

**POST-STOCKPILE REMOVAL  
SAMPLING AND ANALYSIS PLAN**

**WRANGELL JUNKYARD SITE  
WRANGELL, ALASKA**

**ADEC File # 1529.38.006  
AUGUST 25, 2018**



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## ACRONYMS AND ABBREVIATIONS

|       |  |
|-------|--|
| AAC   | Alaska Administrative Code                       |
| ADEC  | Alaska Department of Environmental Conservation  |
| DRO   | Diesel Range Organics                            |
| E&E   | Ecology & Environment                            |
| EPA   | Environmental Protection Agency                  |
| FSG   | Field Sampling Guidance (ADEC)                   |
| mg/Kg | Milligrams per kilogram                          |
| NRC   | NRC Alaska LLC                                   |
| PAH   | Polycyclic Aromatic Hydrocarbon(s)               |
| QA/QC | Quality Assurance and Quality Control            |
| RCRA  | Resource Conservation and Recovery Act           |
| SAP   | Sampling and Analysis Plan                       |
| SPLP  | Synthetic Precipitation Leaching Procedure       |
| START | Superfund Technical Assessment and Response Team |
| TCLP  | Toxicity Characteristic Leaching Procedure       |
| tvoc  | Total Volatile Organic Compounds                 |
| µg/L  | Microgram per Liter                              |



## **1.0 EXECUTIVE SUMMARY**

The Wrangell Junkyard (Site) is owned by the City and Borough of Wrangell (CBW) and has been the subject of ongoing environmental assessment and remedial investigations since 2001. Initial assessments were completed between 2001 and 2014. Numerous recognized environmental concerns (RECs) were identified at the Site as a result of the former salvage operations conducted at the Site. These RECs included, but were not limited to, large volumes of solid waste remaining at the Site, drum caches with unidentified contents, numerous burn pits and areas of soil contamination in exceedance of applicable cleanup standards. The primary REC at the Site was the widespread distribution of lead waste and lead contaminated soil across most of the Site. In areas, lead concentrations in the soil exceeded the residential cleanup limit of 400 mg/kg by more than a factor of 125. Additional contaminants including petroleum, oil, and lubricants (POLs), metals, volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) were also identified in the soil at the site.

In 2016, the Alaska Department of Environmental Conservation (ADEC) contracted NRC Alaska to conduct an emergency cleanup action at the Site. The Remedial Action had two primary objectives; the removal of all remaining solid waste debris from the Site and the removal of all contaminated soil from the Site to residential cleanup limits.

The Remedial action resulted in the removal of remaining solid waste debris from the Site. Solid waste consisted mainly of automotive parts, including axles, tires, engine blocks and transmissions, and various construction materials which were loaded into shipping containers with POL contaminated soils for off-site disposal. Woody solid debris was burned by NRC Alaska at the former Wrangell Institute site and the resulting ash was collected and disposed of with other debris. NRC Alaska shipped a total of 22 drums and 57 containers of contaminated debris from the Site to appropriately permitted treatment, storage and disposal facilities (TSDF) in the Lower 48.

Approximately 18,350 cubic yards of lead contaminated soil was excavated from the Site. This soil material was treated with ECOBOND<sup>®</sup>, and stockpiled in engineered containment cells at the Site. Post treatment sampling of the stockpiled soil confirmed the lead in the containment cells is non-leachable and the stockpiled material is not a RCRA regulated hazardous waste, but rather polluted soil under State regulations.

In 2018, NRC Alaska was awarded a contract to remove the stockpiled soil material from the Site. This material is being removed from the existing stockpile, loaded into containers and is being transported off-site to an approved TSDF in the lower 48.

Per ADEC request, the NRC Alaska Project Team is providing this Post-Stockpile Removal Sampling and Analysis Plan (SAP). This SAP describes the field screening and laboratory sampling methodologies that will be used to assess the soil beneath the treated stockpile footprint after the treated material has been completely removed from the Site. The purpose of this investigation is to assess if contaminants have migrated from the stockpile and affected the underlying soil and to confirm that no contamination remains at the Site subsequent to the removal of the treated stockpiled material.



## 2.0 BACKGROUND

### 2.1 Site Location and Description

The Wrangell Junkyard property (Site) is located at 4 Mile Zimovia Highway, Wrangell, Alaska 99929 (Figure 1). Situated north of the highway, the property is located approximately 150 feet from Zimovia Strait (Figure 2). The parcel number of the property is 03-006-303, Lot Y2, Tract Y, United States Survey (USS) 2321, and is recorded as covering 2.51 acres. The property is located in Township 63 South; Range 38 East; Section 7; Copper River Meridian. The Site latitude is 56.4227° N and longitude 132.3563° W.

The property is currently undeveloped with no permanent structures.

#### 2.1.1 Geology

Wrangell Island is characterized by relatively low, rugged mountains that were cut by steep-sided glacial valleys. Glaciation deepened pre-existing valleys to form U-shaped valleys and rounded mountain peaks and ridges. The bedrock on Wrangell Island consists primarily of sedimentary and intrusive rocks of Cretaceous and Jurassic age. The sedimentary rocks consist of marine mudstone and fine-grained, rhythmically bedded, graywacke turbidities of the Seymour Canal Formation. Minor amounts of limestone are also present in the sedimentary complex. Regional metamorphism has resulted in recrystallization of the sedimentary rocks to sericitic slate or subphyllite, with isoclinal folding and kink bands. Other rock types on the island include andesitic to basaltic volcanic rocks. Intrusive rocks in the vicinity of the site include small plutons and batholiths of granodiorite, tonalite, and subordinate quartz diorite that are part of the Coast Range. Bedrock is exposed at low tide on northern Wrangell Island. Further inland, where covered by surficial deposits, bedrock may be more than 30 feet below land surface. Soils at the Wrangell Junkyard Site were previously stripped to a blue-gray silt soil.

#### 2.1.2 Soils

Surface soils at the Wrangell Junkyard Site were previously stripped to a blue-gray silt soil horizon approximately three to five feet beneath the former ground surface. The silt horizon is of glacial origin, contains numerous large granitic boulders and is highly impermeable. Prior to removal, native Site soils generally consisted of organic silty loam overlying the silt hardpan. Past disturbances to the native soils at the Site resulted in the introduction of various fill materials including sand, gravel, shot rock, boulders and coarse woody organics mixed into the matrix. Bedrock was not encountered at the Junkyard Site.

#### 2.1.3 Groundwater

Specific groundwater data for Wrangell and for the Site specifically is limited. Groundwater in this area is usually shallow with variable depths due to the presence of the glacial till that controls groundwater flow. Although ground water exists within surficial sediments and bedrock surrounding Wrangell, there is no known substantial ground water supply capable of sustaining the entire community of Wrangell (Cederstrom 1952). However, domestic wells supplied drinking water to residences near the site prior to the City of Wrangell providing municipal water to this area. Presently, these wells are no longer in use.



#### 2.1.4 Surface Water

The nearest surface water body to the Site is Zimovia Strait which is located approximately 150 feet to the west of the Site. Two intermittent surface water drainages exist north and east of the Site. These channels were constructed to collect surface water run-off originating from the forested hillside to the north and east of the Site and divert this water around the property. For the purposes of this document, these drainages are herein referred to as the northeast drainage and the northwest drainage. Both of the drainages convey water to the roadside ditches along Zimovia Highway where this water then flows beneath the highway via culverts and into Zimovia Strait.

#### 2.2 Site History

Site use prior to the 1960s is unknown, but the property is presumed to have been undeveloped. Property records and other sources indicate that Mr. Virgil Byford purchased the property in the early 1960s and began salvage yard operations shortly after under the name Byford Salvage. The salvage yard accepted most solid waste, including automobiles, tires, car and boat batteries, boats, drums and other scrap metal. In addition, Mr. Byford operated a lead foundry in one of the two main shop buildings located at the Site.

In 1994, Mr. Byford sold the property to Mr. Curtis Gibb, who intended to continue salvage operations. Mr. Gibb removed several loads of scrap metal from the Site for recycling. In 2008, the City and Borough of Wrangell (CBW) foreclosed on the property due to unpaid property taxes.

#### 2.3 Previous Environmental Investigations

In March 2016, ADEC contracted NRC Alaska LLC (NRC Alaska) to conduct a Remedial Action at the Wrangell Junkyard Site under the Spill Prevention and Response (SPAR) Term Contract 18-7002-01. NRC Alaska completed the Remedial Action in August 2016. The two primary objectives of the project included; the removal and disposal of all drums and solid waste materials remaining on the Site, and the excavation and treatment of the lead contaminated soil material.

Approximately 18,350 cubic yards of lead contaminated soil was excavated from the Site. All lead contaminated soil was treated and stabilized with ECOBOND®, and placed in engineered containment cells on the northwestern portion of the property. TCLP and SPLP analysis results confirm the lead in the containment cells is non-leachable. The test results also showed that the stockpiled material was not a RCRA regulated hazardous waste, but rather polluted soil under State regulations.

Large oversized rocky material (6"+) was segregated and used as backfill in the northeast portion of the Site. Other debris consisted mainly of automotive parts, including axles, tires, engine blocks and transmissions, which were loaded into shipping containers with POL contaminated soils for off-site disposal. NRC Alaska burned woody debris at the former Wrangell Institute site and ash was disposed of with other debris. NRC Alaska shipped a total of 22 drums and 57 containers contaminated debris from the Site to appropriately permitted facilities in the Lower 48.

Analytical results of all soil samples collected at the limits of excavation confirmed that the site met the residential cleanup criteria for lead, petroleum, and other suspected contaminants of



concern. The excavated area was backfilled with clean material and stabilized to reduce the potential for erosion.

In June, 2018, NRC Alaska began the removal of the stockpiled material from the Site. The removal effort is expected to be completed by mid-October of 2018.

### 3.0 SCOPE OF WORK

In 2018, ADEC contracted NRC Alaska to remove, containerize and transport the lead contaminated soil material from the Site to an approved out-of-State treatment storage and disposal facility (TSDF). This SAP was written to address the post-removal assessment of the soil beneath the stockpile footprint.

The stockpile containment cells were constructed upon areas that had previously been excavated to clean limits as confirmed by XRF field screening and laboratory soil sample results in 2016. The purpose of this investigation is to assess the soil underlying the footprint of the stockpile for potential contaminant migration from the overlying stockpile and to confirm that all contamination has been removed from the Site to applicable cleanup limits prior to Site closure.

After NRC Alaska has completed the removal of the lead contaminated soil stockpile from the Site, **NORTECH** will conduct an environmental assessment of the soil beneath the former stockpiling area. This sampling investigation will include the following activities:

- Field screening of exposed soil beneath the stockpile footprint.
  - Screen samples for lead using a Niton XRF instrument
  - Screen samples for total volatile organic compounds with a PID instrument
- Oversee excavation of any soil material identified as contaminated via field screening results (if necessary)
- Collect confirmation laboratory soil samples at final limits
- Provide a written report documenting the Investigation

After receiving the final analytical results and confirmation that all soil samples meet the applicable residential cleanup criteria for lead, petroleum, and other suspected contaminants of concern, site restoration will be completed in accordance with the approved Site Restoration Plan (to be submitted under separate cover).

### 3.1 Lines of Authority

The Alaska Department of Environmental Conservation (DEC) Spills Prevention and Response (SPAR) is the administrator of the project to transport lead contaminated soil material from the Wrangell Junkyard Cleanup Site to an out of state treatment, storage and disposal facility (TSDF). This project is being completed under the State Emergency Cleanup Fund as ADEC AR Term Contract 18-7002-01. The DEC Contaminated Sites (CS) Project Manager for this effort is Sally Schlichting.

NRC was awarded the contract for removal of the lead contaminated material. **NORTECH** was sub-contracted by NRC to provide qualified environmental personnel (QEPs) and professional environmental engineering services in support of the soil removal project. SGS Laboratory, Anchorage, Alaska was sub-contracted by **NORTECH** to provide analysis of project related samples.



## 4.0 METHODOLOGY

Soil field screening and soil sampling for this project will be conducted in general accordance with the ADEC's *Field Sampling Guidance* dated August 2017 (FSG), and **NORTECHs** standardized field screening and laboratory sample collection methodologies. These methodologies have been developed based on industry standards, laboratory guidance, and in general accordance with the August 2017: DEC Field Sampling Guidance, 18 AAC 78 (FSG).

### 4.1 Stockpiled Soil Removal Methodology

The following is a narrative summary description of the methodology currently being used to remove the stockpiled soil material from the Site. It is included here for reference purposes.

A typical profile of the existing soil stockpile at the site includes, from top to bottom:

- A 20-mil HPDE cover
- The treated and stockpiled soil (between about 10-25 feet in thickness)
- A 40-mil stockpile liner
- A felt liner
- A "sacrificial" layer of D1 crushed rock approximately two inches in thickness
- A layer of six-inch crushed rock between six inches to more than one foot in thickness
- The glacial till hardpan at the limits of the 2016 remedial excavation effort.

Procedurally, the 20 mil-HPDE stockpile cover is first removed from the current working area where soil is being removed. An excavator is used to remove the soil material from the stockpile and load the material into transport containers situated within the active working zone. When full, the transport containers are inspected, cleaned of any loose material, then lifted from the loading area and placed onto a truck for transportation to the off-site staging area. Containers are then loaded onto a barge for transportation to an approved off-site TSDf in Eastern Oregon.

Eventually, the soil removal work progresses to a point where the stockpile liner is exposed. The liner and underlying felt are then removed from the bottom and sidewalls of the containment cell and containerized for disposal with soil material waste. The "sacrificial" layer of D1 is also removed and containerized for disposal leaving the base course of crushed rock in place as the new clean working area.

As the removal effort continues further into the stockpile, this process is repeated. The removal effort is conducted in a manner such that the excavation equipment and loading process remain within the active work zone to prevent potential tracking of contaminated soil outside the work zone. The equipment loading containers to the transport truck(s) remain on a clean work surface and do not enter the current work zone or come in contact with contaminated soil material.

The stockpile removal process commenced at the easternmost portion of the stockpile area. The easternmost rock containment berm was removed to provide equipment access to the stockpiled soil. All other containment berms will remain in place until confirmation that all contaminated soil material has been removed from the Site to applicable cleanup limits through soil sampling and laboratory analysis. The rock containment berms will then be dismantled and the material will be spread and incorporated into the final grading of the Site during the site restoration.





#### 4.2 Post-Removal Stockpile Footprint Field Screening

**NORTECH** will conduct field screening of the soil beneath the stockpile footprint for lead and POL contaminants. Field screening will be conducted after the complete removal of the stockpiled soil material, the stockpile liner, the underlying felt liner and the base course of six-inch shot rock overlying the glacial till silt soil horizon. The glacial till silt marks the furthest extent of excavation during the 2016 remedial action. The till layer was previously assessed through field screening and confirmed to meet all applicable cleanup limits through laboratory soil sample analysis prior to construction of the stockpile in 2016.

Field screening samples will be collected on a 20 foot by 20 foot sampling grid. Field screening samples will be collected at the grid nodes or at the nearest location along the perimeter of the stockpile footprint. Figure 3 shows a generalized diagram of the field screening locations proposed for this investigation. Additional screening samples may be collected in any areas where stockpiled soil material (tan to brown in color) are visually observed to be present on the glacial till surface (blue gray in color).

Each field screening sample will be analyzed for total volatile organic compounds (tvoc) using a photo-ionization detector (PID) and headspace monitoring methodologies. Each sample will also be field screened for lead using a Niton X-ray Fluorescence (XRF) instrument. Further detailed descriptions of these field screening methodologies are provided in Appendix B.

#### 4.3 Post-Removal Stockpile Footprint Soil Sampling

**NORTECH** will collect soil samples for laboratory analysis after the completion of field screening effort. Laboratory soil samples will be collected at a minimum of 15% of the field screening locations. Soil sampling locations will be determined based on several considerations.

The first consideration will be choosing locations so that the entire stockpile footprint has been adequately represented. To accomplish this, the stockpile footprint will be divided into three sub-units (shown on Figure 3), and the total number of soil samples will be evenly distributed within these sub-units. Within each sub-unit, sampling locations will be selected based on the locations with the highest field screening results.

It should be noted that the highest field screening results for tvocs within each sub-unit may not correspond to the highest screening results for lead within the same sub-unit. Therefore, laboratory samples will be collected at the aforementioned minimum frequency for the various target analytes.

All laboratory soil samples will be collected using stainless steel hand tools and/or clean disposable sampling tools. **NORTECH** will decontaminate reusable tools between samples. Laboratory samples will be collected in general accordance with the FSG and **NORTECH's** Standard Methodologies (Appendix B). Laboratory samples will be collected directly into clean glassware provided by the laboratory, preserved as required, 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. Sample analysis will be 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 will be collected by a Qualified Environmental Professional as described in 18 AAC 75.390(b).



**4.4 Contaminants of Potential Concern and Pertinent Cleanup Levels**

The contaminants of concern (COCs) for this sampling effort are based on the results of the previous sampling efforts, most specifically, the March 2018 treated stockpile soil characterization sampling results. Lead, DRO and RRO are the COCs identified for this sampling effort.

The ADEC Method Two cleanup levels for soil and groundwater are typically used as cleanup goals for sites managed through the DEC contaminated sites program. DEC has developed the Method 2 cleanup levels to be protective of human health and the environment under the wide range of conditions found in Alaska. These cleanup levels are provided in 18 AAC 75. All project sample results will be compared to current ADEC cleanup levels for soil (Tables B1 and B2).

**Site Cleanup Levels for Soil Samples**

| Contaminant of Concern | Exposure Pathway and Soil Cleanup Limits mg/Kg |       |
|------------------------|--|-------|
| DRO                    | Direct Contact; >40" zone                      | 230   |
| RRO                    | Direct Contact; >40" zone                      | 8,300 |
| Pb (Total)             | Human Health; >40" zone                        | 400   |

Notes:  
 DRO & RRO in soil were compared to ADEC Table B2-Method Two Cleanup Levels  
 Pb in soil were compared to ADEC Table B1-Method Two Cleanup Levels

**5.0 LABORATORY ANALYSIS**

Soil samples will be collected from a minimum of nine locations for lead analysis and a minimum of nine locations for DRO and RRO analysis within the stockpile footprint. As noted above, the total number of samples will be distributed evenly amongst the three sampling sub-units of the stockpile to adequately represent the entire area. Each sample collected for lead analysis will be collected as a surface sample, between the top of the till layer and three inches below ground surface (bgs). Sample collected for DRO and RRO analysis will be collected at each location at a minimum of six-inches bgs. **NORTECH** will collect all soil samples using stainless steel and/or disposable hand tools as described in Section 4.2.

In order to compare results to the most stringent applicable cleanup levels listed in 18 AAC 75 Tables B1 and B2, soil samples will be analyzed for the following:

- o Total Pb (Lead) by Method 6020A
- o DRO by Method AK102
- o RRO by Method AK103

**5.1 Quality Control Measures**

In order to ensure data is of sufficient quality to compare to 18 AAC 75 Tables B1 and B2, 18 AAC 75 Table C, 18 AAC 70 WQS, and ADEC WQCM Cleanup Levels, collection of field duplicate(s) and sample Trip Blanks will follow the ADEC FSG Table 3 – *Minimum Quality Control Requirements*. A minimum of one duplicate sample will be collected for each matrix sampled, each day sampling occurs, and per each ten samples submitted to the laboratory. Duplicate samples will be submitted to the lab blind.



A minimum of one trip blank will be submitted to the laboratory per cooler containing volatile samples submitted to the laboratory. **NORTECH** will use SGS America in Anchorage Alaska for analysis of all laboratory samples collected for this project. SGS is an ADEC certified laboratory for all listed analytes.

## 6.0 PROJECT TIMELINE

**NORTECH** will conduct the sampling activities as outlined in this work plan, upon completion of the removal of the stockpiled soil material and upon ADEC approval of the workplan. The following is an anticipated schedule for the activities proposed within this work plan:

| Project Milestone                 | Anticipated Date       |
|-----------------------------------|------------------------|
| Submit workplan                   | August 2018            |
| Begin Sampling activities         | Mid-October 2018       |
| Laboratory Results Received       | October-November, 2018 |
| Submit Report of Sampling Results | November 2018          |

## 7.0 REPORTING

All project related field activities will be recorded in field notes. Photographic documentation will also be conducted during field activities. Field notes will include an explanatory narrative of the work completed during field activities. The investigation report will include a narrative description of the field investigation, the findings of the investigation, summaries of the laboratory data, an analysis of the field and laboratory sampling data, and will provide site-specific conclusions and recommendations based on field observations and laboratory findings.

## 8.0 LIMITATIONS

While **NORTECH** believes that the activities and methods described in this work plan are appropriate, reasonable alternative field procedures may be used to perform the activities necessary under this contract. Alternative procedures may be necessary based on changes that have occurred on the site, unforeseen site conditions, and/or changes in ADEC requirements. If necessary, alternative methodology implemented by **NORTECH** will be appropriate, safe, within industry standards, and approved by ADEC as necessary.



**9.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS**

**Ronald J. Pratt** is a Senior Environmental Scientist for **NORTECH**. Mr. Pratt is a Qualified Environmental Professional as defined in 18 AAC 75.390(b), with more than 20 year of professional environmental consulting experience in California, Washington, and Alaska.

**Jason Ginter**, PMP, Principal and Juneau Technical Manager for **NORTECH**, is a Qualified Environmental Professional as defined in 18 AAC 75.390(b), and has extensive experience conducting hazardous materials investigations, property assessments, and other environmental fieldwork throughout Alaska.

Primary Author Signature

**Ronald J. Pratt**  
Senior Environmental Professional

Principal Reviewer

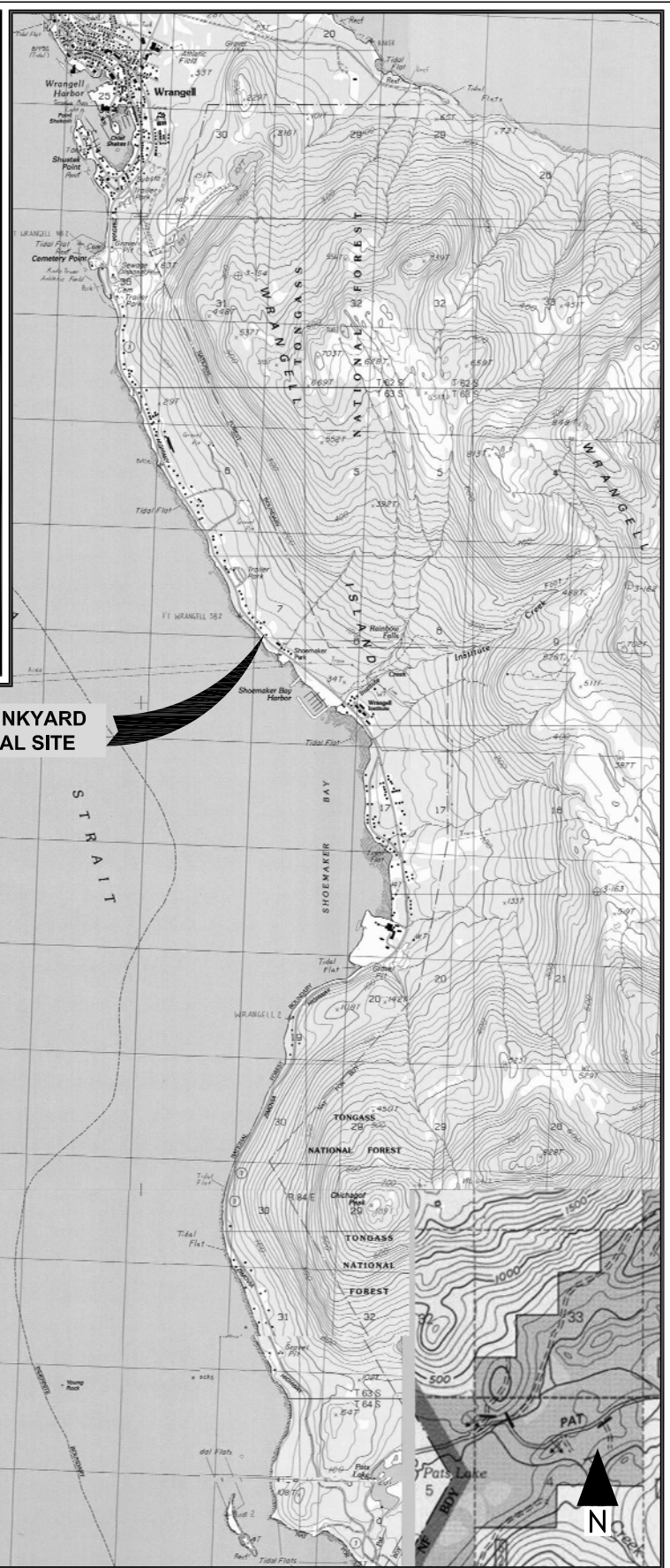
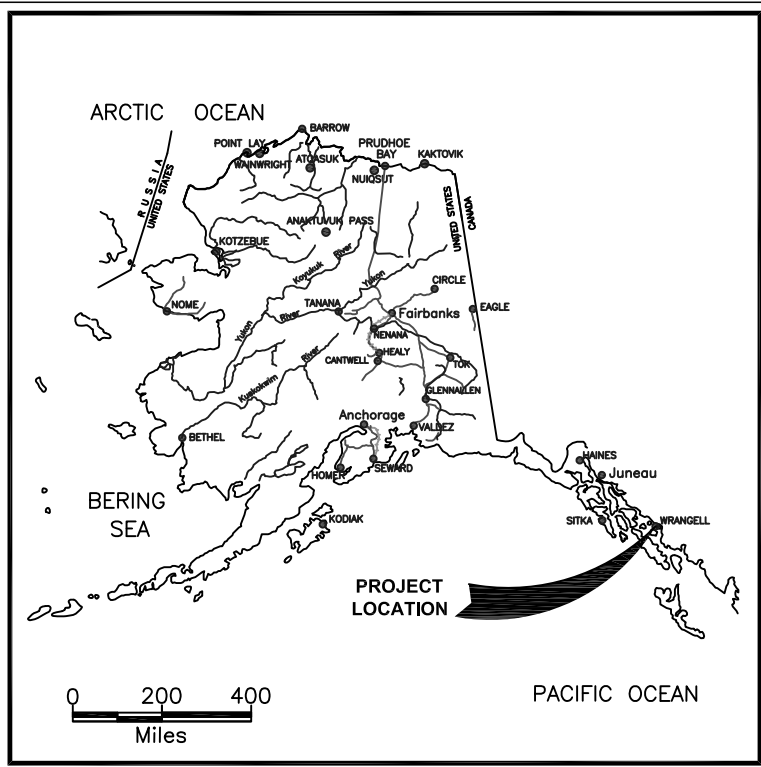
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## **APPENDIX A**

## **FIGURES**



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Site Location Map

Former Byford Junkyard – Soil Stockpile Removal

4 Mile Zimovia Highway, Wrangell, Alaska

ADEC AR Term Contract 18-70020-01

|                     |         |
|---------------------|---------|
| SCALE: 1" = 1 Mile  | FIGURE: |
| DESIGN: JHG         | 1       |
| DRAWN: RJP          |         |
| PROJECT NO: 18-2781 |         |
| DWG: 182781b(01)    |         |
| DATE: 08/24/2018    |         |



ZIMOVI STRAIT

STOCKPILE

STOCKPILE

STOCKPILE

PROPERTY BOUNDARY

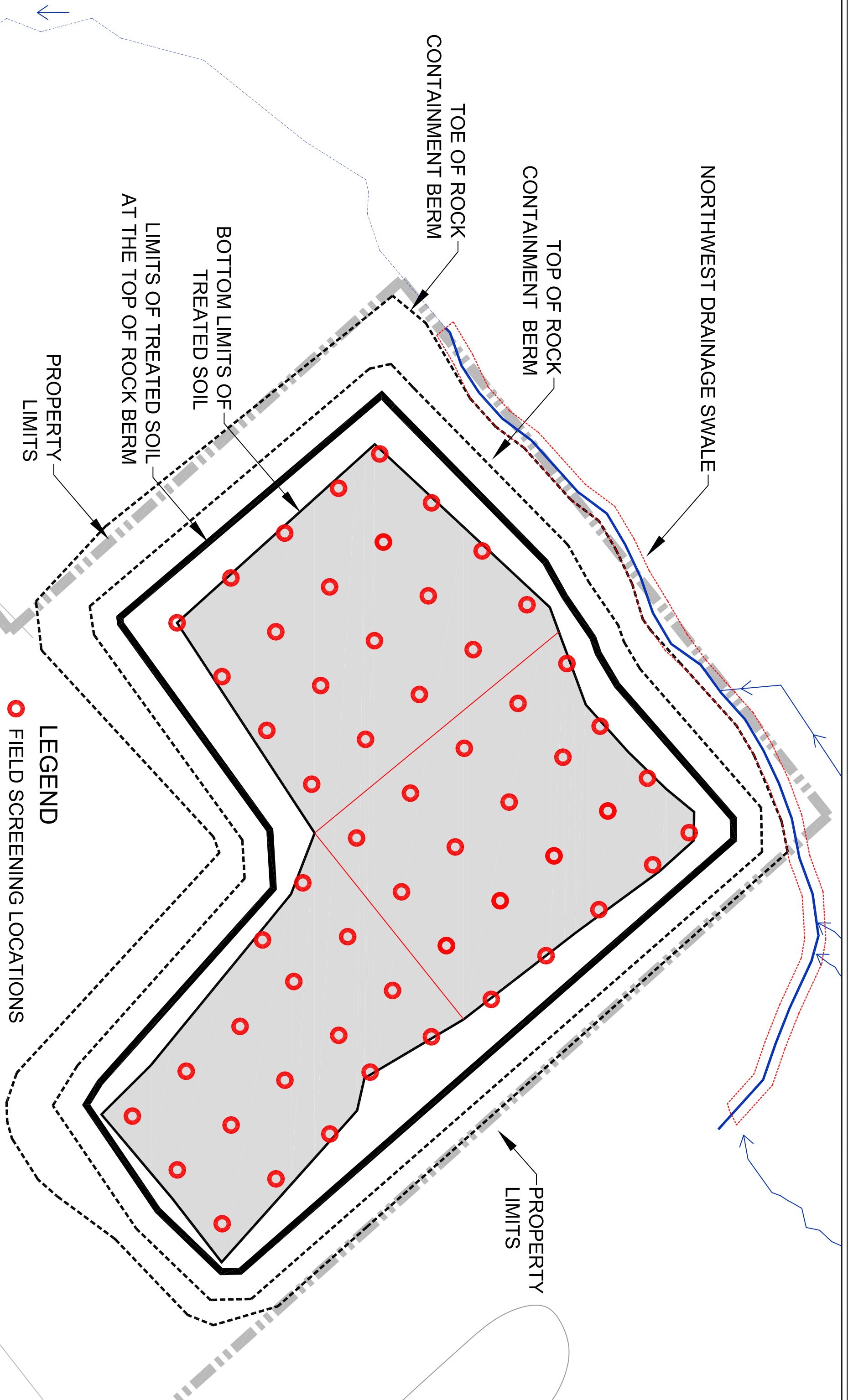
ZIMOVI HIGHWAY



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Site Map  
 Former Byford Junkyard - Soil Stockpile Removal  
 4 Mile Zimovia Highway, Wrangell, Alaska  
 ADEC AR Term Contract 18-70020-01

|                     |              |
|---------------------|--------------|
| SCALE: 1" = 100'    | FIGURE:<br>2 |
| DESIGN: JHG         |              |
| DRAWN: RJP          |              |
| PROJECT NO: 18-2781 |              |
| DWG: 182781b(02)    |              |
| DATE: 08/24/2018    |              |



**LEGEND**  
 ● FIELD SCREENING LOCATIONS



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Post-Removal Soil Stockpile Field Screening Sample Diagram  
 Former Byford Junkyard – Soil Stockpile Removal – 4 Mile Zimovia Highway, Wrangell, Alaska  
 ADEC AR Term Contract 18-70020-01

|                  |                       |
|------------------|-----------------------|
| DATE: 08/23/2018 | SCALE: 1" = 25'       |
| PROJ MGR: JHG    | PROJECT: 18-2781      |
| DRAWN: RJP       | DWG. NO.: 182781b(03) |

FIGURE  
 3





**APPENDIX B**

**STANDARD METHODOLOGIES**



**SUSTAINABLE ENVIRONMENT, ENERGY,  
HEALTH & SAFETY PROFESSIONAL SERVICES**

**STANDARDIZED METHODOLOGY  
WRANGELL JUNKYARD SOIL STOCKPILE REMOVAL  
August 2018**

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**NITON FIELD SCREENING**

Quantification of lead-contaminated soil is performed using a Thermo Fisher NITON XLp-303A (XRF), x-ray fluorescent spectrum analyzer, providing real-time, on-site sample results. Soil field screening consists of partially (33%-50%) filling a clean re-sealable bag with freshly uncovered soils to be field screened. The bag will be agitated for approximately 15 seconds in order to homogenize the contents. **NORTECH** staff will perform three, 30 nomsec shots per bag, at a different spot for each shot. The average of those three readings will be used to determine if the sample is below the site specific field screen action level (FSAL). Readings below the FSAL are considered clean by field screening standards.

A site specific FSAL of 35 was determined for the Site. This FSAL was determined through the collection of hundreds of Niton Field screening sample and reciprocal laboratory analysis results for lead during the assessments and the remedial action conducted at the Site in 2016.

Final soil lead concentrations will be determined by laboratory analysis of soils. Representative soil samples are collected from various locations on site. Soil samples are sent to the lab for analysis of total lead.

All soil contains a measurable amount of lead, however, ADEC has declared soil containing 400.0 mg/kg (XRF analysis or lab analysis) and higher to be above the cleanup level. Soil with lower concentrations of lead than these thresholds may still pose a health hazard if mishandled.

**HEADSPACE MONITORING FIELD SCREENING**

A RAE Systems Hand Held Air Monitor/Photoionization Detector (PID) will be the instrument used to field screen the soils for POL contamination. The RAE 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 RAE 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 PhotoVac 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 105°F (0 to 40°C)                          |



The headspace method of field screening will be used in general accordance with Section III of the ADEC *Field Sampling Guidance* (FSG) dated 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 (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 be 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.

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 determined through subsequent field screening
  - Or will require laboratory analysis to confirm that no contamination is present above the established cleanup concentrations.

Final soil POL concentrations will be determined by laboratory analysis of soils. Representative soil samples are collected from various locations on site. Soil samples are sent to the lab for analysis of various petroleum fractions.



### **HOT WATER SHEEN TEST FIELD SCREENING**

The hot water sheen test (also known as Hydrothermally Induced Iridescent Optrosopy) will be used to corroborate and supplement the PID results and visual and olfactory observations of specific soils. 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, and may be used where high moisture levels may contraindicate the use of a PID. 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.

### **SOIL SAMPLING**

Soil samples will be collected from various locations and depths during the project effort as described in the site-specific Sampling and Analysis Plan. All collected soil samples will be 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 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 excavated areas.

### **Laboratory Sampling Plan**

In general, laboratory sampling will be conducted for the following four primary purposes:

1. to provide confirmation of contaminant removal from the surface and subsurface soil environment
2. to assess the sub-surface soil environment for potential contaminants
3. to assess the surface and/or water from the on-Site Water Treatment System for potential impacts resulting from contaminant migration from the source area(s) and to characterize water prior to release from the Water Treatment System
4. to characterize any additional excavated soil material generated during the investigation for disposal purposes

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

- Surface soil sampling

**NORTECH** will collect all laboratory soil and groundwater samples in general accordance with the SAP and the ADEC 2017 Field Sampling Guidance (FSG) document (adopted by reference for sampling guidance, 18 AAC 78 regulations). All project soil and water samples will be collected directly into laboratory provided clean containers 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. A minimum



of one trip blank will accompany each set of volatile samples submitted to the lab. Permit specific sampling requirements may vary from the ADEC FSG.

The contaminants of concern (COC) for the characterization and corrective action effort (confirmation samples) are listed in the site specific corrective action plan or SAP and will include the analysis identified in that plan.

Typical fuel contaminants are: gasoline range organics (GRO), diesel range organics (DRO), residual range organics (RRO), and benzene, toluene, ethylbenzene, and xylenes (BTEX). Specific laboratory analyses for these types of contaminants are:

- GRO by method AK 101
- DRO by method AK102
- RRO by method AK103
- BTEX by method 8021

Additional common contaminants include RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and polycyclic aromatic hydrocarbons (PAHs). Specific laboratory analyses for these types of contaminants are:

- VOCs by method 8260
- SVOCs by method 8270
- PAHs by method 8270 SIMS
- RCRA Metals by method 6020

**NORTECH** routinely uses SGS Environmental Services in Anchorage, Alaska as the analytical laboratory for all laboratory samples needed for this project. SGS is an ADEC approved laboratory.

#### **Soil and Groundwater Cleanup Limits**

Laboratory analyses of groundwater samples collected during this investigation will include DRO, RRO, and Lead using the methodologies described above. All project soil and sample results will be compared to the site specific cleanup limits provided in the following table:

**ADEC Method 2 Limits**

| <b>Contaminant of Concern</b> | <b>Soil</b> |
|-------------------------------|-------------|
| Lead                          | 400 mg/kg   |
| DRO                           | 230 mg/kg   |
| RRO                           | 8,300 mg/kg |