NSB BARROW SOUTH PAD

CORRECTIVE ACTION PLAN

JULY 8, 2016

Prepared for:

Prepared by:

AGVIQ ENVIRONMENTAL SERVICES

Signature of Qualified Environmental Professional Responsible for Interpreting and Reporting the Data: _____

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ACRONYMS AND ABBREVIATONS

ADEC .....Alaska Department of Environmental Conservation

Agviq .....Agviq, Limited Liability Company

AHA.....activity hazard analysis

ASTs .....Above-Ground Storage Tanks

AWQS…….Alaska Water Quality Standards

bgs.....below ground surface

BTEX.....benzene, toluene, ethylbenzene and xylenes

°C.....degrees Celsius

CAP .....Corrective Action Plan

CLs……..Cleanup Levels

CoC…….Chain-of-Custody

CY.....cubic yard

DRO.....diesel range organic compounds

FD .....field duplicate

FIW.....fuel impacted water

ft.....feet or foot

GAC.....granular activated carbon

GPS.....global positioning system

GRO.....gasoline range organic compounds

HSEPP .....Health, Safety and Environmental Protection Plan

IATA/DOT .International Air Transport Association/Department of Transportation

IDW…….investigation derived waste

kg .....kilogram

L.....liter

LCY .....loose cubic yards

µg.....microgram

MS/MSD.....matrix spike/ matrix spike duplicate

mg .....milligram

ml…….milliliter

NSB .....North Slope Borough

OSHA .....Occupation Health and Safety Administration

PAH .....polynuclear aromatic hydrocarbons

PID.....photoionization detector

POL.....petroleum, oil and/or lubricants

PPE .....personal protective equipment

ppmv .....parts per million by volume

QC.....quality control

RA.....removal action

RCRA .....Resource Conservation Recovery Act

RRO.....residual range organic compounds

SGS.....SGS Environmental Services, Inc.

SF.....square feet or square foot

SIM .....selective ion monitoring

S&W……Shannon and Wilson, Inc.

T&D.....transportation and disposal

TAH.....total aromatic hydrocarbons

TAT .....turn-around-time

TAqH.....total aqueous hydrocarbons

VOCs .....volatile organic compounds

1. INTRODUCTION

This Corrective Action Plan (CAP) was prepared by Agviq, LLC (Agviq) for the North Slope Borough (NSB) under Contract No. 2015-087 and CIP Project No. 65102 to address fuel contaminated soil, empty drums, staged waste and aboveground storage tanks (ASTs) at South Pad (Site) in Barrow, Alaska. The location of Barrow is shown on **Figure 1** and the site location is shown on **Figure 2**. The approach described in the CAP is based upon the results of previous site characterizations performed by other contractors and the Agviq 2015 Barrow South Pad Site Characterization. The Agviq Site Characterization was performed in accordance with the *Barrow South Pad Site Characterization of Drum Staging Area, Above-Ground Storage Tank Cleaning and Sump and Contaminated Soil Removal Action,* Work Plan (Agviq. 2015). The site was added to the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Database in 2012 as file number 310.38.028.

1.1 Site Description

South Pad is located approximately one (1) mile southwest of Barrow Alaska, a village of the NSB. South Pad consists of multiple structures to include Service Shop Building, above-ground storage tanks (ASTs), Wooden Storage Building, pump house and various material staging areas were constructed on a gravel pad. The Service Shop Building, constructed around 1981, was used for vehicle maintenance and cleaning operations and condemned in 1993 due to extensive flour settlement. Drums, small containers, and potentially hazardous building materials were identified inside the Service Shop Building. (Shannon and Wilson, Inc. [S&W]. 2011).

The ASTs currently located on South Pad include one 45,000-gallon and one 10,000-gallon tank. Other structures include the asphalt plant, connex containers, lumber, wooden racks, sled and platform formerly utilized for drum storage, pump house, and dispenser area.

Barrow is the northernmost city in the United States, situated on the North Slope of Alaska on the Arctic Ocean (**Figure 1**). The site (71.272685 degrees N, 156.811376 degrees W) is located approximately one mile southwest of the city of Barrow on Apayuk Road (**Figure 2**). Barrow has an arctic climate, temperatures range from -20 to 45 degrees Fahrenheit (°F) annually. Winters are severe, and summers are cool and short. Freezing temperatures and snowfall can occur at any time during the year. The Site is situated on an imported man-made gravel pad overlying native tundra below. Underlying the tundra is permafrost that is estimated to be as much as 1,300 feet (ft.) thick.

1.2 Site History

South Pad was constructed by the NSB in 1980 and used by contractors as a staging area for various activities. The pad is constructed of sandy gravel to gravelly sand between 2.5 and 8 ft. thick, underlain in areas by geofabric on top of tundra. In 1986, the NSB assumed control of the pad and continues to use it

for outdoor storage. The maintenance Building (also referred to as the Service Shop) was constructed by SKW/Eskimos, Inc. in 1981 with a concrete slab on grade foundation and used for vehicle maintenance and cleaning operations. The sump pumps within the Service Shop were installed after the building was constructed. Due to excess slab settlement, under the direction of the Occupational Safety and Health Administration (OSHA) the Service Shop building was condemned in 1993. The ASTs currently located on South Pad include one (1) 45,000-gallon AST and one (1) 10,000-gallon AST. Other structures include the asphalt plant, connex boxes, stacked lumber, wooden drum storage racks, drum storage platform, pump house and dispenser area.

Previous investigation indicated diesel range organic compounds (DRO), residual range organic compounds (RRO), arsenic, benzo(a)anthracene, several volatile organic compounds (VOCs), lead and chromium contamination in soil and/or pad-pore water. More than 350 leaking and/or rusted drums of unknown material, 24 ASTs, numerous 5 gallon and 1 gallon containers, stained soil and signs of contaminant migration from the gravel pad into the surrounding tundra were noted in 2011. The site is located southwest of the village of Barrow, Alaska on Apayuk Road**.**

Contaminated soil was identified in a 2002 Technical Memorandum Phase II Environmental Investigation (S&W. 2002) at the following five (5) areas: (1) Service Shop Building, (2) Drum Storage, Dock, (3) Wood Storage Building, (4) Treated Lumber, and (5) Vehicle Staging Areas. Fifty two (52) subsurface and 90 surface soil samples were collected as well as samples of creosote/ pentachlorophenol treated lumber. Diesel range organic compounds and residual range organic compounds (RRO) were detected at concentrations as high as 34,100 mg/kg and 19,300 mg/kg, respectively. Arsenic was detected at a concentration of 23.9 mg/kg from a sample collected near the wood storage building, and benzo(a)anthracene was detected at 37.5 mg/kg from a sample near the creosote poles, the Wood Storage Building is shown on **Figure 3.**

Eight (8) of the soil boings were converted to pad-pore water monitoring wells, six (6) of the eight (8) pad-pore water monitoring wells contained DRO and RRO at concentrations greater than the ADEC groundwater acceptance criteria of 1.5 mg/L and 1.1 mg/l, respectively. Drum characterization results identified 38 waste streams. Drum contents included fuels, waste oil, acids, solvents, batteries, and other wastes. At the time, it estimated that 80 cubic yards of contaminated soil was present at the site. (ADEC. 2015). This estimate appears to be based on surface data and not subsurface results. The integrity of these wells appear to be compromised based on resent observations documenting missing caps that should be present to protect the wells.

An additional Site Characterization of South Pad was performed in March 2012. The characterization effort was conducted concurrent with debris removal efforts and characterization of drums, Sumps 3 and 4 and other containers located inside the building. Container characterization activities identified the following: five(5) 55-gallon drums and four (4) 15-gallon drums of petroleum, oil, and/or lubricants (POL); two (2) super sacks of drill cuttings from the 2001 well installation and drilling effort; 10 gallons of latex paint; 30

gallons of flammable paint; 5 gallons of methanol; 5 gallons of solvent; mercury and lead containing materials (lights, batteries, etc.); and approximately 1,400 gallons of oily water that was ponded in the southern section of the building.

Four (4) sumps were identified in the Service Shop Building with water and non-aqueous phase liquid (NAPL) present in four (4) of the sumps. The analytical results from soil samples collected from two sumps (Sump 3 and 4) contained concentrations of DRO as high as 40,500 mg/kg and RRO as high as 129,000 mg/kg in Sump 3 (S&W. 2012). Several VOCs, lead and chromium were detected at concentrations indicating the soil would be considered a hazardous waste when removed from Sump 3. Petroleum contaminants were also detected in water samples from each of the sumps (ADEC. 2015). A sediment sample collected from Sump 3 during the sump evaluation performed in March 2014 was tested to evaluate hazardous characteristics for metals previously detected in 2012 using the SW1311 toxicity characteristic leaching procedure (TCLP). The metals did not exceed Resource Conservation and Recovery Act (RCRA) 40 CFR 261.24 criteria and is no longer considered to be hazardous. During the 2014 evaluation sediment samples were also collected from Sumps 1 and 2; Sump 4 sediments were adequately characterized during the 2011 effort. The DRO/RRO results for sediment in Sumps 1 and 2 exceeded ADEC Method One Arctic Zone cleanup levels; only the RRO concentration in Sump 2 and arsenic in both sump sediment samples exceeded ADEC Method Two Arctic Zone cleanup levels.

Site Characterization report for the Barrow South Pad (S&W. 2014) objectives were to delineate the extent of soil contamination in area where drums had previously been stored along the north edge of the property. Fifty Five (55) surface samples were collected, 22 samples were submitted for laboratory analysis. Four surface water samples were collected from ponded water along the northern edge of the pad and submitted for laboratory analysis.

Polynuclear aromatic hydrocarbons (PAHs) were not detected in surface water samples; however, benzene and ethylbenzene were detected in surface water samples collected in 2013. The total analytical results from these samples did not exceeded in the ADEC Water Quality Standard (AWQS) for total aromatic hydrocarbons (TAH) and total aqueous hydrocarbons (TAqH).

Soil samples contained DRO concentrations above the ADEC Method One Arctic Zone gravel pad cleanup level of 500 mg/kg in 18 of the 22 samples with concentrations ranging from 630 mg/kg to 27,500 mg/kg. Only 15 samples contained RRO at concentrations above the ADEC Method One Arctic Zone cleanup level of 2,000 mg/kg with concentrations ranging from 2,850 mg/kg to 45,100 mg/kg. PCBs were not detected and PAHs and VOCs were not detected above cleanup levels.

The report indicates that significant staining was observed across portions of the pad and tar is present in a few locations.

Drum characterization results identified 38 waste streams. Drum contents included fuels, waste oil, acids,

solvents, batteries and other wastes. A debris removal effort and characterization of drums inside the Service Shop occurred in 2012. The waste streams identified included petroleum, oil, and/or lubricant (POL) drums, super sacks of soil cuttings, latex and flammable paint containers, methanol, solvent, mercury and lead containing materials (lights, batteries, etc.), free product in the sumps and approximately 1,400 gallons of oily water that was ponded in the southern section of the Service Shop. Significant staining and tar was identified.

Agviq performed further characterized the Site during the 2015 Site Characterization/Interim Removal Action at the South Pad in Barrow; the results are presented in Section 2.0 of this CAP.

2. 2015 SITE CHARACTERIZATION SUMMARY

This section summarizes the 2015 Barrow South Pad Site Characterization activities performed by Agviq in areas shown on **Figure 3**. This figure identifies areas where contamination exceeded ADEC 18 AAC 75 2015 Method One Arctic Zone cleanup levels (CLs). All data is presented in the *NSB South Pad Site Characterization Report Final* (Agviq. 2016). For purposes of the 2015 Site Characterization, the site was divided into the following seven (7) areas:

Northwest Area

The 9,358 square foot (SF) Northwest Area is located north of the Wooden Storage Building (**Figure 3**). The area previously served as a staging area for drums and containers observed in 2012. Previous surface soil samples collected within this area, at depths ranging from 0.2 ft. to 0.6 ft. below ground surface (bgs), identified concentrations of DRO and RRO above ADEC cleanup levels (S&W. 2014). During the visit to the Site in June 2015, tar was observed on the soil surface at multiple locations.

Northeast Area

The 24,778-SF Northeast Area located west of the wooden rack and lumber piles served as a lay down area for drums and containers as observed in 2012. Previous surface soil samples collected at depths ranging from 0.1 ft. to 0.8 ft. bgs, reported results (S&W 2014) for gasoline range organic compounds (GRO), DRO, and RRO at concentrations above ADEC CLs.

Southeast Area

The 2,470-SF Southeast Area is located east of the Wooden Storage Building near the eastern edge of the gravel pad and includes a sled and platform formally used for drum storage. Previous surface samples collected within this area at sample depths ranging from 0.2 ft. to 0.3 ft. bgs, indicate concentrations of DRO and RRO exceeded cleanup levels (S&W 2014). Agviq conducted debris removal and wooden rack demolition at the Southeast Area.

Aboveground Storage Tank Area

The 2,700-SF AST Area, between the Service Shop and the Wooden Storage Building (**Figure 3**), is the location of the 45,000-gallon AST. Previous characterizations were not conducted in this area and it is assumed that the diesel fuel was transferred via the tank, pump house and dispenser.

The 45,000-gallon AST was cleaned and decommissioned. Four (4) 85 gallon salvage drums were filled with fuel impacted water (FIW) and ice from the AST. The salvage drums were moved into the Service Shop to allow the ice to melt and then transferred into six (6) 55 gallon open top drums and shipped offsite for disposal.

A second 10,000-gallon AST located north of the 45,000-gallon AST was empty when it was moved to the Site and was never used at South Pad. The 10,000-gallon AST was also cleaned and decommissioned. Since it was never used at the Site, characterization of the soil in the area of the 10,000-gallon AST was not required.

Dispenser Area

The 900-SF Dispenser Area is located south of the AST Area. Previous characterizations in this area were not conducted.

Pump House Area

The 900-SF Pump House Area is located north of the AST Area. Previous characterizations in this area were not conducted.

Service Shop

The Service Shop constructed in 1981 was used for vehicle maintenance and cleaning operations. The sumps within the Service Shop were installed after the building was constructed. Due to excessive slab settlement, under the direction of OSHA the Service Shop building was condemned in 1993.

As guided by the results of previous site investigations, Agviq conducted a removal action at two (2) of the four (4) sumps.

2.1 Site Characterization Activities and Analytical Results

A sample grid representing 250-SF cells was established for each of the areas at South Pad in 2015, with the exception of the Service Shop. One (1) soil boring was placed inside each 250-SF grid where samples were collected. A total of 173 soil borings were advanced using a direct push drill rig. Soil cores were extracted from a depth of 0 to 7 ft. bgs. The core samples were field screened with a photoionization detector (PID) and samples were collected for offsite analysis. When two (2) soil samples were required, one (1) sample was collected from surface 0 to 2 ft. bgs and one (1) sample was collected from subsurface 2 to 7 ft. bgs at the depth with the highest PID reading. When one (1) soil sample was required, the sample was collected from the depth with the highest PID reading. Analyte concentration exceedances in soil found during the site characterization are presented in **Figure 3**.

Northwest Area

Forty soil borings were advanced within the 9,358-SF Northwest Area. Of the 40 soil borings, only one (1) location, J-3, contained contamination at levels exceeding CLs (**Figure 3**). Cleanup levels for DRO (200 milligrams per kilogram [mg/kg]), GRO (100 mg/kg), and 1,2,4-trimethylbenzene (49 mg/kg) were exceeded at J-3.

The DRO were detected in soil boring, J-3, at a concentration of 3,380 mg/kg; the GRO at 669 mg/kg; and 1,2,4-trimethylbenzene at 50.1 mg/kg.

Soil boring J-3 is located on the northern-central edge of the Northwest Area sampling grid were contamination was present at 3 ft. and frozen tundra was encountered at 6 ft. bgs. The northern extent of contamination was not fully defined as shown by blue gridded area outside of the footprint where additional characterization is required.

Northeast Area

Ninety-nine soil borings were advanced within the 24,778-SF Northeast Area. Of the 99 soil boring locations characterized, contamination concentrations at five (5) locations, S-2, V-3, W-7, W-8, and X-8, exceeded ADEC CLs (**Figure 3**). The CL for DRO (200 mg/kg) was exceeded at all five (5) borings, with highest levels observed at V-3 (3,430 mg/kg) and W-8 (1,140 mg/kg).

Additionally, the GRO results (109 mg/kg) exceeded the ADEC CL of 100 mg/kg at W-7.

The lateral extent of contamination within the Northeast Area has been defined with the exception of one area, No. 9. Peat, permafrost or geofabric overlying peat was encountered below depths of five to six ft. bgs in the five cells requiring removal action. Cells, W-7, W-8, and X-8 are grouped to form one (1) excavation area. Pad material above cleanup levels ranges from surface to approximately six ft. bgs. Pad gravel will be excavated to depth of contamination but will not exceed into tundra.

Southeast Area

Ten soil borings were advanced within the 2,470-SF Southeast Area. The results at the 10 locations did not exceed ADEC CLs and no further action is recommended (**Figure 3**).

Aboveground Storage Tank Area

Twelve soil borings were advanced within the 2,700-SF AST Area. Contamination levels at two (2) of the 12 soil boring locations, CC-1 and CC-3, exceeded the 200 mg/kg cleanup level for DRO (with concentrations of 668 and 264 mg/kg, respectively) and the 100 mg/kg cleanup level for GRO (with concentrations of 416 and 114 mg/kg, respectively) (**Figure 3**).

Monitoring well, MW-06 will be decommissioned during removal action if contamination extends as suspected.

Peat and ice or geofabric overlying frozen peat was encountered at approximately 4 ft. bgs beneath pad material in areas requiring removal action. Contamination at locations west of CC-1 and CC-3 on the exterior edge of the AST Area and beneath the 45,000-gallon AST was not fully characterized during the 2015 Site Characterization.

Dispenser Area

Four (4) soil borings were advanced within the 900-SF Dispenser Area. The ADEC CLs for GRO and DRO at two (2) locations were exceeded as shown on **Figure 3**. The DRO in soil borings GG-1 and GG-2 (1,020 mg/kg and 1,190 mg/kg, respectively) were reported at concentrations of above the CL of 200 mg/kg. The GRO in soil boring GG-2, (150 mg/kg), was reported above the cleanup level of 100 mg/kg.

Peat was encountered at a depth of 4 to 4.5 ft. bgs. Soil east of the Dispenser Area was not fully characterized. Monitoring well, MW-05 will be decommissioned if contamination extends to the location of the well.

Pump House Area

Four (4) soil borings were advanced within the 900-SF Pump House Area. The GRO result (224 mg/kg) in soil boring AA-1 exceeded the GRO CL of 100 mg/kg. Geofabric overlying frozen peat was encountered at depths of 2 to 5.5 ft. bgs. Soil south and west of AA-1 near the Service Shop building was not adequately characterized.

Monitoring Wells

Seven (7) monitoring wells were installed across the Site to evaluate impact to pad-pore water and offsite migration of contamination potentially present in the pad gravel. Soil samples were collected from each monitoring well.

Due to freezing temperatures and lack of recharge, monitoring wells not sampled during the 2015 Site Characterization will be sampled during the summer of 2016 according to the 2015 approved work plan (Agviq. 2015), results will be presented in an addendum to the *NSB Barrow South Pad Site Characterization Report Final* (Agviq. 2016).

Surface Water and Sediment

AWQS for TAH and TAqH were met in all three (3) surface water samples collected. Sediment sample results from two (2) samples did not exceed National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQuiRT) criteria (NOAA. 2008).

2.2 Interim Removal Action Activities

During late September to early October 2015, an interim removal action was conducted at South Pad

Tank Cleaning

The 45,000-gallon AST was cleaned and then decommissioned by cutting a hole in the sidewall of the clean AST and labeling the AST, “out of service” with bold paint. The 10,000-gallon AST was cleaned and decommissioned in the same manner.

Tar Removal

Solidified tar was present on the ground surface in the locations of W2, W3, X2 and X3 within the Northeast Area to a depth of 4 inches bgs (S&W 2014). During the interim removal action, Agviq removed the tar, placed it into super sacks and staged the material inside the Service Shop. This non-hazardous material will be managed with waste generated during the 2016 Removal Action. Some of the wooden drum storage racks were cut into pieces to allow access to soil beneath the large racks.

Service Shop

Previous site investigation information indicated two (2) of the four (4) sumps did not pass water tightness test and soil beneath the floor in these areas was contaminated. Therefore, the two (2) sumps and associated soil were removed. Soil removed from the sumps was placed in super sacks and staged in the Service Shop.

Well Decommissioning

During site reconnaissance two (2) old monitoring wells located near the Pump House and within the Northeast Area were decommissioned. Both monitoring wells were filled and sealed with bentonite and covered with pad gravel.

3. CORRECTIVE ACTION PLAN

The Barrow South Pad CAP provides details for the following removal action (RA) and transportation and disposal (T&D) activities:

- Tank, secondary containment cell and pump house demolition
- Drum cleaning, crushing and disposal in landfill
- Excavation of contaminated soil and placement into super sacks
- Decommissioning of MW-05 and MW-06
- Field screening
- Confirmation sampling
- Excavation backfilling
- Waste transport to barge staging area and disposal

3.1 2016 Project Objectives

The 2016 project objectives supported by the results of previous site characterizations are defined as follows:

- Remove the 45,000-gallon tank and associated secondary contaminant to allow characterization beneath the tank footprint. Characterize areas where contamination may have migrated outside the foot print of the 2015 site characterization and excavate soil in areas where contamination does not meet ADEC CLS. This will ensure complete removal of contamination during the 2016 removal action.
- Remove the contaminated soil not meeting ADEC 18 Alaska Administrative Code (AAC) 75 CLs defined by Method One and Method Two Arctic Zone Criteria to eliminate future ecological and human health impacts.
- Clean and crush empty drums that are not usable and dispose of crushed drums and trash in the municipal landfill so drums cannot not be used in the future.
- Properly dispose of contaminated soil, tar and other waste at approved transport, storage and disposal facility to eliminate further environmental impacts.

3.2 Utility Clearance

Agviq is aware of existing utilities within the areas where drilling took place during 2015 Site Characterization. Prior to excavation of areas associated with the AST and Pump House, the Agviq Site Superintendent will conduct a field sweep for underground utilities running from the AST and Pump House to the Service Shop. A metal detector and digital line tracer will be used to verify the location of buried utilities. Excavation in these areas will be limited due to proximity of these buried utilities; Agviq will excavate up to but no closer than 5 ft. to the foundation of the Service Shop to maintain structural integrity.

3.3 Removal Action Task Summary

This subsection provides a summary of tasks to be performed during the RA.

Demolish 45,000-Gallon AST, Pump House, and Underground Piping.

Sample and remove water ponding in secondary containment associated with the 45,000-gallon tank. If results in sample collected of ponded water meet AWQS (ADEC. 2016a), water will be discharged to the gravel pad at least 100 ft. from surface water body. If AWQS criteria are not met, water will be treated with a granular activated carbon (GAC) filter before being discharged to the gravel pad. If water does not meet AWQS, sludge in the bottom of the containment area will be placed in a drum and shipped offsite for disposal. The previously cleaned and decommissioned AST will be cut into pieces just small enough to be moved by a loader and stacked no more than 1,000 ft. from its current location. Surface wipe samples collected from the paint on the outside layer and surface of the tank were collected and confirmed the paint does not contain lead. The material associated with the secondary containment will be removed and disposed in the landfill after all residual material is wiped from the surface. Material used to wipe soil from the liner will also be disposed in landfill. Associated piping will be disconnected, wiped clean and disposed in the landfill. Any fuel remaining in the piping associated with the AST will be collected into a 55 gallon drum. The low area surrounding the tank will be backfilled with clean borrow material to original grade and appearance.

The pump house will be demolished and associated underground piping will be removed. Debris and associated materials will be wiped with a cloth to remove any fuel or loose soil before it is disposed in the municipal landfill. Pipes are expected to contain a small volume of diesel fuel that will be recovered using a pneumatic pump and collected in a 55 gallon drum. Recovered fuel will be transferred to the NSB for reuse or disposal. A spill response kit and duck ponds will be onsite to prevent spillage of diesel during pipe removal activities. The locations of the 45,000-gallon AST and Pump House are depicted on **Figure 3**.

Drum Disposal

Used 55-gallon drums and salvage drums (over packs) located inside and around the South Pad Maintenance Building will be collected, wiped clean with sorbent material and transported to Shop 3 after being clearly labeled. A bright color of spray point will be used to paint the following message on used 55-gallon drums and salvage drums, “DO NOT REUSE CONTAINER FOR WASTE STORAGE OR TRANSPORTATION”. All other labels or markings on the drums will be spray painted black. Some drums may be used by the NSB to store medical waste for incineration. Drums that are not usable for medical waste incineration will be crushed by the NSB and transported to the Barrow Municipal Landfill. Agviq assumes the drums will be Resource Conservation and Recovery Act (RCRA) empty, contain non-hazardous waste, and no more than 75 drums are present.

Contaminated Soil Excavation and Placement into Super Sacks

Soil removal will occur at nine (9) areas at South Pad. Eight (8) excavation areas were identified during the 2015 site characterization and one (1) area was identified through research into past characterizations performed by other consultants at the Site. Approximately 676 in place cubic yards (CY) will be excavated and placed into 1 CY super sacks. Using a 1.15 expansion factor (in place to excavated volume) and 0.9 CY maximum volume per super sack equates to approximately 836 super sacks. All excavated material will be considered contaminated, none will be used as excavation backfill. In areas where contamination was not fully delineated, Agviq will further excavate those unbounded borders to determine whether additional lateral impacts exist. Those excavated soils will be measured with a PID to determine whether offsite disposal is required. Soils exhibiting an exceedance of 20 parts per million by volume (ppmv) will be assumed "impacted" and shipped offsite. The nine (9) proposed areas to be excavated are summarized below and depicted on **Figure 3**. Confirmation floor and sidewall samples will be collected from each excavation at a frequency satisfying ADEC requirements presented in *Field Sampling Guidance* (ADEC. 2016b).

Dispenser Area (Excavation 1)

An area associated with sampling grids GG-1 and GG-2, totaling 1,360 SF will be removed from the Dispenser Area. Samples were not collected south and east of grids GG-1 and GG-2, therefore the area of excavation will be extended to the south and east of the original grids in order to determine if additional lateral impacts have occurred. Monitoring well MW-05 lies within the area to be excavated and will be properly decommissioned. The well will not be sampled prior to being decommissioned.

Aboveground Storage Tank Area (Excavations 2 & 3)

Two (2) areas totaling 1,230 SF associated with grids CC-1 and CC-3 will be excavated after the ponded water and 45,000-gallon AST have been removed. The excavation associated with grid CC-1 totals 680 SF. and will be extended to the west towards the Service Shop. The excavation associated with grid CC-3 totals 550 SF and will also be extended to the west towards the Service Shop to determine if contamination has migrated laterally. Monitoring well MW-06 located in grid CC-3 will need to be removed during the excavation. The well will not be sampled prior to decommissioning.

Pump House Area (Excavation 4)

An area associated with sampling grid AA-1, totaling 590 SF will be removed from the Pump House Area after the pump house has been demolished. The excavation of grid AA-1 will be extended to the south and west towards the Service Shop to monitor lateral contaminate migration.

Northwest Area (Excavation 5)

An area associated with sampling grid J-3, totaling 760 SF will be removed from the Northwest Area. Grid J-3 borders the north side of the area grid, samples were not collected and the area north of J-3 was not characterized. Because of this, Agviq will extend the excavation north and northwest of J-3 to determine if contamination occurs outside the area grid.

Northeast Area (Excavations 6, 7, 8 and 9)

Three (3) areas totaling 1,250 SF, associated with sampling grids S-2, V-3, W-7, W-8, and X-8 will be excavated at the Northeast Area. A less than 250-SF area, located directly east of grid Z-3, where a sample was previously collected may indicate potential contamination is present outside the gridded area established by Agviq during the 2015 Site Characterization, will be field screened and excavated if found to be contaminated at levels exceeding 20 ppmv.

Monitoring Well Decommissioning

Monitoring wells, MW-05 and MW-05, within the Dispenser Area (Excavation 1) and the Aboveground Storage Tank Area (Excavations 2) areas, respectively, will need to be decommissioned in accordance with ADEC *Monitoring Well Guidance* (2013). Monitoring wells will be decommissioned by first knocking out the bottom of the screen with a steel drill rod/ pipe. The well casing and screen will be removed completely or until the screened interval is above the groundwater interface, allowing material to collapse into the borehole. Casings may be pulled using a hook attached to the excavator bucket. The monitoring wells have 5 ft. screens, so the casings will be pulled up at least 5 ft. Once the casing has been withdrawn at least 5 ft., bentonite chips will be added slowly (to prevent bridging) to the well to near ground surface. More bentonite chips will be added as the casing is withdrawn (to avoid sloughing, compromising the seal). Bentonite chips will be added to 2 ft. below ground surface. Permafrost or frozen conditions may prevent the complete removal of the well casing and screen. If the casing breaks while being pulled, the screen will be filled with sand and the casing will be filled with bentonite chips and cut off near ground surface. The bentonite chips will be hydrated in accordance with the manufacturer specifications to complete the seal. The remaining 2 ft. will be filled with gravel to grade. Decommissioning procedures will be recorded in a field log book and documented with photographs.

Backfilling of Excavated Areas

Backfill material will be sampled upon arrival of field crew to Barrow. The material will not be utilized until laboratory analytical results show that the source does not exceed ADEC criteria (ADEC. 2016c). Backfilling will be performed concurrently with excavation activities. None of the nine (9) excavation areas will be backfilled until confirmation samples have been collected and analytical results show the

excavation sidewalls and floor to be non-impacted. Excavations will be backfilled to original grade and appearance. Heavy equipment tires or tracks will be used to compact the backfilled areas. The NSB will deliver and stage backfill material at South Pad.

Waste Disposal

Waste generated from the 2015 Site Characterization, in addition to waste generated during the 2016 Removal Action will be removed during this field effort. Waste generated during 2015 includes:

- Eleven super sacks of mixed soil and tar (originated from the Northeast Area Interim Removal Action)
- Ten super sacks of petroleum, oil, and lubricant (POL) impacted soil (originated from the sump removal within the Service Shop)
- Two super sacks of soil cuttings (originated from drilling activities during the site characterization)
- One 85 gallon salvage drum of water collected from sump 3 in the Service Shop

Super sacks generated during 2015 will be shipped offsite and disposed with waste generated during 2016. The water collected from Sump 3 exhibited no sheen or odor and petroleum sorbent pads were not effective on the liquid. The water will be filtered through a GAC filter and discharged to the pad surface.

Waste generated during 2016 will include 836 super sacks of fuel impacted soil from nine (9) areas.

All lined super sacks will be transported and disposed at appropriate landfills out of state via barge. Waste consolidation will include staging approximately 859 super sacks at a location easily accessible to the barge landing area. A temporary laydown area will be constructed and lined 10-mil plastic to protect the ground in case a sack is breached during handling. The barge subcontractor will load super sacks onto the barge, the process will be overseen by the Agviq Superintendent. The plastic liner will be collected and disposed in the municipal landfill.

4. SAMPLING PLAN

The following section defines the sampling plan to be followed during the South Pad 2016 RA activities.

4.1 Ponded Surface Water Sampling

Immediately after mobilizing to the site, the field sampler will collect a surface water sample from the ponded water within the secondary containment surrounding the 45,000-gallon AST. The sample will be shipped to SGS Environmental Services, Inc. (SGS), an ADEC accredited laboratory. The sample will undergo "RUSH" 3-day turn-around-time (TAT) analysis for:

- DRO/RRO by AK102/AK103
- Benzene, toluene, ethylbenzene and xylene (BTEX) by SW8260B and
- Polynuclear aromatic hydrocarbons (PAHs) by SW8270D selective ion monitoring (SIM)

If sample results do not exceed AWQS for TAH and TAqH, surface water will pumped directly to the pad surface. If AWQS criteria are not met, surface water will be pumped through a GAC filter prior to being discharged to the pad surface. In text **Table 4-1** shows the holding times and containers for water samples. The surface water sampling form is included in **Attachment 1**.

Table 4-1: Sample Containers, Holding Times and Storage Requirements for Water Samples

Parameter	Analytical Method	Holding Times	Containers	Preservation	Storage Requirements
Water					
DRO/RRO	AK102/ AK103	7 days	(2) 250 ml. amber glass, TLC	HCl; pH< 2	4°C ± 2°C
PAH SIM	SW8270D	7 days	(2) 1 liter amber glass	None	4°C ± 2°C
BTEX	SW8260B	14 days	(3) 40 ml. glass, TLS	HCl; pH< 2	4°C ± 2°C

Notes:
30 day extraction holding time should be added for semi volatile methods to follow initial preparation holding time shown in table
ml – milliliter
oz. – ounce
RCRA Metals – arsenic, barium, cadmium, chromium, selenium, silver, lead, and mercury
pH - hydrogen ion concentration
TCL – Teflon® lined screw cap
TLS – Teflon® lined septa screw cap

4.2 Borrow Source Sampling

Upon arrival to Barrow a 5-point composite representative sample will be collected from Barrows gravel borrow source area as identified by NSB. The analytical results shall meet Method One and Method Two Arctic Zone Soil Cleanup Levels (CLs).

Borrow material to be used as backfill will undergo "RUSH" 3-day TAT analysis for:

- GRO by AK101
- DRO/RRO by AK102/AK103
- VOCs by SW8260B
- 8 Resource Recovery Conservation and Recovery Act (RCRA) Metals by SW6010A and
- Mercury by SW7470A

If ADEC criteria are not met by the backfill material, a new source will be identified and sampled before being used as backfill.

4.3 Soil Confirmatory Sampling

Confirmation samples will be collected from the floor and sidewalls of the nine (9) areas to be excavated at the frequency defined by the new requirements presented in *ADEC Field Sampling Guidance* (ADEC. 2016b).

Table 4-2 of this CAP presents the number of proposed confirmation samples based on estimated size of the excavation. However, if excavation increases or if two adjacent excavations merge the number of samples will be adjusted according to the *Field Sampling Guidance* Table 2B. Excavations will proceed until confirmation samples confirm contamination exceeding applicable ADEC 18 AAC 75 cleanup levels has been removed or until native tundra is reached. Excavation will stop when native tundra or pad interface is reached, no excavation will exceed the depth of native tundra or impact stability of permafrost. A sample will be collected from the tundra in the bottom of the excavation using a composite approach that creates a sample representative of the contamination remaining in the unexcavated material. A five spot composite sample will be obtained from the bottom of the excavation through collection of a small aliquot of tundra from each corner and the center of the area of concern; a second five spot composite sample will be collected when excavations are 750 SF or greater. The container used for volatile and GRO analysis will be filled directly from each of the five locations (approximately 2-4 grams of tundra will collected and no more than 20 grams will be collected to ensure methanol completely covers the sample). Samples collected for volatiles will not be homogenized; for all other parameters, the tundra will be collected into a clean resealable gallon freezer bag and shaken to homogenize the sample. Sample containers will be filled from the freezer bag. Side wall sample frequency will follow the ADEC *Field Sampling Guidance* of one per sidewall (typically assume four per excavation) and one additional sidewall sample for excavations over 250 SF biased toward areas with highest PID results.

If excavation does not reach native tundra, discreet samples will be collected from the sidewall and bottom of excavation per Table 2B in the ADEC *Field Sampling Guidance*.

All confirmatory soil samples will undergo analysis for:

- GRO by AK101

- DRO/RRO by AK102/AK013
- VOCs by SW8260B
- PAHs by SW8270D SIM (10% frequency)

In order to expedite backfill and site restoration, all soil samples will undergo "RUSH" 3-day TAT analysis. In text **Table 4-2**, shows the areas of the nine (9) excavations and the proposed number of samples to be collected from each, including quality control (QC) samples.

Table 4-2: Approximate Excavation Size and Sample Numbers

Excavation Number	Excavation Size (SF)	Sidewall Samples	Bottom of Excavation Samples	MS/MSD (2 Samples)	Trip Blank	FD	Total Samples
1	1360	4	5	2	1		17
2	550	4	3	0	0	1	8
3	680	4	3	0	0	2	10
4	600	4	4	0	0	2	10
5	760	4	5	0	1	1	11
6	250	2	2	0	0	1	7
7	250	2	2	0	0	1	7
8	750	4	4	2	1	2	13
9	<250	4	2				
	5,450	32	30	4	3	14	83

Note: Matrix spike/matrix spike duplicates (MS/MSD) will be collected at a frequency of one (1) set per every 20 samples and field duplicate (FD) samples will be collected at a frequency of one (1) per every day samples are collected. Assume field effort will be completed in 14 days. Sidewall sample numbers will be reduced when excavation connects to previous location of samples collected documenting area is clean. Sample frequency will follow the ADEC *Field Sampling Guidance* (ADEC. 2016b).

Following completion of excavation to proposed horizontal dimensions and vertical depths, confirmation samples will be collected from the floor and sidewalls. Floor samples will be collected to define vertical extent. Sidewall samples will be collected to define horizontal extent. Prior to the collection of any confirmatory sample, PID headspace readings, using a threshold of 20 ppmv, will confirm that contamination has been adequately removed. If headspace samples do not meet 20-ppmv criteria, soil removal will continue. Confirmatory sample results in gravel shall meet ADEC Method One Arctic Zone CLs for fuel constituents and Method Two Arctic Zone CLs for non-fuel constituents in gravel (ADEC. 2016c). Method Two Arctic Zone CLs will apply to native soil sample results. Field screening and confirmation sampling will be conducted in accordance with *ADEC Field Sampling Guidance* (ADEC. 2016b).

Confirmation soil samples will be collected using the following process:

- Samples will be collected below the depth of highest contamination detected by field screening or characterization results.
- Remove 2 to 6 inches of surface soil before collecting samples for volatile analyses (GRO and VOCs) from sidewall or bottom of excavation. If excavation has been open for more than one hour,

remove 6 to 12 inches of soil before collecting samples for volatile analyses. When collecting samples for non-volatile analyses (DRO & RRO), removal of top soil is not required.

- Sampler will avoid collecting large rocks and pieces of vegetation such as peat.
- Soil collected for non-volatile samples shall be homogenized. Soil will **not** be homogenized when collected for VOCs or GRO analyses.
- If sample is collected from the excavator bucket when excavation reaches unsafe depths (>4 ft.), sampler will collect the sample from the center of the bucket after removing 4 to 6 inches of soil.
- Samples for volatile analysis (GRO and VOC) will be collected first, followed by those for semi-volatile analysis.
- Upon completing sample collection, the sample location will be written on the top of the lid, label or container, and the containers will be placed in a cooler containing frozen gel ice to keep the samples at the optimum temperature, between 0 degrees Celsius (°C) and 6°C.
- Each sample location will be recorded using a hand-held Global Positioning System (GPS) unit capable of providing sub-meter accuracy.

When collecting soil samples for VOCs and GRO analyses place approximately **50 grams** of soil in a pre-weighed 4-ounce amber jar and submerge the soil completely with 25 milliliters (ml) of methanol. Field samplers shall use a scale to ensure adequate volume is collected. Do not add more than one (1) volume of methanol to each sample container. *Do not place a label on pre-weighed containers.* Unpreserved 4-ounce jars will be filled from the same depths to determine percent solids. When DRO/RRO and VOC/GRO samples are collected from the same location, percent moisture can be collected from the sample container provided for DRO/RRO analysis. If a pre-weighed container is not provided with a label attached, place sample container into a 1-quart re-sealable freezer bag and place the label on the outside of the bag. Place a second bag over the bag with label to protect label from moisture and damage.

Confirmation samples shall be collected from bottom and side walls of the excavation. If sample representative of the 250-SF area at the bottom of the excavation cannot be collected due to frozen soil conditions, collect side wall sample near bottom of excavation in addition to any planned sidewall samples that are not at depth. Every effort shall be made to collect sample from bottom of excavation. In text **Table 4-3** defines the requirements for sample management.

Table 4-3: Sample Containers, Holding Times and Storage Requirements for Soil Samples

Parameter	Analytical Method	Holding Times	Containers	Preservation	Storage Requirements
Soils					
DRO/RRO	AK102/ AK103	14 days	4-oz. amber glass, TLC	None	4°C ± 2°C
GRO	AK101	28 days	4-oz. amber glass, TLS	Methanol	4°C ± 2°C
PAH SIM	SW8270D	14 days	4-oz. amber glass, TLC	None	4°C ± 2°C
VOCs	SW8260B	14 days	4-oz. glass, TLS	Methanol	4°C ± 2°C

Notes:
30 day extraction holding time should be added for semi volatile methods to follow initial preparation holding time shown in table
oz. – ounce
pH - hydrogen ion concentration
TCL – Teflon® lined screw cap
TLS – Teflon® lined septa screw cap

4.4 Sample Custody, Storage, and Shipping

Following sample collection, containers will be labeled with unique sample identification, sample time, sample date, and requested analytical method(s). The sample identification will be comprised of the following information:

- Year (2 digits: 16 for 2016)
- Hyphen
- BRWSP (Barrow South Pad)
- Hyphen
- Excavation Number (01 through 09)
- Hyphen
- Confirmation sample collected from “Sidewall” or “Floor” location (SD-01, SD-02, FL-01, FL-02 etc.) as determined by Lead Field Sampler
- Examples: first sidewall confirmation sample collected in 2016 from Barrow South Pad RA at excavation number one (1): 16-BRWSP-01-SD-01 or first confirmation floor sample collected from excavation one (1): 16-BRWSP-01-FL-01

Samples will be stored in hard, plastic coolers and chilled with gel ice. Cooler temperatures will be maintained between 0 °C and 6 °C. Each cooler will contain a temperature blank used to measure the internal temperature of samples when received by the laboratory. All containers shall be placed in an upright position in the cooler with additional packing material to ensure containers remain in an upright position during transport to the laboratory. Methanol preservation will leak out of containers that do not remain upright.

Sample custody will remain in control of the sampler until samples are shipped to the laboratory. Chain-of-custody (CoC) forms will accompany all coolers leaving the site. CoC forms will be signed and dated before being placed in a plastic bag which will be taped to the inside of the cooler lid. Strapping tape will be used to ensure the cooler is not opened during transit to the laboratory by being placed around the cooler at two (2) locations. Custody seals will be placed across the body and lid at two (2) locations and secured with clear tape.

Samples will be submitted to SGS using standard CoC procedures. The laboratory will be notified before samples are shipped from the site and contacted again upon assumed sample receipt to ensure delivery and pickup. The ADEC Laboratory Data Review Checklists will be completed for each sample delivery group and data qualified according to failed QC parameters. Qualifiers will be placed in tables reporting analytical results.

4.5 Excavation Backfill

The excavations will be backfilled to previous existing grade after laboratory analytical results confirm contaminated soil has been adequately removed. This will require the laboratory to submit results within 3 working days of sample receipt. It is important that the field sampler clearly defines when sample results are needed on the CoC and in communication with laboratory. Field sampler will take into account the potential impact from holidays and weekends when shipping samples for "RUSH" turn around. Clear communication with laboratory is mandatory so excavation can be backfilled in a timely manner. Stockpiled clean material will be placed back into the excavation and capped with clean borrow material. A total of 777 loose cubic yards (LCY) of backfill material will be required to complete the 2016 RA activities. Approximately 777 LCY will be required to backfill the excavation areas and an additional 117 LCY will be required to bring the excavation up to the surrounding grade of the area. The total 894 LCY of backfill includes 15% additional volume to account for compaction factors.

Backfill material will be placed into excavation and properly compacted with heavy equipment, (tracking or tire paths) at 1 ft. intervals until surface reaches previous existing grade.

4.6 Investigation-Derived Waste Management

Investigation-derived waste (IDW) includes excess soil from sample collection, liner, personal protective equipment (PPE), and used sampling materials. Soil will be collected in super sacks and transferred to the laydown area. Disposable sampling gear such as stainless steel sampling spoons, spent PPE and liner will be managed as solid waste and placed in the Barrow Landfill after visible soil has been brushed from the surface.

If water accumulating in excavations interferes with clean removal of contaminated soil, water will be pumped into drums and treated using a GAC system. Treated water will be analyzed for BTEX, GRO,

DRO, RRO, and PAH SIM prior to discharge to the ground surface. Water will only be discharged if analytical results meet both groundwater criteria (ADEC. 2016c) and Alaska Water Quality Standards (ADEC. 2016a). If water fails to meet criteria, GAC system will be modified until water meets acceptance criteria and standards.

4.7 Health, Safety, and Environmental Precautions

Demolition, excavation, waste management, soil transport and sample management are the main components of this task order. A Health, Safety, and Environmental Protection Plan (HSEPP) has been prepared for this project and all site personnel are required to understand the HSEPP and associated Activity Hazard Analyses (AHAs) and sign-off where required. A daily report will be completed and will record near misses, unsafe acts, unsafe conditions, and incidents as well as hours worked, track individuals on-site and activities completed (Agviq Contractor Production Report provided in **Attachment 2**).

Level D PPE is required for this task. The PPE will include, at a minimum, steel toed work boots, safety glasses, heavy (leather) gloves, heavy pants and work shirt and a reflective vest. Arctic wear clothing will be worn, as needed. Personnel working around heavy equipment shall wear a hard hat and ear protection suited for the type of equipment (i.e. ear plug, ear muffs, or both). If deheaded drums need to be wiped clean, personnel will wear an air-purifying respirator with cartridges appropriate for the contents of the drums. Safety vest, steel toed boots and safety glasses shall be worn at all times when personnel are onsite.

Agviq will ensure that spill control and spill clean-up materials are on hand prior to bringing heavy equipment to the site and commencing all fueling operations to prevent impact to ecological and human health.

All equipment related waste will be disposed at the discretion of the Barrow NSB Public Works fleet mechanic.

4.8 Shipping Procedures

Many items cannot be shipped by air without a Shipper's Declaration for Dangerous Goods properly filled out by the shipper, for the carrier. Shipping of equipment will be performed by personnel with International Air Transport Association/ Department of Transportation (IATA/DOT) training. The Agviq Project Manager or Program Manager will authorize and review shipping documents prior to all shipments.

5. REFERENCES

Alaska Department of Environmental Conservation (ADEC). 2016a. 18 Alaska Administrative Code (AAC) 70. *Water Quality Standards*. 2016. Amended as of February 19, 2016

ADEC. 2016b. *Field Sampling Guidance*. 2016. Final version revised as of March 13, 2016.

ADEC. 2016c. 18 AAC 75. *Oil and Hazardous Substances Pollution Control*. 2016. Revised as of May 8, 2016.

ADEC. 2013. *Monitoring Well Guidance*. September 2013.

Agviq, LLC (Agviq). 2015. *Barrow South Pad Site Characterization of Drum Staging Area, Above-Ground Storage Tank Cleaning and Sump and Contaminated Soil Removal Action*, Work Plan. 2015.

Agviq. 2016. *NSB South Pad Site Characterization Report Final*. 2016.

National Oceanic and Atmospheric Administration (NOAA). 2008. *Screening Quick Reference Tables (Cards)*. OR&R Report 08-1.

Shannon and Wilson, Inc. (S&W) 2014. *Site Characterization, South Pad Barrow, Alaska*. February 2014.

FIGURE 1: SITE LOCATION MAP

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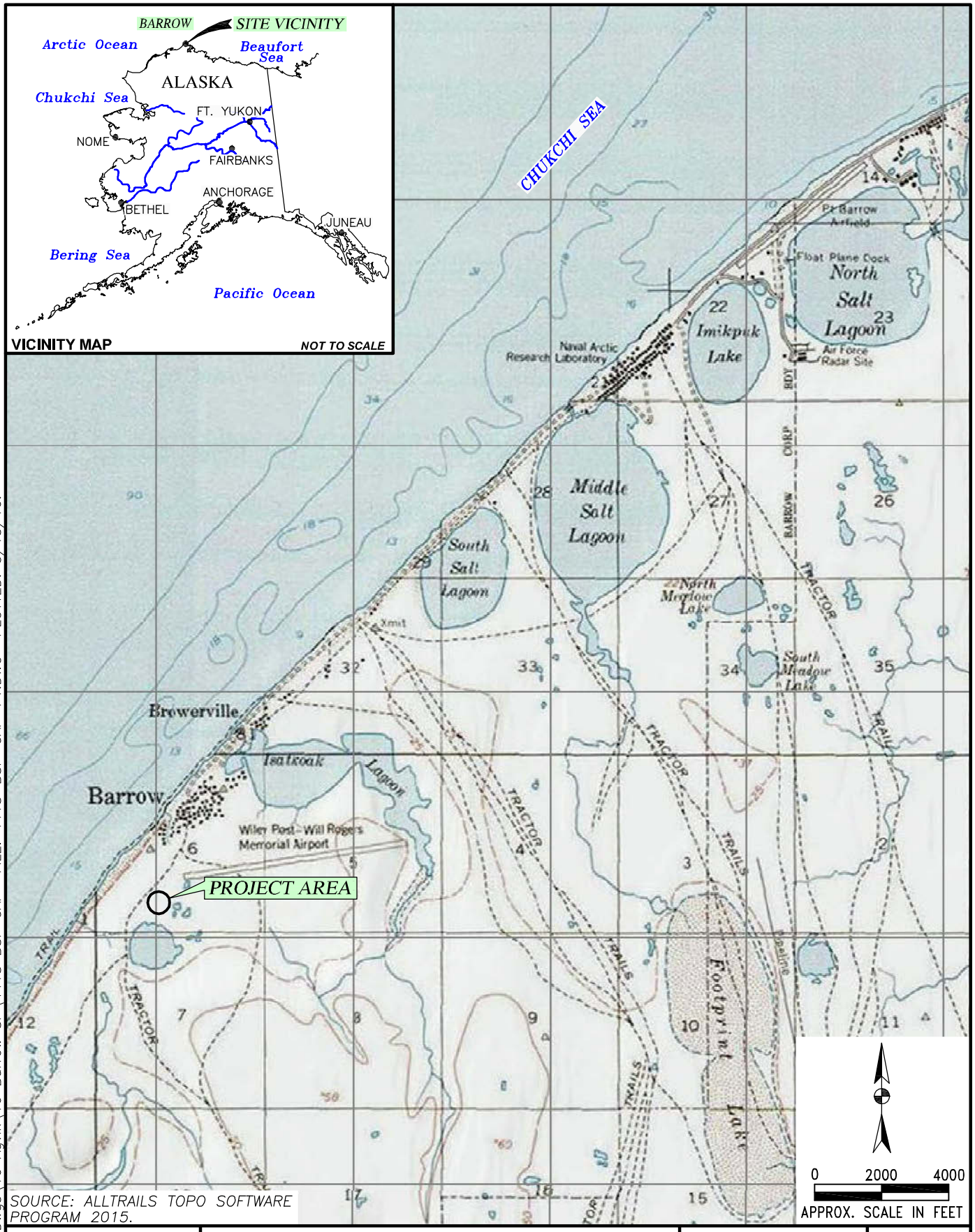

SOURCE: ALLTRAILS TOPO SOFTWARE PROGRAM 2015.

PATH: D:\2016 Dwgs\16 Agvik\16 Barrow SP\4418 BSP CAP FILE: 4418-BSP-CAP-F1.DWG PLOTTED: 5/13/16.

DATE: MAY 2016
CHKD: G.M.B.
DRAWN: C.E.H.
PROJ. No.: 4418

SITE LOCATION MAP

BARROW SOUTH PAD
2016 CORRECTIVE ACTION PLAN
Barrow, Alaska

AGVIQ
AGVIQ ENVIRONMENTAL SERVICES
301 W. Northern Lights Ave., Suite 660
Anchorage, Alaska 99503

FIGURE
1

FIGURE 2: SITE MAP

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SOURCE: GOOGLE EARTH PRO. IMAGE DATED 6/27/2009.

PATH: D:\2016 Dwgs\16 Agvik\16 Barrow SP\4418 BSP CAP FILE: 4418-BSP-CAP-F2.DWG PLOTTED: 5/13/16.

DATE: MAY 2016
CHKD: G.M.B.
DRAWN: C.E.H.
PROJ. No.: 4418

SITE MAP

BARROW SOUTH PAD
2016 CORRECTIVE ACTION PLAN
Barrow, Alaska

AGVIQ
AGVIQ ENVIRONMENTAL SERVICES
301 W. Northern Lights Ave., Suite 660
Anchorage, Alaska 99503

FIGURE
2

FIGURE 3: 2016 PROPOSED AREAS OF EXCAVATION

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PATH: D:\2016 Dwgs\16 Agvik\16 Barrow SP\4418 BSP CAP FILE: 4418-BSP-CAP-F3.DWG PLOTTED: 5/13/16.

NORTHEAST AREA GRID

NORTHWEST AREA GRID

PUMP HOUSE AREA GRID

SOUTHEAST AREA GRID

AST AREA GRID

DISPENSER AREA GRID

ABOVEGROUND STORAGE TANKS

WOODEN RACK

PUMP HOUSE (TO BE DEMOLISHED IN 2016)

SLED AND PLATFORM FORMERLY UTILIZED FOR DRUM STORAGE

WOODEN STORAGE BUILDING

SERVICE SHOP

10,000-GALLON ABOVEGROUND STORAGE TANK

45,000-GALLON ABOVEGROUND STORAGE TANK (TO BE DEMOLISHED IN 2016)

DISPENSER

MW-01 MW-02 MW-03 MW-04 MW-05 MW-06 MW-07

0 25 50
APPROX. SCALE IN FEET

LEGEND

- SOIL BORING CONVERTED TO A MONITORING WELL
- SOIL BORING SAMPLE LOCATION
- PROPOSED EXCAVATION WITH IDENTIFIER
- APPROXIMATE LOCATION OF DRUMS AND CONTAINERS OBSERVED IN 2012
- SAMPLING GRID

2015 SITE CHARACTERIZATION RESULTS

- GRO RESULT ABOVE METHOD 1 CLEANUP LEVEL
- DRO RESULT ABOVE METHOD 1 CLEANUP LEVEL
- 4TMB RESULT ABOVE METHOD 2 CLEANUP LEVEL

ANALYTES AND CLEANUP LEVELS (mg/kg)

GRO	GASOLINE RANGE ORGANICS [100]
DRO	DIESEL RANGE ORGANICS [200]
4TMB	1,2,4-TRIMETHYLBENZENE [49]
[#]	INDICATES ANALYTE CLEANUP LEVELS FOR ARCTIC ZONE CRITERIA

NOTES:

1. SEE TABLE 2 IN THE 2015 SITE CHARACTERIZATION REPORT FOR ALL SOIL ANALYTICAL RESULTS.
2. MUST BE PRINTED IN COLOR.

SOURCE: IMAGE DOWNLOADED FROM ALASKA DEC. CONTAMINATED SITES PROGRAM. DATE UNKNOWN.

FIGURE 3

AGVIQ
ACVIQ ENVIRONMENTAL SERVICES
301 W. Northern Lights Ave, Suite 660
Anchorage, Alaska 99503

2016 PROPOSED AREAS OF EXCAVATION

BARROW SOUTH PAD
2016 CORRECTIVE ACTION PLAN
Barrow, Alaska

DATE: MAY 2016
CHKD: G.B.M.
DRAWN: C.E.H.
PROJ. No.: 4418

ATTACHMENT 1: SURFACE WATER SAMPLING FORM

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SURFACE WATER SAMPLING FORM

AGVIQ ENVIRONMENTAL SERVICES

Location:
PROJECT#: **Date:**
PROJECT NAME: **Start Time:**
SITE: **End Time:**
FIELD TEAM:
SAMPLE ID: **Time:** primary dup/split ms/msd
SAMPLE ID: **Time:** primary dup/split ms/msd
SAMPLE ID: **Time:** primary dup/split ms/msd
WEATHER CONDITIONS:

Sensory Observations (circle all that apply)

Color: clear; amber; tan; brown; grey; milky white; other;
Odor: none; low; medium; high; very strong; H_2S; fuel-like; chemical; unknown
Turbidity: none; low; medium; high; very turbid; heavy silts

Marine	Lake/Pond	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

TEMP	SPECIFIC COND.	CONDUCTIVITY	DO	Ph	ORP
°C	(mS/cm^c)	(µS/cm)	(mg/L)		(mV)

SAMPLE DEPTH (ft)	TOTAL DEPTH (ft)	FLOW DIRECTION	VELOCITY (ft/sec)

Location Diagram/Notes:

ANALYTICAL METHOD	# BOTTLES COLLECTED	BOTTLE TYPE (preservation)	Comments:

Signed Sampler: **Date:**

Signed Reviewer: **Date:**

ATTACHMENT 2: Agviq CONTRACTOR PRODUCTION REPORT

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AGVIQ ENVIRONMENTAL SERVICES **PROJECT #**	**CONTRACTOR PRODUCTION REPORT** (ATTACH ADDITIONAL SHEETS IF NECESSARY)		**DATE OF REPORT:** **REVISION NO:** **REVISION DATE:**
CTO NO:	**PROJECT NAME/LOCATION:**		**REPORT NO:**
PROJECT NO:	**SUPERINTENDENT:**		**SITE H&S SPECIALIST:**
WEATHER CONDITIONS:		**MAX TEMP:**	**MIN TEMP:**

Summary of Safety Issues Identified this day:

Summary of Unsafe Conditions and Unsafe Acts Identified and Discussed with Team:

SAFETY JOB

Was A Job Safety Meeting Held This Date?	☐ Yes	☐ No	**TOTAL WORK HOURS ON JOB SITE THIS DATE** (Including Continuation Sheets)	
Were there any lost-time accidents this date? (If Yes, attach copy of completed OSHA report)	☐ Yes	☐ No	**Onsite Hours**	**Today**
Were there any near misses reported this date? (If Yes, attach description of incident and proposed action)	☐ Yes	☐ No	Agviq	
Were any incidents reported (If Yes, attach description of incident and proposed action)	☐ Yes	☐ No	GeoTek	
Was Hazardous Material/Waste Released into the Environment? (If Yes, attach description of incident and proposed action)	☐ Yes	☐ No	**Total Onsite Hours**	**To Date**
			Agviq	
			GeoTek	

SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTIONS CONDUCTED (Include Safety Violations, Corrective Instructions Given, Corrective Actions Taken, and Results of Safety Inspections Conducted):

EQUIPMENT/MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB

DESCRIPTION OF EQUIPMENT/MATERIAL RECEIVED	MAKE/ MODEL/ MANUFACTURER	EQUIPMENT/ LOT NUMBER	INSPECTION PERFORMED BY	NUMBER/ VOLUME/ WEIGHT

EQUIPMENT USED ON JOB SITE TODAY.

EQUIPMENT DESCRIPTION	EQUIPMENT MAKE/MODEL	SAFETY CHECK PERFORMED	NUMBER OF HOURS		
			USED	IDLE	REPAIR

CHANGED CONDITIONS/DELAY/CONFLICTS ENCOUNTERED (List any conflicts with the delivery order [i.e., scope of work and/or drawings], delays to the project attributable to site and weather conditions, etc.)**: Include Equipment not Operational in Red Bold Font**

VISITORS ON SITE and TIME ONSITE:

LIST OF ATTACHMENTS (OSHA report, confined space entry permit, incident reports, etc.):

FIELD PROJECT PROGRESS REPORT DATE : _____

	Activities Completed Today	Activities Completed to Date	Activities Planned for Next Day	Comment
Soil Borings Sampled				
Monitoring Wells Installed				
Monitoring Wells Sampled				
Surface Waters Sampled				
Sediments Sampled				
Excavated Soil (CY)				
Stockpiled Soil (CY)				
Backfill Received Onsite				
Backfill Placed in Excavation				
Super Sacks Filled				
Samples Shipped To Lab				**Lab and Chemist notified?**
Photographs				
Other activities:				

		Does Issue Require Immediate Attention?	**Lead Person to Resolve Issue**	**Date Identified/Date Resolved**
Issues Identified Today	• .. • ..			
Open Issues Not Resolved	• .. • .. •			
Project or Program Manager Aware of Issue	•			
Variances to Work Plan	• .. •			

Employees Arrived Today:	
Employees Left Site Today:	

AGVIQ ENVIRONMENTAL SERVICES **PROJECT #**	**FIELD PRODUCTION REPORT** (ATTACH ADDITIONAL SHEETS IF NECESSARY)		**DATE OF REPORT:** **REVISION NO:** **REVISION DATE:**
CTO NO:	**PROJECT NAME/LOCATION:**		**REPORT NO:**
PROJECT NO:	**SUPERINTENDENT:**	**SITE H&S LEAD:**	

WORK PERFORMED TODAY

EMPLOYEE	WORK PERFORMED	EMPLOYER	LOCAL HIRE	VILLAGE of RESIDENCE	TITLE/TRADE	HRS

INCLUDE ALL PERSONNEL WORK HOURS IN THE TOTAL WORK HOURS ON JOB SITE

SAFETY REQUIREMENTS HAVE BEEN MET ☐

SUPERINTENDENT'S SIGNATURE _____ DATE _____

Attach Figure from the Work Plan that shows where activities were completed as necessary. (Attached is example Figure)

ATTACHMENT 3: JULY 8 ADEC COMMENTS TO JUNE 20, 2016 DRAFT CORRECTIVE ACTION PLAN

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William Loskutoff

From: Oconnell, Bill A (DEC) <bill.oconnell@alaska.gov>
Sent: Friday, July 08, 2016 11:16 AM
To: Gloria Beckman
Cc: William Loskutoff; Tom Elkins
Subject: RE: CAP for Barrow South Pad RA for Review

Hi Gloria, I got your message on the water sampling from secondary containment, glad to hear nothing was detected above our regulatory levels. Regarding the CAP, I do have a few comments/questions:

1. Section 4.3, page 16 indicates if the excavations reach peat soil below the pad, one sample of peat and pone sample of the underlying frozen material would be collected. We do have cleanup levels for native soil in Method Two and the excavation confirmation sampling requirements do not go away just because you're into the peat, so if you find yourself in this situation, you will need to collect confirmation samples from the bottom of the excavation regardless of the depth or material. Because the cleanup levels are so much higher for peat than for pad gravel and because we would not ask NSB to excavate into the peat soil below the pad so as not to disturb the permafrost, I would accept a single composite sample from excavation bottoms that reach peat material below the pad and I would suggest running silica gel cleanup on those samples. Please revise the work plan accordingly or give me a call to discuss.
2. Section 4.3, page 18 indicates you will be preserving 50 grams of soil with 25 ml of methanol. I have no objection to this, but please also include language that states that the sample material will be completely submerged by the methanol.
3. Table 4-2 is called Excavation Size and Sample numbers. This should probably be revised to Approximate Excavation Size and Sample Numbers as I believe we are currently unsure of the final size of some of the excavations. If the size of the excavation exceeds the size listed on the table, the sample numbers would have to be revised accordingly per the Field Sampling Guidance, so it's probably best to give yourself some flexibility here.

I'll be in office on Monday and Tuesday, then on leave until August so if you are unable to revise this before then, I'll have to hand it off to someone else to issue the approval.

Bill

Bill O'Connell, C.P.G.
Environmental Program Manager
ADEC Contaminated Sites Program
(907) 269-3057

From: Gloria Beckman [mailto:gbeckman@tikigaq.com]
Sent: Friday, July 01, 2016 8:45 AM
To: Oconnell, Bill A (DEC) <bill.oconnell@alaska.gov>
Cc: William Loskutoff <wloskutoff@tikigaq.com>; Tom Elkins <Tom.Elkins@north-slope.org>
Subject: CAP for Barrow South Pad RA for Review

Good Morning Bill,

Please find attached the CAP for the removal action at South Pad for your review and approval. We plan to mobilize next week to demo the tank and secondary containment, and pump house to allow access to the contaminated soil beneath.

We will begin moving soil staged inside the maintenance building to the barge load out area. We won't begin excavation until we receive your approval of the work plan.
Please call me on my cell if you have any questions.

Thanks and have a great 4th of July,

Gloria

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ATTACHMENT 4: JULY 8, 2016 RESPONSE TO ADEC COMMENTS TO DRAFT CAP

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***Document Reviewed**: Barrow South Pad Corrective Action Plan*

***Commenter**: Bill O'Connell* ***Date**: July 11/2016*

***Project**: South Pad Removal Action* ***Responders**: Bill Loskutoff and Gloria Beckman*

Comment/ Response No.	Section	Comment	Response to Comment
1.	Section 4.3, page 16	Indicates if the excavations reach peat soil below the pad, one sample of peat and one sample of the underlying frozen material would be collected. We do have cleanup levels for native soil in Method Two and the excavation confirmation sampling requirements do not go away just because you're into the peat, so if you find yourself in this situation, you will need to collect confirmation samples from the bottom of the excavation regardless of the depth or material. Because the cleanup levels are so much higher for peat than for pad gravel and because we would not ask NSB to excavate into the peat soil below the pad so as not to disturb the permafrost, I would accept a single composite sample from excavation bottoms that reach peat material below the pad and I would suggest running silica gel cleanup on those samples. Please revise the work plan accordingly or give me a call to discuss.	The text will be modified as follows: Table 4-2 of this CAP presents the number of proposed confirmation samples based on estimated size of the excavation. However, if excavation increases or if two adjacent excavations merge the number of samples will be adjusted according to the Field Sampling Guidance Table 2B. Excavations will proceed until confirmation samples confirm contamination exceeding applicable ADEC 18 AAC 75 cleanup levels has been removed or until native tundra is reached. Excavation will stop when native tundra or pad interface is reached, no excavation will exceed the depth of native tundra or impact stability of permafrost. A sample will be collected from the tundra in the bottom of the excavation using a composite approach that creates a sample representative of the contamination remaining in the unexcavated material. A five spot composite sample will be obtained from the bottom of the excavation through collection of a small aliquot of tundra from each corner and the center of the area of concern; a second five spot composite sample will be collected when excavations are 750 SF or greater. The container used for volatile and GRO analysis will be filled directly from each of the five locations (approximately 2-4 grams of tundra will collected and no more than 20 grams will be collected to ensure methanol completely covers the sample). Samples collected for volatiles will not be homogenized; for all other parameters, the tundra will be collected into a clean resealable gallon freezer bag and shaken to homogenize the sample. Sample containers will be filled from the freezer bag. Side wall sample frequency will follow the ADEC Field Sampling Guidance of one per sidewall (typically assume four per excavation) and one additional sidewall sample for excavations over 250 SF biased toward areas with highest PID results. If excavation does not reach native tundra, discreet samples will be collected from the sidewall and bottom of excavation per Table 2B in the ADEC Field Sampling Guidance.
2.	Section 4.3, page 18	Indicates you will be preserving 50 grams of soil with 25 ml of methanol. I have no objection to this, but please also include language that states that the sample material will be completely submerged by the methanol.	The text will be modified as follows: The first sentence in the fouth paragraph of Section 4.3 on page 18 will be revised to read: "When collecting soil samples for VOCs and GRO analyses place approximately 50 grams of soil in a pre-weighed 4-ounce amber jar and submerge the soil completely with 25 millileters (ml) of methanol."
3	Table 4-2 page 17: Excavation Size and Sample Numbers	Is called Excavation Size and Sample numbers. This should probably be revised to Approximate Excavation Size and Sample Numbers as I believe we are currently unsure of the final size of some of the excavations. If the size of the excavation exceeds the size listed on the table, the sample numbers would have to be revised accordingly per the Field Sampling Guidance, so it's probably best to give yourself some flexibility here.	Table 4-2 on page 17 will be modified to read: "Approximate Excavation Size and Sample Numbers".

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