED METHODOLOGY
Version 4
June 2019

Field Screening Equipment Description
A hand-held Air Monitor/Photoionization Detector (PID, PhotoVac 2020, MiniRAE, or similar) will be the instrument used to field screen the soils for total volatile organic contaminants. 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 MiniRAE 3000 (and other PIDs) 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 MiniRAE PID are as follows:

Instrument:	MiniRAE -3000 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)

Field Screening Methodology
NORTECH proposes to use a PID for all soil field screening to be conducted during the characterization and remedial action effort in the following manner:

The headspace method of field screening will be used in general accordance with the ADEC Field Sampling Guidance (FSG), August 2017. 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 (app. 250 ml).

The bag is closed, sealed and headspace vapors are allowed to develop for at least 10 minutes and not more than one hour. The bag will be agitated for approximately 15 seconds at the beginning and end of the headspace development period. The soil and headspace will be tested at a temperature of at least 40° F (5° 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. The highest PID reading from each sample will be recorded in the project field notes for inclusion in the final report.

Calibration will be performed in accordance with the manufacturer's specifications. If 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 will also be recorded in the field log.

Site Specific 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. ***NORTECH***'s experience with recent heating oil releases is that results generally show a good relationship between PID and laboratory results. PID results at this site more than 20 ppm almost always exceeding the ADEC cleanup level for one or more heating oil COCs.

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 experience, for 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.

Site-specific Field Screening and Sampling Objectives
The site-specific field screening and sampling plan for this project is relatively simple. Field screening will be conducted at all known locations that had been impacted by contamination. Field screening will be conducted for primary purposes as indicated below:

1. To assess the areas suspected of having contaminated soil and to confirm the removal of the contaminated soil
2. To identify laboratory confirmation soil sampling locations
3. To characterize any additional excavated and stockpiled soil material for disposal purposes.

For the purposes of this document, the field screening approach is described below by the following areas of assessment:

- Excavated soil
- Stained areas
- Areas with odors
- Excavation limits

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NORTECH

SUSTAINABLE ENVIRONMENT, ENERGY, HEALTH & SAFETY PROFESSIONAL SERVICES

STANDARDIZED METHODOLOGY
REGULATED UST CLOSURE PROCEDURES
September 2019 (Version 4)

This describes the procedures and methods to be completed by ***NORTECH*** and a contractor to close a regulated underground storage tank (UST) in Alaska.

Tank closure by removal will be completed in general accordance with the American Petroleum Institute (API) Recommended Practice 1604 *Closure of Underground Petroleum Storage Tanks*. The following summarizes the general work sequence for tank preparation, excavation, stockpiling, screening, testing, analysis, and reporting with overlap where possible. The outline is further divided into responsibility and timeline.

Contractor Responsibilities

- Up to one week before UST removal
  - Contact the local fire department and notify them of the removal
  - Ensure all fuel from the dispensers and fuel lines have been drained back into the tank
  - Turn off and disconnect all tank/dispenser monitoring; electrical connections at monitoring station
  - Cap and secure all openings including fill pipe, gauge pipe vapor recovery fitting and vapor return
  - Contract a vendor to remove any remaining diesel fuel from the tank
  - Complete underground utilities locate if not already completed

- One to two days before UST removal
  - Remove concrete pad over tank(s)
  - Eliminate all potential sources of ignition (i.e. smoking, sparking equipment and tools, non-essential personnel and equipment)
  - Ground and/or bond tank to avoid the generation of static electricity during work
  - Measure the remaining fuel in the tank bottom
  - Hand pump any remaining fuel/sludge/water mixture from the tank
  - Inert the tank of oxygen and flammable vapors by crushing and evenly distributing 15 pounds of dry ice for each 1000 gallons; or
  - Purge the tank of flammable vapors using an eductor or air diffuser
  - Purge the fuel lines of residual fuel
  - Plug all tank holes except for vent line
  - Remove outer dispenser housing

- UST removal day(s)
  - Excavate to the top of the tank
  - Divert surface water by berming soil around the excavation to prevent direct entry of stormwater into the excavation
  - Keep bermed soil and equipment at least two feet from the edge of excavation
  - Remove gauge pipe, submersible pump, drop tube, vapor recovery connection and/or other fixtures if any
  - If able, clean the tank in the ground using hot water spray and a vacuum truck in the ground after checking for oxygen and/or flammable vapors

- Leave the vent pipe, plug all tank holes except for a 1/8 inch vent line and stickup
- Excavate around the tank and piping for removal while ***NORTECH*** screens soil for petroleum and stockpile according to screening results
- Plug abandoned fuel lines where lines are inaccessible or are to remain
- Sweep the top of the tank and sides to remove excess soil
- Remove the tank and/or any piping not specified to remain
- Haul labeled and secured tank and piping to property for cutting and cleaning offsite or secure tank on ground away from the excavation and secure to prevent rolling for cutting and cleaning onsite
- After tank is rechecked for oxygen and flammable vapors, add additional dry ice if needed
- Cut a large hole in each end of the tank using a non-sparking tool to access removal of any sludge or scale
- Tip the tank and jet rinse the tank with water , washing the sludge to one end then pump into drum for disposal (if not completed or not thorough while tank was in the ground)
- Manually scrape any remaining caked on scale, remove and drum
- Dry the tank with absorbent pads if sheen remains and drum
- Finish cutting the tank and dispose – obtain disposal receipts
- Haul contaminated soil to treatment facility
- Backfill the open excavation
- Demobilize

NORTECH Responsibilities

In addition to overseeing tank decommissioning, ***NORTECH*** will complete a site characterization/assessment in accordance with the Alaska Administrative Code (AAC) 78.090 Site Characterization and Assessment.

- 15-60 days before UST removal
  - Complete and submit an Intent-To-Close to ADEC at least 15 days, but no more than 60 days, before beginning the closure and site assessment work

- Up to one week before UST removal
  - Coordinate with earthwork contractor to ensure utility locates and fire department notification are completed
  - If contamination is suspected or known, complete an ADEC *Transport, Treatment, & Disposal Approval Form* for Contaminated Media for signature

- UST removal day(s)
  - Oversee and direct operator(s) and laborer(s) during tank closure
  - Regularly test the tank atmosphere and surrounding area for oxygen content or flammable vapors using a combustible gas indicator (CGI) and oxygen meter before and during removal activities
  - Screen soil for petroleum hydrocarbons using a photoionization detector (PID) during all stages of excavation, direct stockpile location according to screening
  - Screen final UST excavation limits and collect soil samples
  - Screen stockpiles and collect soil samples for analysis at a licensed laboratory
  - Recheck the tank atmosphere for oxygen levels and flammable vapors before cutting and cleaning begins
  - Demobilize

- Post UST removal
  - Complete Post Closure notice and submit to ADEC within 30 days of closure
  - Acquire any contractor disposal receipts and/or manifests
  - Prepare SA/Tank Removal Report

In accordance with API 1604, vapors during purging or inerting should be exhausted through the vent pipe reaching a minimum of 12 feet above grade and 3 feet above rooflines. ***NORTECH*** will routinely test air for oxygen and flammable/combustible vapor levels in the excavation and other below grade areas on-site; at ground level, especially near the vent; and, in the tank (after initiating vapor-freeing procedures). The tank will be considered inert and safe for removal when the O_2 level measured in the top, middle, and bottom of the tank reaches the target range of 6-7% 0_2.

If the tank is to be purged of flammable vapors, the tank will be considered purged and safe for removal when the lower explosive limit (LEL) reaches the target range of less than 10 % measured in the top, middle, and bottom of the tank.

If the tank is to be hauled offsite for cleaning, the contractor should place the excavated tank on a flatbed truck and secure tightly to the truck to prevent movement. As outlined in API 1604, the tank should be labeled with legible letters at least 2 inches high as shown similar to the API example:

TANK CONTAINED DIESEL
NOT VAPOR FREE
NOT SUITABLE FOR FOOD STORAGE/LIQUIDS FOR HUMAN/ANIMAL CONSUMPTION
REMOVED: MONTH/DAY/YEAR

- Before cleaning, recheck the tank atmosphere for oxygen levels or flammable vapors before cutting and cleaning begins

LABORATORY SAMPLING PLAN
STANDARIZED METHODOLOGY
Version 4a
May 1, 2023

Laboratory Sampling Plan
This document provides the standard methodology used to obtain and analyze the site samples. In general, laboratory sampling will be conducted for the following four primary purposes:

1. To assess the surface and sub-surface soil environment in the subject area for potential contaminants
2. To provide confirmation of contaminant removal from the surface and subsurface soil environment in areas impacted by the contaminant(s)
3. To assess, if necessary, the groundwater environment at the Site for potential impacts resulting from contaminant migration from the source area(s) (if groundwater is encountered)
4. To characterize excavated soil material generated during the investigation for disposal purposes (if applicable)

For the purposes of this document, the laboratory sampling approach is described below by the following areas:

- Surface soil sampling of suspect areas
- Surface and sub-surface soil sampling of the impacted area to define the horizontal and vertical extent of contamination.
- Groundwater sampling at a location adjacent to ponded water or river within 100 feet of tank area

NORTECH will collect all laboratory soil and groundwater samples in general accordance with the Alaska Department of Environmental Conservation (DEC) January 2022 Field Sampling Guidance (FSG) document. All project soil and groundwater 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. A minimum of one duplicate sample will be collected for each ten samples submitted to the laboratory. If multiple days of sampling are required, a minimum of one duplicate sample will be collected each day. A minimum of one trip blank will accompany each set of volatile samples submitted to the lab

The contaminants of concern (COC) for the characterization and corrective action effort (confirmation samples) are listed in the site-specific work plan or site sampling plan. Typical fuel contaminants are: gasoline range organics (GRO), diesel range organics (DRO), and benzene, toluene, ethylbenzene, and xylenes (BTEX).

Specific laboratory analyses for these types of contaminates are:

- GRO by Alaska method AK 101
- DRO/RRO by Alaska method AK102/103
- VOCs by EPA Method 8021 o0r 8260D
- SVOCs by EPA Method 8270E
- PAHs by EPA Method 8270E-SIM

Should the contaminate(s) of concern be other than the above listed or should a deviation be necessary, the site-specific plan will identify those changes, deviations, and any additional required analysis.

NORTECH typically uses SGS Environmental Services in Anchorage, Alaska as the analytical laboratory for all laboratory samples needed for this project. SGS was used during the soil sampling previously conducted at the Site and is an ADEC approved laboratory.

Soil Sampling
Soil samples will be collected from various locations and depths during the project effort. All soil samples will be collected of freshly exposed soils using clean or disposable sampling tools.

In general, surface soil sampling (0-2 feet of the ground surface) will be conducted to determine the presence of contamination, or confirm that contamination has been removed from the site to the applicable cleanup limits. Surface sample locations will be determined by the field screening results and samples will be collected using hand tools. Sub-surface soil sampling (>2 feet) will be conducted to assess the potential presence of contaminants and to characterize contaminant concentration which may remain in the sub-surface soil environment. Sub-surface soil samples will be collected from cores recovered from direct-push borings advanced through the subsurface environment, or from soil removed by excavator or equipment.

Groundwater Sampling
Existing groundwater wells and the temporary sampling points are not present on site; however, it is possible that hand-driven points may be installed to collect groundwater screening samples if it is determined that they will provide beneficial information to the project. If installed, they will be purged and sampled using low-flow techniques, or a submerged bailer. Purging will consist of the removal of about three well volumes and/or until the suspended silt is minimized. One sample will be collected from each groundwater sampling point. At least one field duplicate will be collected for every ten samples submitted.

Soil and Groundwater Cleanup Limits
Laboratory analyses of groundwater samples collected during this investigation will include GRO, DRO, RRO, and VOCs contaminants using the methodologies described above. All project soil and groundwater laboratory sample results will be compared to the site-specific soil and groundwater cleanup limits provided in the following tables:

ADEC Method 2 Limits

Contaminant of Concern	Soil (mg/Kg)*	Groundwater (mg/L)**
GRO	300	2.2
DRO	250	1.5
RRO	10,000	1.1
Benzene	0.022	0.0046
Toluene	6.7	1.1
Ethylbenzene	0.13	0.015
Total Xylenes	1.5	0.190
VOCs	Various per Table B1	Various per Table C
SVOCs	Various per Table B1	Various per Table C
Lead	400 mg/kg	15 μg/L

* 18 AAC 75.341. Soil cleanup levels; Tables B1 and B2 (Under 40 Inch Zone) Migration to groundwater.
**18 AAC 75.345. Groundwater and surface water cleanup levels Table C.