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RCRA CLOSURE PLAN - EPA ID NO. AKR000210740

Hiland Mountain Correctional Center Shooting Range Closure

EAGLE RIVER, ALASKA

SHANNON & WILSON

February 2025

Shannon & Wilson No: 113736-001

Submitted To: United States Environmental Protection Agency - Region 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101
Attn: Kimberly Ogle, Section Manager

Subject: RCRA CLOSURE PLAN - EPA ID NO. AKR000210740, HILAND MOUNTAIN CORRECTIONAL CENTER SHOOTING RANGE CLOSURE, EAGLE RIVER, ALASKA

Shannon & Wilson prepared this Resource Conservation and Recovery Act (RCRA) Closure Plan (Closure Plan) for the Hiland Mountain Correctional Center (HMCC) Shooting Range in Eagle River, Alaska. The Closure Plan has been revised to address the Environmental Protection Agency (EPA) Fourth Notice of Deficiency (NOD) dated January 31, 2025. EPA Comments on the January 2025 HMCC Shooting Range Draft Closure Plan (Enclosure 1 of the January 31, 2025 NOD) are attached to this Closure Plan cover letter. Responses to each EPA Comment have been provided including the Section(s) in the Closure Plan where each comment is addressed.

Our scope of services was specified in Professional Services Agreement Number 240005783 with the State of Alaska Department of Corrections dated June 14, 2024.

If you have questions concerning this Closure Plan, or we may be of further service, please contact the undersigned at 907-561-2120.

Sincerely,

SHANNON & WILSON

LeeAnne Osgood

Dan P. McMahon, PMP
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Enclosure 1. EPA Comments on Draft Work Plan Submittal

Comment 1. "Visible bullet casings and spent shells will be collected by the QEP and properly disposed". Revise statement to "Visible bullet casings and spent shells will be collected by the QEP and properly disposed of in accordance with local, state, and federal regulations.".

Response 1. The statement has been revised as requested in Section 5.3.

Comment 2. "an additional 4 inches will be excavated and additional ISM confirmation sampling conducted in the impacted area to meet final closure". Provide clarification what is meant by impacted area. Does this statement indicate DUs? Also, please revise "to meet final closure" to "meet the closure performance standards under 40 CFR 265.111".

Response 2. The statement has been revised to "an additional 4 inches of soil will be excavated and additional ISM confirmation sampling conducted in the decision unit where concentrations of COCs are greater than the applicable CULs to meet the closure performance standards under 40 CFR 265.111" in Section 5.5.

Comment 3. "the analytical laboratory results from the 2009 and 2018 sampling will be used to characterize the excavated soil and vegetation for disposal". Unclear if the waste determination and disposal procedures outlined in this paragraph applies to potential waste identified by the additional site characterization work.

Response 3. The statement has been revised to "the analytical laboratory results from the 2009 and 2018 sampling and 2025 additional site characterization activities, as applicable, will be used to characterize the excavated soil and vegetation for disposal". In addition, "and waste management" has been added to Sections 5.1.1.2 and 5.1.2 to clarify that the waste determination and disposal procedures outlined in Section 6 apply to potential waste identified by the additional site characterization work.

Comment 4. It is unclear how the liquid waste generated from the decontamination activities will be characterized and disposed of. Department of Corrections (DOC) needs to provide the process used to make a waste determination in accordance with 40 CFR 262.11 and provide a method of disposal, as appropriate to the determination.

Response 4. The statement "The solids and liquids generated during decontamination are assumed to be impacted with lead and considered hazardous waste and will not be sampled." has been added to Section 5.6. In addition, the first sentence in Section 6 has been revised to "The impacted media including containerized soil and bullets/lead fragments, remnant vegetation, and solids and liquids generated during decontamination efforts are considered hazardous waste and will be transported and disposed in accordance with EPA regulations.".

Comment 5. "recommendations for applying the targeted limited removal actions outlined in this closure plan will be provided in this letter report, if necessary". It is unclear how recommendations (not clearly identified activities supporting closure) will support final closure of the shooting range in accordance with identified closure performance standards and 40 CFR 265. DOC needs to indicate how the interim report will be used (e.g. the report will provide additional site characterization to fill the data gaps on the COCs. If additional site characterization indicates that identified COCs exceeds the closure performance standards CULs, then additional targeted removal actions will be completed until the closure performance standards are met, as shown by additional confirmation sampling). Also, please clarify if and when EPA will be provided a copy of this report.

Response 5. The statement "recommendations for applying the targeted limited removal actions outlined in this closure plan will be provided in this letter report, if necessary" has been revised to "Specifically, the letter report will document the additional site characterization results used to address the data gaps on the COCs. If additional site characterization indicates that identified COCs exceed the closure performance standards CULs, then additional targeted removal actions as outlined in this Closure Plan will be completed until the closure performance standards are met, as shown by additional confirmation sampling." in Section 8.1. The statement "The DOC will submit the Interim Additional Site Characterization Letter Report to EPA and ADEC per the Project Schedule in Figure 4." has been added to Section 8.1.

Comment 6. The closure certification requirements are not included in the closure work plan. DOC must provide in the workplan how it intends to meet the requirements of 40 CFR 265.115.

Response 6. The closure certification requirements of 40 CFR 245.115 have been added in Section 8.3. In addition, the closure certification submittal date has been added to the Project Schedule in Figure 4.

Comment 7. The survey plat requirements of 40 CFR 265.116 are not included in the closure work plan. DOC must provide in the workplan how it intends to meet the requirements of 40 CFR 265.116.

Response 7. The survey plat requirements of 40 CFR 265.116 have been addressed in Section 8.4. Note that neither landfill cells or hazardous waste disposal units will be present following the closure activities; therefore, a survey plat will not be conducted.

Comment 8. "comparison of sample results to applicable regulatory cleanup levels.". Sample results need to be compared to the established closure performance standards used in the closure plan.

Response 8. The statement "comparison of sample results to applicable regulatory cleanup levels" has been revised to "comparison of sample results to the established closure performance standards used in the Closure Plan" in Section 8.2.

Comment 9. "…DOC intends to implement this closure plan during the 2025 summer season". In addition to this statement, DOC must implement the closure activities in accordance with the provided schedule in the closure plan, once approved by EPA.

Response 9. Section 9 has been edited to indicate the closure activities will be conducted in accordance with the Project Schedule once the Closure Plan is approved by EPA.

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ACRONYMS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
bgs	Below Ground Surface
CFR	Code of Federal Regulations
COC	Contaminant of Concern
CoC	Chain-of-Custody
CSM	Conceptual Site Model
CUL	Cleanup Level
CV	Coefficient of Variation
cy	Cubic yards
DNT	2,4-dinitrotoluene
DOC	Alaska Department of Corrections
EPA	Environmental Protection Agency
HMCC	Hiland Mountain Correctional Center
HPLC	High Performance Liquid Chromatography
HWMU	Hazardous Waste Management Unit
IBCs	Intermodal Bulk Containers
ID	Identification Number
IDW	Investigation Derived Waste
ISM	Incremental Sampling Method
ITRC	Interstate Technology & Regulatory Council
mg/kg	Milligram Per Kilogram
mg/L	Milligrams Per Liter
NG	Nitroglycerin
NOD	Notice of Deficiency
PAHs	Polynuclear Aromatic Hydrocarbons
QEP	Qualified Environmental Professional
RCRA	Resource Conservation and Recovery Act
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leaching Procedure
UCL	Upper Confidence Level

1 INTRODUCTION

This Resource Conservation and Recovery Act (RCRA) Closure Plan (Closure Plan) has been prepared in accordance with 40 Code of Federal Regulations (CFR) Part 265.112. The Closure Plan includes a description of the methods to conduct a targeted limited removal action at the inactive Hiland Mountain Correctional Center (HMCC) shooting range, located in Eagle River, Alaska.

The purpose of this project is to close the inactive shooting range in accordance with applicable federal regulations in 40 CFR 265.111 through the removal of lead-impacted soil and bullet/lead fragments such that future maintenance of the shooting range is not necessary and potential exposure to human health and the environment is minimized.

The inactive shooting range is the only hazardous waste management unit at the site. The targeted limited removal action described herein will cover the maximum extent of historical operations of the inactive HMCC shooting range. No portion of the inactive HMCC shooting range will remain unclosed following implementation of the targeted limited removal action.

The project objective is to conduct closure activities to meet closure performance standards that protect human health and the environment. The closure activities will be conducted in accordance with Environmental Protection Agency (EPA) regulations in 40 CFR 265 and the Alaska Department of Environmental Conservation (ADEC) regulations 18 Alaska Administrative Code (AAC) 75 and 18 AAC 60 regarding shooting ranges and solid waste. Activities conducted to accomplish the project objective will include additional site characterization to address identified data gaps; removal of vegetation, concrete, lead-impacted soil, and bullets/lead fragments; confirmation sampling to evaluate the effectiveness of the targeted limited removal action; decontamination of remedial equipment; containerization and transportation of generated wastes including soil, concrete, and vegetation for off-site disposal; and reporting.

2 SITE DESCRIPTION AND BACKGROUND

2.1 Site Description

The inactive HMCC shooting range (Site) is located east of the Glenn Highway frontage road, in the southeast ¼ of Section 14, Township 14 North, Range 2 West, Seward Meridian, Alaska. For the purposes of this report, the "Site" is defined as the former active HMCC

shooting range located east of the HMCC structures. A vicinity map showing the Site and surrounding area is included as Figure 1. The former HMCC shooting range activities were conducted within an approximately 0.6-acre area. A site plan of the area showing the approximate boundary of the former HMCC shooting range is included as Figure 2. A detailed site plan showing the layout of the former HMCC shooting range site features including the firing lanes, target brackets, and backstop / impact area is included as Figure 3. Photographs of the current condition of the former shooting range are included in Appendix A.

The former shooting range included eight (8) firing lanes formed by approximately 3 feet wide by 90 feet long concrete walkways running east to west and a backstop berm located at the east end of the range as shown in Photo 1. Target brackets were positioned at the east end of each concrete walkway as shown in Photo 2. During a site visit on July 8, 2024, the concrete walkways were observed to be in various states of degradation. Vegetation, including grass and alders, covered the areas in between the concrete walkways and backstop berm, respectively.

2.2 Historical Site Use

The Site was used as a shooting range by the Alaska Department of Corrections (DOC) between 1980 and 1998. It is our understanding that the range was used by the DOC staff and other law enforcement personnel. Weapons used at the range were primarily handguns (.38 and .40 caliber) and shotguns (12 gage). The range is approximately 30 yards long. Weapons were fired at stationary targets set in steel brackets mounted in the concrete firing lanes using slugs or 00-buckshot. Moving targets as at trap or skeet ranges were not used; therefore, the HMCC shooting range was only operated as a static range. The range is currently inactive and has not been used for any other activity that would preclude its use as a firing range. DOC staff are unaware of any regrading activities at the range backstop.

2.3 Prior Investigations

Site characterizations were conducted at the HMCC in 2009 and 2018 to identify the nature and extent of lead-impacted soil. Copies of the 2009 and 2018 Site Characterization reports are included in Appendix B.

2.3.1 2009 Baseline Soil Sampling

Site characterization efforts were initially conducted at the former HMCC shooting range in 2009 to evaluate the extent and degree of lead-impacted soil. Surface soil samples were collected and screened from three separate areas: grid area, target line, and berm backstop. The grid comprised of four approximately equal areas, between the firing line and the target

line. Using hand tools, the samples were collected from the upper 4 inches of surface soil to qualitatively evaluate and document the extent of lead impact. The target line and the berm backstop area soils were qualitatively evaluated to a maximum depth of 12 inches below ground surface (bgs). Spent ammunition casings were observed throughout the Site, although no visible lead fragments were noted in the sample areas.

A total of 43 surface soil samples were visually screened for lead fragments, and eight analytical samples were collected. Analytical samples were collected from four locations within the grid, with one sample from each of the four areas. Within each grid, analytical samples were collected from areas where the most spent cartridges were observed. Samples were also collected from two locations along the former target line and two locations from the backstop berm. The eight samples were analyzed for total lead by EPA Method 6020 and leachable lead by Toxicity Characteristic Leaching Procedure (TCLP) using EPA Method 1311/6020. In addition, the two samples collected from the former target line were analyzed for total and leachable concentrations of the remaining seven RCRA metals (arsenic, barium, cadmium, chromium, mercury, selenium, and silver).

Six of the eight analytical soil samples contained lead concentrations [49,800 milligram per kilogram (mg/kg) maximum] that exceed the ADEC Method Two cleanup level for residential soil (400 mg/kg). Additionally, leachable lead concentrations [684 milligrams per liter (mg/L) maximum] in five samples also exceed the RCRA standard for leachable lead (5 mg/L). The highest concentrations were reported in the samples from the berm backstop.

Concentrations of total arsenic (27.8 mg/kg maximum) and chromium (66.5 mg/kg maximum) in the two former target line samples exceeded the 2018 ADEC Method Two cleanup levels (3.9 mg/kg and 25 mg/kg, respectively). It was Shannon & Wilson's opinion that the arsenic and chromium concentrations were considered within background concentrations.

2.3.2 2018 Site Characterization

Additional site characterization activities were conducted in 2018 to evaluate the potential costs associated with range closure. The site characterization activities included further identifying areas containing spent bullets and bullet fragments, documenting the extent of lead contamination in soil, and conducting bench-scale testing to evaluate the effectiveness of stabilizing the lead in soil. The following decision units were identified for the 2018 site characterization and their approximate locations are shown on Figure 3.

- Decision Unit 1. Measuring 40 feet by 140 feet; encompassing the firing line and approximately 15 feet east and downrange.

- Decision Unit 2. Measuring 45 feet by 140 feet; positioned adjacent east and downrange of Decision Unit 1.
- Decision Unit 3. Measuring 50 feet by 140 feet; positioned adjacent east and downrange of Decision Unit 2; encompassing the target line with target brackets.
- Decision Unit 4. Measuring 42 feet by 140 feet; positioned adjacent east of Decision Unit 3 and encompassing the backstop berm and impact area. The impact area measured approximately 12 feet by 110 feet within Decision Unit 4.

Based on the sampling conducted, the soil in Decision Units 1 and 2 meet the EPA's criterion of 5 mg/L leachable lead and ADEC residential criteria of 400 mg/kg for allowable lead concentration. The soil in Decision Unit 1 had 61.4 mg/kg total lead, 83.5 mg/kg 95% upper confidence level (UCL) of the mean total lead concentration, and 0.556 mg/L TCLP lead. The soil in Decision Unit 2 had 193 mg/kg total lead, 262 mg/kg 95% UCL of the mean total lead concentration, and 0.799 mg/L TCLP lead. In addition, bullets and lead fragments were not observed. The site characterization results for total and TCLP lead indicated remedial activities were not required in Decision Units 1 and 2 for range closure.

The soil in Decision Units 3 and 4, and the Impact Area, exceed the ADEC criterion for lead in soil for residential (400 mg/kg) and commercial (800 mg/kg) exposure scenarios. The soil also exceeds the EPA's criteria for leachable lead (5 mg/L). These results are consistent with the results of the discreet sampling conducted in the 2009 Baseline Soil Sampling.

Based on the bench-scale testing conducted, the addition of rock phosphate will not adequately stabilize the lead to meet the leachability criteria. Bullets and lead fragments were observed in the samples collected from Decision Unit 4 and the Impact Area. Sieving was effective at collecting bullets and bullet fragments, however the soil that passed through the sieve failed the leachability criterion for lead.

3 CONCEPTUAL SITE MODEL

Based on the findings from the 2009 and 2018 site characterization efforts, a conceptual site model (CSM) was prepared to identify contaminants and environmental media of concern and potential exposure pathways at the inactive HMCC shooting range.

3.1 Contaminants of Concern

Potential contaminants of concern (COCs) typically present at small firing ranges may include the target analyte list (TAL) metals lead, arsenic, antimony, copper, nickel, and zinc; polynuclear aromatic hydrocarbons (PAHs); and unburned propellants (ITRC, 2003; EPA, 2012).

3.1.1 Lead

Lead has been determined to be a COC based on the 2009 and 2018 site characterization efforts. Both total and leachable lead concentrations were documented at the Site at concentrations exceeding applicable regulatory cleanup levels presented in Section 4.3.

3.1.2 Arsenic, Antimony, Copper, Nickel, and Zinc

The analytical suite for the 2009 baseline characterization sampling included the eight RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). Relatively elevated concentrations of total arsenic and chromium were documented in soil from the target line. The arsenic and chromium concentrations were within the background concentrations expected for the area; however, a site-specific background sample has not been collected. Therefore, arsenic is considered a potential COC. Chromium is not a potential COC for small arm firing ranges.

Antimony, copper, nickel, and zinc concentrations in soil have not been characterized; therefore, these metals are considered potential COCs.

3.1.3 Polynuclear Aromatic Hydrocarbons

PAHs are not expected to be present at the former HMCC shooting range since clay targets were not used. PAHs are not considered COCs.

3.1.4 Propellants

Unburned propellants present as microscopic discrete particles are potential COCs at small arm firing ranges. Specifically, 2,4-dinitrotoluene (DNT) and nitroglycerin (NG) are commonly used in propellants. In most cases, the residue of unburned propellants at a small arm firing range is deposited close to the firing position and within 5 meters (15 feet) to 10 meters (30 feet) downrange for pistols and rifles, respectively (EPA, 2012).

DNT and NG in soil have not been characterized; therefore, are considered potential COCs.

3.2 Environmental Media of Concern

Potential environmental media of concern at the inactive HMCC shooting range include soil, groundwater, surface water / sediment, and air.

3.2.1 Soil

The primary environmental media of concern is soil where the bullets / lead fragments are deposited. Results from the 2009 and 2018 site characterization effort indicate lead-impacted

soil at concentrations exceeding applicable regulatory cleanup levels is present at the Site within the former shooting range boundary. The vertical depth of lead-impacted soil has been determined to extend a maximum depth of 12 inches bgs. Direct contact with the lead-impacted soil through incidental ingestion and dermal contact is a potentially complete exposure route.

Additionally, soil outside the bullet / lead fragment deposition area may be impacted as the result of overspray and runoff or windblown movement of lead-impacted soil particles. The soil outside of the deposition area has not been characterized.

3.2.2 Groundwater

Groundwater in the bullet / lead fragment deposition area is a potential environmental media of concern through the migration of COCs from impacted soil. Groundwater in the HMCC vicinity is approximately 35 feet bgs based on site characterization activities conducted by Shannon & Wilson at the HMCC in 2004. Groundwater has not been characterized at the Site for the known and potential COCs; however, the maximum extent of lead-impacted soil is 12 inches bgs. The migration to groundwater is not considered a complete pathway based on the limited vertical extent of lead-impacted soil.

3.2.3 Surface Water and Sediment

Surface water and sediment, either directly or potentially via surface water runoff/migration, are also potential media of concern. The closest surface water body is Eagle River, which at its closest point, is located approximately 1,700 feet east of the Site. The migration to surface water / sediment is not currently considered a complete pathway due to the distance from the Site.

3.2.4 Air

Volatile COCs are not present at the Site; therefore, air is considered an incomplete exposure pathway.

3.3 Summary of Identified Data Gaps

Data gaps that may affect the final closure of the inactive HMCC shooting range have been identified. The following data gaps will be addressed during the targeted limited removal actions.

- Antimony, copper, nickel, and zinc are potential metal COCs in soil within the deposition area that have not been characterized.

- Propellants, specifically DNT and NG, are potential COCs in soil within the deposition area that have not been characterized.
- Concrete forming the firing lane walkways has not been characterized for disposal.
- Soil beneath the concrete firing lane walkways has not been characterized.
- Soil outside the boundary of the deposition area has not been characterized for impact of known and potential COCs from overspray and/or migration resulting from runoff or windblown movement of impacted soil particles.
- A background sample from a non-impacted area in the vicinity of the Site has not been collected to determine concentrations of known and potential COCs that would be present in the absence of the shooting range.

4 REGULATORY STATUS

Under traditional interpretations of ADEC and RCRA regulations, lead shot and lead-contaminated soil that is moved, excavated or otherwise managed is a generated waste, and subject to 40 CFR 262.11 requiring evaluation for hazardous characteristics that may cause it to be classified as a hazardous waste. Based on the sampling conducted on the Site, soil excavated would be classified as a characteristic hazardous waste. This classification necessitates obtaining an EPA identification number, conducting cradle-to-grave tracking of the generated material, and disposing the material in a permitted RCRA Subtitle C landfill if it fails the RCRA criteria for leachable lead.

Moreover, recent court cases and EPA interpretations suggest that lead shot in the environment, even if undisturbed by human activities, can become a RCRA waste, if present at a closed or abandoned shooting range. This changes the traditional interpretation and can require removing all lead shot from the range; regardless if the soil samples pass the ADEC and RCRA criteria.

The Site is currently classified as an inactive range. No changes to the range have occurred that would prevent the range from becoming active in the future. The long-term intent of DOC is to close this range and continue to use other facilities for training.

4.1 EPA Identification Number

The HMCC shooting range has been assigned the EPA Site Identification Number (ID) AKR000210740. This ID will be used in conducting cradle-to-grave tracking of the excavated lead-impacted soil and removed bullets and lead fragments.

4.2 Hazardous Waste Inventory

In accordance with 40 CFR 265.112(b)(3), an "estimate of the maximum inventory of hazardous waste ever on-site over the active life of the facility" must be included in the Closure Plan. Hazardous waste was not present on Site during the HMCC shooting range operations from 1980 to 1998.

Approximately 400 cubic yards (cy) of lead-impacted soil are estimated to be present at the Site and are considered a hazardous waste due to the former firing range activities.

4.3 Regulatory Cleanup Levels

ADEC and EPA criteria will be used to determine if closure performance standards have been satisfied.

ADEC soil cleanup levels (CULs) for total TAL metals (arsenic, antimony, copper, nickel, and zinc) are based on the October 2023 Oil and Other Hazardous Substances Pollution Control Regulations of 18 AAC 75.341, Table B1. Method Two migration to groundwater (mtg) levels. ADEC soil CULs listed below will be used for evaluating the proposed additional site characterization soil sampling efforts and excavation confirmation sampling. Note that the naturally occurring arsenic concentrations in soil in the vicinity of the Site are expected to be greater than the ADEC mtg CUL. The results of the proposed Background Area ISM sample (Section 5.1.3) will be considered when evaluating the additional site characterization soil samples and excavation confirmation samples for the potential COCs. The greater concentration of either the 95% upper confidence level (UCL) of the mean concentrations of Background Area ISM sample or the ADEC mtg CUL will be used.

ADEC CULs for DNT and NG are based on the October 2023 Oil and Other Hazardous Substances Pollution Control Regulations of 18 AAC 75.341, Table B1. Method Two Under 40 Inch Zone Human Health (HH) levels listed below and will be used for evaluating the additional site characterization soil samples.

The EPA regional screening level (RSL) for residential soil lead presented in the January 17, 2024 Memorandum regarding Updated Residential Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities will be used for evaluating the total lead concentrations in the proposed additional site characterization soil sampling efforts, excavation confirmation sampling, and decontamination equipment samples.

The EPA RCRA hazardous waste characteristic levels in 40 CFR 261.24, Table 1 TCLP levels will be used for waste management including the transport and disposal of impacted soil and concrete.

Exhibit 4-1: Applicable Cleanup Levels (CULs)

COC	ADEC Migration to Groundwater (mg/kg)	ADEC Human Health (mg/kg)	EPA RSL (mg/kg)	EPA TCLP (mg/L)
Arsenic	0.20	–	–	–
Antimony	4.6	–	–	–
Copper	370	–	–	–
Lead	–	–	200	5.0
Nickel	340	–	–	–
Zinc	4,900	–	–	–
NG	–	8.2	–	–
DNT	–	23	–	–

5 OVERVIEW OF SHOOTING RANGE CLOSURE PROCEDURES

The selected remedy for final closure of the former HMCC shooting range is a limited targeted removal action of surface soil and lead fragments/bullets.

The closure process will entail implementation of the actions discussed below. Although the closure activities have been funded, the DOC is currently evaluating contracting mechanisms.

Fieldwork on this project will be conducted by an ADEC-Qualified Environmental Professional (QEP), provided by Shannon & Wilson, as defined by 18 AAC 75.333. An appropriately qualified contractor (Contractor) will provide equipment and personnel to prepare the Site and excavate, temporarily store, transport, and dispose of the impacted soil, lead fragments/bullets and concrete. A laboratory with the appropriate ADEC certifications will conduct the analytical testing of the soil and concrete.

5.1 Additional Site Characterization Activities

Additional site characterization will be conducted at the Site prior to implementing the targeted limited removal action to address data gaps identified in the CSM.

5.1.1 Deposition Area

The 2009 and 2018 site characterization efforts targeted sampling within the deposition area of the inactive HMCC shooting range in four discreet decision units. The results indicated remedial activities are not required in Decision Units 1 and 2 for range closure. However, data gaps identified in the CSM must be addressed prior to making this determination.

5.1.1.1 Concrete

The eight (8) firing lanes were formed by approximately 3 feet wide by 90 feet long concrete walkways. Neither the concrete nor the soil underlying the concrete walkways were characterized. The following will be conducted to remove and characterize the concrete for appropriate disposal.

The Contractor will use an excavator to remove the concrete. The concrete will be cleaned with a steel brush within the decision unit in which it was generated to remove loose soil and vegetation. Following dry brushing, the concrete will be stockpiled and placed on and covered by 10-mil liners. Based on an assumed thickness of 6 inches, an estimated 50 cubic yards (cy) of concrete (approximately 25 cy from Decision Units 1 and 2 and approximately 25 cy from Decision Unit 3) will be removed and stockpiled for sampling. The concrete remnants will be segregated into two stockpiles with concrete removed from Decision Units 1 and 2 in one stockpile and concrete removed from Decision Unit 3 in a second stockpile. The concrete walkways do not extend into Decision Unit 4.

The QEP will collect samples from the stockpiled concrete to characterize the solid waste for disposal. Four (4) composite samples (2 samples from each stockpile) will be collected. The sample locations will be selected to be spatially representative of the top, bottom, and sides of the concrete remnants. A rotary impact hammer drill equipped with a 1-inch diameter carbide drill bit, or equivalent sampling device, will be used to drill into the concrete to a depth of approximately 0.5 inches to collect the minimum required sample mass of 10 grams. A new, disposable Scoopula®, or equivalent collection device, will be used to retrieve the uniform, finely ground powder from the drill holes. The sample material will be weighed with a digital scale and placed in the appropriate laboratory supplied sample container.

The composite concrete samples will be analyzed for TCLP lead. The analytical results of the concrete samples will be compared to the EPA TCLP lead CUL of 5 mg/L to determine appropriate disposal options. If concentrations TCLP lead are less than 5 mg/L, the concrete will be disposed of as solid waste. If the concentrations of TCLP lead exceed 5 mg/L, the concrete will be disposed of as a hazardous waste as discussed in Section 6.

Upon removal of the concrete walkways, the underlying soil will be exposed and characterized in Decision Units 1 and 2 as discussed in Section 5.1.1.2.

5.1.1.2 Soil in Decision Units 1 and 2

To address the soil data gaps within the deposition area of Decision Units 1 and 2, an Incremental Sampling Method (ISM) will be used by the QEP to obtain statistically representative samples of the surface soil after the concrete has been removed. The samples will be analyzed for TAL metals lead, arsenic, antimony, copper, nickel, and zinc and propellants DNT and NG. The analytical results of the ISM samples will be compared to the applicable following CULs to determine if remedial activities are required:

- Arsenic - 0.20 mg/kg
- Antimony - 4.6 mg/kg
- Copper - 370 mg/kg
- Lead - 200 mg/kg
- Nickel - 340 mg/kg
- Zinc - 4,900 mg/kg
- NG - 8.2 mg/kg
- DNT - 23 mg/kg

If concentrations of one or more of the analytes exceed the CULs, the targeted limited removal actions and waste management outlined in this Closure Plan will be applied to the decision unit(s) to meet final closure.

5.1.1.3 Data Gaps in Decision Units 3 and 4

Data gaps were also identified for the presence / absence of antimony, copper, nickel, and zinc in Decision Units 3 and 4. However, Decision Units 3 and 4 will not be sampled during the additional site characterization efforts since targeted limited removal actions will be implemented due to the presence of lead-impacted soil. Confirmation soil samples collected after the lead-impacted soil and concrete walkway removal will be analyzed for the TAL metals.

5.1.2 Perimeter Surface Soil Characterization

Surface soil along the perimeter of the deposition area may be impacted from overspray and/or migration resulting from runoff or windblown movement of impacted soil particles. Eleven (11) discrete surface soil samples will be collected by the QEP from the approximate locations shown in Figure 3. The sample locations are selected to be spatially representative. Each perimeter surface soil sample will be analyzed for total TAL metals. In addition, the four perimeter surface soil samples adjacent to Decision Units 1 and 2 will be analyzed for propellants DNT and NG.

Analytical results of the perimeter surface soil sampling will be compared to the below applicable CULs to determine if overspray or soil particle migration resulted in impacted surface soil outside of the deposition area.

- Arsenic - 0.20 mg/kg
- Antimony - 4.6 mg/kg
- Copper - 370 mg/kg
- Lead - 200 mg/kg
- Nickel - 340 mg/kg
- Zinc - 4,900 mg/kg
- NG - 8.2 mg/kg
- DNT - 23 mg/kg

If concentrations of COCs are greater than the applicable CULs, the targeted limited removal actions and waste management outlined in this Closure Plan will be applied to the impacted area to meet final closure.

5.1.3 Background Soil Sample

A background sample will be collected by the QEP to determine concentrations of known and potential COCs that are present on Site in the absence of the shooting range. ISM will be used to obtain a statistically representative sample of the surface soil from an area similar in size to Decision Unit 1 at the approximate location shown in Figure 2.

5.2 Mobilization for Targeted Removal Action

The Contractor will coordinate with the DOC representative for site access. Mobilization to the former shooting range can be conducted without entrance to the fenced and secured area of the HMCC.

At least three days prior to the excavation of lead-impacted soil, the utility locate center will be contacted by the Contractor to mark buried utilities within the project area.

The Contractor will mobilize the equipment and materials needed to clear vegetation, temporarily store concrete and excavated soils, excavate soils, and transport impacted soils and concrete to an off-site disposal facility.

5.3 Grubbing and Site Preparation

Based on a site visit conducted on July 8, 2024, the closed shooting range and backstop areas are covered with vegetation (primarily grass and alders) as seen in Photos 1 and 2 in Appendix A. In addition, remnants of the concrete walkways and the target brackets for the eight (8) firing lanes are present.

The vegetation within Decision Units 3 and 4 will be mowed and/or hydro-axed by DOC or a subcontractor to cut the vegetation down to within several inches of the ground surface. The cut vegetation will be collected and left adjacent to and outside of the Decision Units 3 and 4 excavation areas. The remaining vegetation and roots will be removed during excavation of the impacted surface soil. The remnant vegetation that is excavated will be containerized and disposed with the impacted soil.

Although no soil excavation is anticipated in Decision Units 1 and 2 for range closure, bullet casings and spent shells were observed during the 2009 and 2018 sampling efforts. Visible bullet casings and spent shells will be collected by the QEP and properly disposed of in accordance with local, state, and federal regulations.

5.4 Excavation of Impacted Soil

5.4.1 Initial Soil Removal

Following the site preparation effort, the Contractor will conduct the soil removal activities. The upper four-inches of soil from Decision Unit 3, the upper 18-inches of soil from Decision Unit 4, and the upper 18-inches of soil from the Impact Areas will be removed and disposed as a D008 characteristic hazardous waste. Based on previous field work, an estimated 400 cy of lead-impacted soil will be excavated from Decision Units 3 and 4 and the Impact Area. Excavated soil, along with the remnant vegetation and roots, will be stockpiled and placed on and covered by 10-mil liners to prevent the spread of lead contamination or placed directly in the container(s) selected for off-site transport. The soil will be containerized in 1-cy super sacks or 5-yard or 13-yard intermodal bulk containers (IBCs), depending on cost and availability at the time of the remedial activities.

5.4.2 Metal Detector and Additional Impacted Soil Excavation

Following the initial soil removal, a metal detector will be used to evaluate the newly exposed surface soil for bullets and lead fragments. The QEP will walk along transects spaced approximately 5 feet apart with the metal detector to evaluate the Decision Units 3 and 4 and Impact Areas. If bullets or lead fragments are observed, they will be removed and containerized for disposal. The location of the bullets/lead fragments will be marked

with lathe or an equivalent method. After removal, an additional 2 to 4 inches of soil will be excavated by the Contractor for disposal from the area directly beneath the former bullet/lead fragment location. The area will then be rescreened with the metal detector to confirm the removal of bullets/lead fragments.

5.5 Excavation Confirmation Sampling

Once the soil and/or bullets and lead fragments have been removed, confirmation sampling will be conducted by the QEP. ISM will be used to obtain statistically representative samples of the surface soil from Decision Units 3 and 4 and the Impact Areas.

Analytical results of the ISM confirmation soil sample will be compared to the below applicable CULs to confirm the remaining soil is not impacted with COCs exceeding the applicable CULs.

- Arsenic - 0.20 mg/kg
- Antimony - 4.6 mg/kg
- Copper - 370 mg/kg
- Lead - 200 mg/kg
- Nickel - 340 mg/kg
- Zinc - 4,900 mg/kg

If concentrations of COCs are greater than the applicable CULs, an additional 4 inches of soil will be excavated and additional ISM confirmation sampling conducted in the decision unit where concentrations of COCs are greater than the applicable CULs to meet the closure performance standards under 40 CFR 265.111.

5.6 Decontamination of Sampling Equipment

Clean, disposable sampling equipment and supplies (spoons, lathe, carbide drill bit, scoops, etc.) that will be in contact with the impacted soil and potentially impacted concrete will be used by the QEP. Decontamination of the sampling tools will therefore not be needed. The sampling equipment and supplies will be managed as discussed in Section 6.

The Contractor will be responsible for decontamination of heavy equipment and supplies used to conduct the soil excavation and containerization efforts. The Contractor will establish a decontamination zone outside of the active excavation area. Equipment will be dry brushed to remove visible soil from surfaces formerly in contact with excavated soil. A detergent wash with potable water rinse will be conducted to remove visible soil. Solids and liquids generated during decontamination efforts will be containerized for disposal with the

lead-impacted media per Section 6. The solids and liquids generated during decontamination are assumed to be impacted with lead and considered hazardous waste and will not be sampled.

6 WASTE MANAGEMENT

The impacted media including containerized soil and bullets/lead fragments, remnant vegetation, and solids and liquids generated during decontamination efforts are considered hazardous waste and will be transported and disposed in accordance with EPA regulations. The HMCC shooting range has been assigned the EPA ID AKR000210740 which will be used in conducting cradle-to-grave tracking of the lead-impacted media. The containerized impacted media will be transported off-Site for disposal by the Contractor to a permitted RCRA Subtitle C landfill. The analytical laboratory results from the 2009 and 2018 sampling and 2025 additional site characterization activities, as applicable, will be used to characterize the excavated impacted soil and vegetation for disposal. The Contractor will complete the appropriate hazardous waste manifests and documentation for transportation and disposal tracking.

The ADEC will be contacted under separate cover prior to disposal of the impacted media. The QEP will complete the ADEC's Transport, Treatment & Disposal Approval Form for Contaminated Media and provide analytical soil data for ADEC review and approval prior to coordinating impacted soil disposal. A copy of the ADEC's Transport, Treatment & Disposal Approval Form is included in Appendix C.

Disposal of the stockpiled concrete remnants will be based on the results of the characterization samples. If the TCLP lead concentrations are less than 5 mg/L, the concrete remnants will be transported and disposed as solid waste at the local Anchorage Regional Landfill (ARL) in Eagle River by the Contractor. If the TCLP lead concentrations are greater than 5 mg/L, the concrete remnants are hazardous waste and will be transported and disposed at a permitted RCRA Subtitle C landfill in the same manner as the lead-impacted soil. The Contractor will complete the appropriate hazardous waste manifests and documentation for transportation and disposal tracking.

Investigation-derived waste (IDW) will consist of PPE, disposable sampling equipment and supplies, and decontamination supplies. Other waste may include empty bullet casings and/or shotgun shells. IDW will be containerized with the lead-impacted media for disposal at a permitted RCRA Subtitle C landfill.

7 CLOSURE SAMPLING AND ANALYSIS PLAN

The closure sampling and analysis plan will be implemented by the QEP and a selected ADEC-certified analytical laboratory.

7.1 Field Procedures

7.1.1 Additional Site Characterization

One ISM sample will be collected from each of the two decision units (Decision Units 1 and 2) and from the Background Area shown on Figure 2 using the methodology for non-volatile samples outlined in the ITRC Incremental Sampling Methodology, Technical and Regulatory Guidance (January 2020) and the ISM reference document included in Appendix D. In addition, duplicate and replicate samples will be collected from Decision Units 1 and 2 and the Background Area. The sub-portion samples will be collected from the undisturbed soil from the ground surface to 2 inches below grade.

Eleven (11) discrete surface soil samples will be collected from the approximate locations shown on Figure 2 for the perimeter sampling. The samples will be collected from the undisturbed soil from the ground surface to 2 inches below grade. One duplicate sample will be collected from one of the four discrete surface soil sampling locations adjacent to Decision Units 1 and 2.

Four (4) composite concrete samples will be collected as discussed in Section 5.1.1.1.

7.1.2 Excavation Confirmation

One ISM sample will be collected from Decision Unit 3, Decision Unit 4, and the Impact Area using the methodology for non-volatile samples outlined in the ITRC Incremental Sampling Methodology, Technical and Regulatory Guidance (January 2020) and the ISM reference document included in Appendix D. In addition, duplicate and replicate samples will be collected from Decision Unit 3, Decision Unit 4, and the Impact Area and the sub-portion samples will be collected from the undisturbed soil from the excavation base to 2 inches below.

7.2 Documentation

Documents for implementing the planned remedial activities include the following:

- Soil Sampling Form used to record the ISM field sampling data

- Chain-of-Custody (CoC) to document the transfer of samples from the field to the laboratory
- ADEC Transport, Treatment & Disposal Approval Form for Contaminated Media

Copies of these forms are included in Appendix C.

In addition, a description of field efforts will be recorded daily in a field book to document the additional site characterization and closure activities and photographs will be taken to document the range closure activities.

7.3 Analytical Program

The project soil samples will be delivered to the selected analytical laboratory using chain of custody procedures and tested on a standard 21 day turnaround time.

Project soil samples for the additional site characterization effort will include:

- three (3) primary ISM samples collected from Decision Units 1 and 2 and the Background Area,
- three (3) duplicate/replicate ISM samples collected from Decision Units 1 and 2 and the Background Area,
- eleven (11) primary discrete samples collected from the deposition area perimeter,
- one duplicate discrete sample collected from the deposition area perimeter, and
- four (4) composite concrete samples.

Each of the additional site characterization ISM and discrete soil samples will be tested for the TAL metals by EPA Method 6020 and the propellants DNT and NG by high performance liquid chromatography (HPLC) using dual wavelength ultraviolet detector by EPA Method 8330B. The duplicate/replicate ISM and duplicate discrete samples will be tested for the same analytical suite as the primary sample. The composite concrete samples will be tested for TCLP lead by EPA Method 1311/6020.

Project soil samples for the excavation confirmation effort will include:

- three (3) primary ISM samples collected from Decision Units 3 and 4 and the Impact Area, and
- three (3) duplicate/replicate ISM samples collected from Decision Units 3 and 4 and the Impact Area.

Each primary and duplicate/replicate ISM soil sample will be tested for the TAL metals by EPA Method 6020.

7.4 Field Quality Control

As discussed in Section 7.1, duplicate and replicate samples will be collected from Decision Units 1, 2, 3, 4; the Impact Area; and the Background Area with the location of each sub-portion being determined by a random number generator.

A coefficient of variation (CV) will be calculated for the decision unit where the duplicate and replicate ISM samples will be collected. Based on the results of this calculation either a Student T-test (CV less than 1.5) or the Chebyshev equation (CV greater than 1.5) will be used to calculate the 95% UCL of mean concentration of COCs in the soil. A CV greater than 3 indicates that the data is not usable due to errors in the sampling process or the presence of areas of significantly higher contaminant concentration.

8 REPORTING

Reporting efforts will include preparation of an Interim Additional Site Characterization letter report and draft / final Closure report.

8.1 Interim Additional Site Characterization Letter Report

An Interim Additional Site Characterization letter report will be prepared by the selected QEP following receipt of the analytical results of the deposition area, perimeter, and background soil sampling efforts. The letter report will evaluate whether each data gap identified in the CSM has been adequately addressed. Specifically, the letter report will document the additional site characterization results used to address the data gaps on the COCs. If additional site characterization indicates that identified COCs exceed the closure performance standards CULs, then additional targeted removal actions as outlined in this Closure Plan will be completed until the closure performance standards are met, as shown by additional confirmation sampling. The DOC will submit the Interim Additional Site Characterization Letter Report to EPA and ADEC per the Project Schedule in Figure 4.

8.2 Closure Report

Draft and final reports documenting the closure activities will be prepared by the selected QEP. The closure report will include:

- Background information including results of the Additional Site Characterization,
- Narrative of field work accomplished, including identification of anomalies or other notable highlights,
- Site photographs,

- Analytical laboratory reports, including CoC forms,
- ADEC laboratory data review checklist(s),
- Completed field note forms,
- Tabulated field data and analytical results,
- Comparison of sample results to the established closure performance standards used in the Closure Plan. The 95% UCL of the contaminant mean will be compared to the ADEC's Method Two cleanup levels for residential land use.
- Scaled site plan showing the ISM sub-portion sample locations,
- Quality control and data assessment summary, and
- Disposal documentation.

The conclusions presented in the closure report will be based solely upon the services described herein. One electronic copy of the draft report will be provided to DOC for review and comment. After addressing DOC comments, a final report will be prepared. One electronic copy of the final report will be provided to DOC. Following approval from DOC, an electronic copy of the final closure report will be submitted to EPA.

8.3 Certification of Closure

Within 60 days of completion of final closure, DOC will submit to the EPA Regional Administrator, by registered mail, a certification that the former HMCC shooting range has been closed in accordance with the specifications in this Closure Plan to meet the requirements of 40 CFR 265.115. The certification will be signed by the DOC and by a qualified Professional Engineer provided by Shannon & Wilson. Documentation supporting the Professional Engineer's certification will be furnished to the EPA Regional Administrator upon request.

8.4 Survey Plat

Survey plat requirements of 40 CFR 265.116 indicate "an owner or operator must submit to the local zoning authority, or the authority with jurisdiction over local land use, and to the Regional Administrator, a survey plat indicating the location and dimensions of landfill cells or other hazardous waste disposal units with respect to permanently surveyed benchmarks." Landfill cells or other hazardous waste disposal units will not be present at the former HMCC shooting range after implementing this Closure Plan; therefore, a survey plat will not be prepared.

9 SCHEDULE

Although DOC has secured funding for the closure activities, the schedule for implementing the HMCC shooting range closure is contingent on the award of a contract. At this time, the DOC anticipates a contract for the shooting range closure will be awarded by May 1, 2025. DOC intends to implement this Closure Plan during the 2025 summer season. The closure activities will be implemented in accordance with the Project Schedule included in Figure 4, once the Closure Plan is approved by EPA.

Based on the Project Schedule, the final closure of the HMCC shooting range is anticipated to be completed in 2025.

10 REFERENCES

ADEC, 2022, 18 AAC 60 Solid Waste Management, February 22

ADEC, 2023, 18 AAC 75 - Oil and Other Hazardous Substances Pollution Control, October 1

EPA, 40 CFR Part 261 - Identification and Listing of Hazardous Waste

EPA, 40 CFR 262.11 - Hazardous Waste Determination and Recordkeeping

EPA, 40 CFR Part 265.111 - Closure Performance Standard

EPA, 40 CFR Part 265.112 - Closure Plan; Amendment of Plan

EPA, 2024, Memorandum regarding Updated Residential Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, January 17

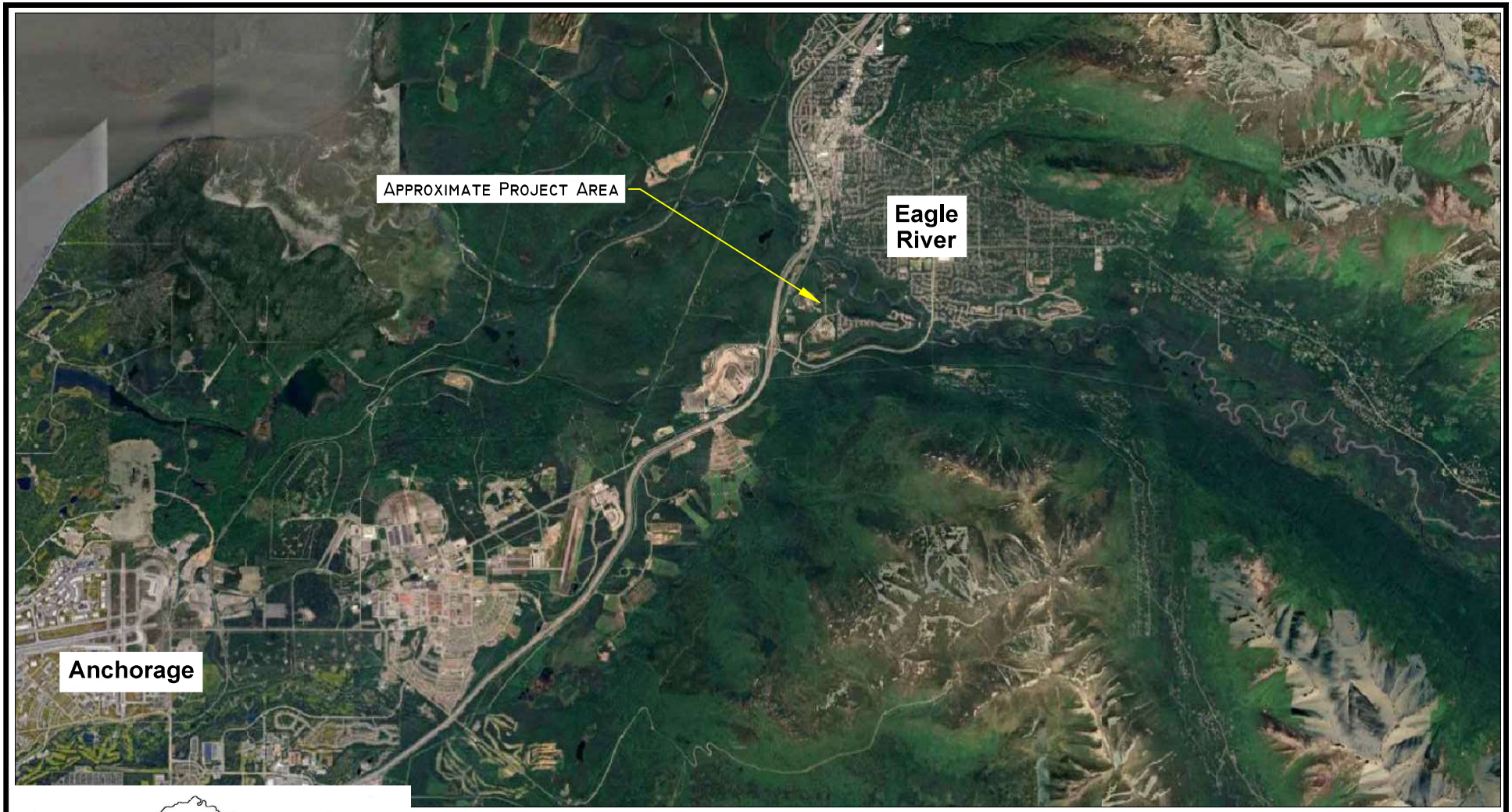
EPA, 2012, EPA Federal Facilities Forum Issue Paper: Site Characterization for Munitions Constituents, January

ITRC, 2020, Incremental Sampling Methodology, Technical and Regulatory Guidance, January

ITRC, 2003, Characterization and Remediation of Soils at Closed Small Arms Firing Ranges, January

Shannon & Wilson, 2009, Baseline Soil Sampling and ROM Cleanup Cost Estimate, Hiland Mountain Correctional Facility, Eagle River, Alaska; PSA No. 02582014; NTP No. 4A, July 9

Shannon & Wilson, 2018, Shooting Range Site Characterization, Hiland Mountain Correctional Center, Eagle River, Alaska, October



Map adapted from aerial imagery provided by GoogleEarth® , Image date: June 2024

0 0.75 1.5 3

APPROXIMATE SCALE IN MILES

N

HMCC Shooting Range
Eagle River, Alaska

Vicinity Map

February 2025 113736-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 1

Map adapted from aerial imagery provided by GoogleEarth® . Image date: July 2024

0 25 50 100
APPROXIMATE SCALE IN FEET

N

HMCC Shooting Range
Eagle River, Alaska

SITE PLAN

February 2025 113736-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2

LEGEND

Map adapted from aerial imagery provided by GoogleEarth® . Image date: July 2024

- Approximate location of target bracket
- Approximate Decision Unit boundary
- Approximate location of former firing lane concrete walkway
- Approximate area for background sample collection
- Approximate location of Impact Area
- Approximate location of proposed discrete surface soil sampling

N

0 15 30 60

APPROXIMATE SCALE IN FEET

HMCC Shooting Range
Eagle River, Alaska

DETAILED SITE PLAN

February 2025 113736-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3

Figure 4 - Project Schedule

Activity	Start	Finish	Activity Duration (days)
TIME PERIOD FOR HMCC SHOOTING RANGE CLOSURE	8/2/2024	12/24/2025	510
RCRA Closure Plan			
Draft Closure Plan submitted to DOC	8/2/2024	8/2/2024	1
DOC submited Draft Closure Plan to EPA	8/13/2024	8/13/2024	1
Receive EPA NOD and Comments on Draft Closure Plan	9/13/2024	9/13/2024	1
Draft Closure Plan Comment Resolution Meeting	9/20/2024	9/20/2024	1
Prepare Revised Draft Closure Plan	9/21/2024	11/20/2024	60
DOC submits Revised Draft Closure Plan to EPA and ADEC	11/22/2024	11/22/2024	1
EPA and ADEC Revised Draft Closure Plan Review	11/22/2024	12/22/2024	30
Receive EPA Third NOD and Comments on Revised Draft Closure Plan	12/13/2024	12/13/2024	1
Prepare Draft-Final Closure Plan	12/14/2024	1/12/2025	30
DOC submits Draft-Final Closure Plan to EPA and ADEC	1/10/2025	1/10/2025	1
EPA and ADEC Draft-Final Closure Plan Review	1/10/2025	2/9/2025	30
Receive EPA Fourth NOD and Comments on January 2025 Draft-Final Closure Plan	1/31/2025	1/31/2025	1
Prepare Revised Draft-Final Closure Plan	2/1/2025	2/6/2025	6
DOC submits Revised Draft-Final Closure Plan to EPA and ADEC	2/7/2025	2/7/2025	1
EPA and ADEC Draft-Final Closure Plan Review	2/7/2025	3/9/2025	30
Receive EPA and ADEC Approval of Draft-Final Closure Plan	3/10/2025	3/10/2025	1
Public Comment Period on Draft-Final Closure Plan	3/10/2025	4/9/2025	30
Prepare Final Closure Plan	4/10/2025	4/18/2025	9
DOC submits Final Closure Plan to EPA and ADEC	4/18/2025	4/18/2025	1
Final Closure Plan approval received from EPA and ADEC	4/25/2025	4/25/2025	1
Secure Funding for Closure*	2/1/2025	5/1/2025	90
Additional Site Characterization Activities			
Coordinate site access / project logistics	5/26/2025	5/30/2025	5
Grubbing and Site Preparation	6/2/2025	6/2/2025	1
Concrete (Decision Units 1, 2, and 3) Removal/Sampling	6/2/2025	6/3/2025	2
Deposition Area (Decision Units 1 and 2) ISM Sampling	6/4/2025	6/5/2025	2
Perimeter Surface Soil Discrete Sampling	6/5/2025	6/5/2025	1
Background Soil ISM Sampling	6/6/2025	6/6/2025	1
Limited Targeted Removal Action			
Coordinate site access / project logistics	7/15/2025	7/18/2025	4
Utility Locates	7/16/2025	7/18/2025	3
Mobilization	7/21/2025	7/21/2025	1
Grubbing and Site Preparation	7/21/2025	7/21/2025	1
Initial Impacted Soil Excavation	7/22/2025	7/23/2025	2
Metal Detector Evaluation	7/23/2025	7/23/2025	1
Additional Impacted Soil Excavation / Metal Detector Evaluation (if necessary)	7/23/2025	7/23/2025	1
Containerize Impacted Media (soil, IDW, concrete) for transport and off-site disposal	7/21/2025	7/25/2025	5
Excavation Confirmation ISM Sampling	7/24/2025	7/25/2025	2
Decontamination of Sampling Equipment	7/25/2025	7/25/2025	1
Demobilization of Sampling Equipment	7/31/2025	7/31/2025	1
Analytical Laboratory Soil Testing			
Additional Site Characterization soil samples analyses	6/6/2025	6/27/2025	21
Excavation Confirmation soil samples analyses	7/25/2025	8/15/2025	21
IDW Management			
ADEC Transport, Treatment & Disposal Approval Form	7/7/2025	7/14/2025	7
Prepare transport / disposal documents	7/7/2025	7/25/2025	18
Transport of Containerized Media to RCRA Subtitle C landfill	7/28/2025	8/27/2025	30
Receive Impacted Media Disposal Documentation	9/1/2025	9/1/2025	1

Figure 4 - Project Schedule

Activity	Start	Finish	Activity Duration (days)
Potential Intervening Closure Activities			
Additional Impacted Soil Excavation / Metal Detector Evaluation (if necessary)	8/18/2025	8/19/2025	2
Additional Excavation Confirmation ISM Sampling	8/20/2025	8/20/2025	1
Additional Excavation Confirmation soil samples analyses	8/21/2025	9/11/2025	21
Prepare transport / disposal documents	8/18/2025	8/20/2025	2
Transport of Containerized Media to RCRA Subtitle C landfill	8/21/2025	9/20/2025	30
Receive Impacted Media Disposal Documentation	9/22/2025	9/22/2025	1
Reporting			
Interim Additional Site Characterization Letter Report	6/30/2025	7/14/2025	14
DOC submits Interim Additional Site Characterization Letter Report to EPA and ADEC	7/15/2025	7/15/2025	1
Draft Closure Report	8/18/2025	10/17/2025	60
DOC submits Closure Report to EPA and ADEC	10/22/2025	10/22/2025	1
EPA and ADEC Closure Report Review	10/22/2025	11/21/2025	30
Final Closure Report	11/24/2025	12/8/2025	14
DOC submits Final Closure Report to EPA and ADEC	12/10/2025	12/10/2025	1
DOC submits Certificate of Closure to EPA Regional Administrator	12/10/2025	12/10/2025	1
HMCC Shooting Range closure approval received by EPA and ADEC	12/24/2025	12/24/2025	1
Year HMCC Shooting Range Closure Completed		**2025**	

*Funding has been secured however contract mechanism has not been identified. DOC anticipates a contract for HMCC Shooting Range Closure to be awarded by May 1, 2025 for implementation of closure activities outlined in this RCRA Closure Plan

APPENDIX A: SITE PHOTOGRAPHS

Appendix A

Site Photographs

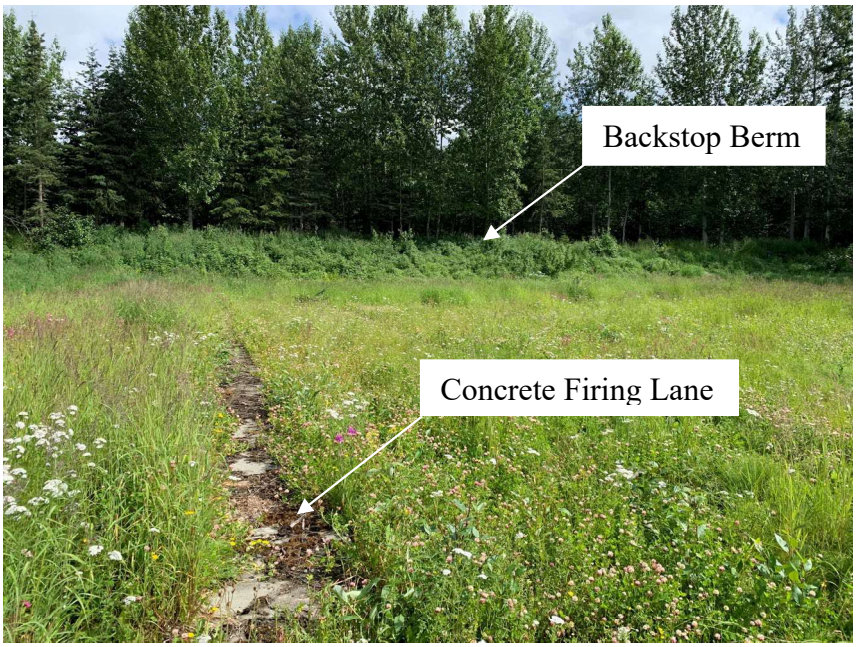


Photo 1: Looking east across inactive HMCC shooting range with former backstop berm covered with alders. (August 2024)

Photo 2: Looking east at target bracket located end of former concrete firing lane. (August 2024)

APPENDIX B: SITE CHARACTERIZATION REPORTS

Appendix B

Site Characterization Reports

CONTENTS

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

July 9, 2009

Alaska Department of Transportation & Public Utilities
2200 East 42nd Avenue
Anchorage, Alaska 99508

Attn: Mr. Ronald Searcy, P.E.

RE: BASELINE SOIL SAMPLING AND ROM CLEANUP COST ESTIMATE, HILAND MOUNTAIN CORRECTIONAL FACILITY, EAGLE RIVER, ALASKA; PSA NO. 02582014; NTP NO. 4A

This report presents the results of our limited environmental baseline study activities conducted at the closed shooting range at the Hiland Mountain Correctional Facility, Eagle River, Alaska. Notice to proceed with the work was received from Mr. Joel Aubin, P.E. of the Alaska Department of Transportation and Public Facilities (ADOT&PF) on March 20, 2009. The work was conducted in general accordance with our March 16, 2009 proposal.

SITE AND PROJECT DESCRIPTION

The project site is located east of the Glenn Highway frontage road, in the southeast ¼ of Section 14, Township 14 North, Range 2 West, Seward Meridian, Alaska. For the purposes of this report, the "project site" is defined as the former shooting range located east of the Hiland Mountain Correctional Center structures. A vicinity map showing the site and surrounding area is included as Figure 1. A site plan of the area is included as Figure 2.

The site was used as a shooting range by the Alaska Department of Corrections between 1980 and 1998. It is our understanding that the range was used by the Department of Corrections staff and other law enforcement personnel. Weapons used at the range were primarily handguns and shotguns. Shotguns were fired at stationary targets using slugs or 00-buckshot, not at moving targets as at trap or skeet ranges. The Property is to be subdivided, and remediation of the site will be necessary prior to redevelopment.

The overall project purpose is to address the lead-impacted soil to allow property re-use. The primary data collection objective is to evaluate the extent and degree of lead impacted soil at the former shooting range. Using that information, a budgetary cost estimate for remedial action was prepared and provided as an attachment to this report.

FIELD ACTIVITIES

Field activities for this project consisted of collecting characterization soil samples for analytical testing. The activities were conducted in material accordance with the 18 Alaska

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www.shannonwilson.com

Administrative Code (AAC) 75 Oil and Other Hazardous Substance (October 2008) regulations. Sample locations and descriptions are provided in Table 1. Photographs of site activities are included in Attachment 1.

On April 28, 2009, a representative from Shannon & Wilson collected and screened surface soil samples from the former firing range. A general view of the area is shown in Photo 1 included in Attachment 1. The samples were collected from three separate areas: grid area, target line, and berm backstop. The grid comprised of four approximately equal areas, between the firing line and the target line, as shown in Figure 3. Using hand tools, the samples were collected from the upper 4 inches of surface soil to qualitatively evaluate and document the extent of lead impact. The target line (Photo 2) and the berm backstop areas were qualitatively evaluated to a maximum depth of 12 inches below ground surface (bgs). Spent ammunition casings were observed throughout the project site, although no visible lead fragments were noted in the sample areas. Photos of spent casings are shown in Photos 3 and 4.

A total of 43 surface soil samples were screened for lead, and eight analytical samples were collected. Analytical samples were collected from four locations within the grid—one sample from each of the four areas identified as Sections A, B, C, and D on Figure 3. Within each grid, analytical samples were collected from areas where the most spent cartridges were observed. Samples were also collected from two locations along the former target line and two locations from the backstop berm.

The characterization samples were transferred to laboratory-supplied jars using dedicated stainless steel spoons, and submitted to SGS Environmental Services (SGS) of Anchorage, Alaska using chain-of-custody procedures. The samples were analyzed on a standard 15 working-day turnaround. The number, depth, and classification of samples collected for the project are summarized in Table 1.

LABORATORY ANALYSIS

Under the sample numbering scheme used for this project, a typical analytical sample number is '32-1-17294 SS5'. For brevity in the report text, the '32-1-17294', which indicates the Shannon & Wilson job number, is omitted.

Each analytical sample was analyzed for total lead by Environmental Protection Agency (EPA) Method 6020 and leachable lead by Toxicity Characteristic Leaching Procedure (TCLP) by EPA Method 1311. Two samples beneath the former target line were also tested for TCLP Resource Conservation and Recovery Act (RCRA) metals by EPA Methods 6020 and 1311.

The analytical results of the soil samples are summarized in Table 2. The laboratory report is included in Attachment 2.

SUBSURFACE CONDITIONS

Based on visual observations, the soil at the site is uniformly brown, gravelly, sandy silt from the ground surface to about 12 inches below ground surface (bgs). No groundwater was observed during the sampling activities.

DISCUSSION OF RESULTS

The reported total metals concentrations in the soil are compared to the cleanup levels listed in the Oil and Other Hazardous Substances Pollution Control Regulations (18 AAC 75.341, October 2008). The total metals soil criteria are based on the most stringent exposure pathway listed in Table B1 for the "under 40-inch (precipitation) zone". For the ingestion and inhalation exposure pathways, the Alaska Department of Environmental Conservation (ADEC) lead cleanup levels is 400 milligrams per kilogram (mg/kg) for unrestricted (residential) land use, and 800 mg/kg for commercial/industrial land use. The leachable metal concentrations are compared to the maximum contaminant level (MCL) listed in Table 1, 40 CFR 261.30 (July 1, 2008).

Project Sample Results

Samples from seven of the eight discrete locations contained total lead concentrations greater than 400 mg/kg. Lead concentrations in five of these samples also exceed the 800 mg/kg commercial/industrial cleanup level. The highest total lead concentration from the characterization samples was 49,800 mg/kg, reported in one of the two samples collected from the berm backstop. Despite elevated lead concentrations, no visible projectile fragments were observed in the samples. In addition, the two samples analyzed for RCRA total metals (Samples SS38 and SS40) contained concentrations of arsenic and chromium that exceed the ADEC cleanup levels. The arsenic concentration reported in Sample SS38 and the chromium concentration reported in Sample SS40 are within background concentrations.

Five of the eight soil samples contained leachable lead (TCLP) concentrations that exceed the 5 milligrams per liter (mg/L) MCL. The highest leachable lead concentration was 684 mg/L, measured in a sample collected from the berm backstop (Sample SS30).

Quality Control Results

Data quality for this project was assessed using internal laboratory procedures. No field quality control samples were collected as part of this scope. The project laboratory implements

on-going quality assurance/quality control procedures to evaluate conformance to applicable ADEC data quality objectives (DQO). Internal laboratory controls to assess data quality for this project included method blanks, laboratory control samples (LCS), matrix spike/matrix spike duplicates (MS/MSD), and laboratory duplicates to evaluate accuracy, precision, and bias. If a DQO was not met, the project laboratory provides a brief narrative concerning the problem in the case narrative of their laboratory data report (see Attachment 2).

Shannon & Wilson reviewed the field data and SGS data deliverables and completed the ADEC's Laboratory Data Review Checklist for each work order, which are included in Attachment 2. The following non-conformances were noted:

- The arsenic practical quantitative limit (PQL) for Sample SS40 was elevated. However, the reported arsenic concentration for Sample SS40 was greater than the ADEC cleanup level, and the elevated PQL is unlikely to have affected the sample concentration.

- The cooler temperature was outside the range of 4° ± 2° Celsius (C), with a temperature of 8°C. The samples are inorganics and elevated temperatures are unlikely to affect the sample results. In addition, samples were submitted to the laboratory shortly after sample collection.

ROM CLEANUP COST

We understand that the ADOT&PF intends to reuse the site and that a "Cleanup Complete with no Institutional Controls" regulatory status is preferred for the presumed land transfer. Because portions of the site contain lead concentrations that exceed the RCRA standard, excavated soil from these areas will be considered hazardous waste and will need to be treated within 90 days following excavation. Two options for treatment of this hazardous waste are described below, and rough order of magnitude (ROM) cleanup cost estimates are included in Attachment 3. The ROM estimates are provided for general planning purposes only and cannot be construed as a bid to complete cleanup work.

The first option is removal and off-site disposal of the soils that are greater than RCRA and ADEC standards. Neither soils with lead concentrations greater than RCRA standards nor soils with lead concentrations greater than ADEC standards can be disposed in Alaska. However, different disposal requests for the two types will necessitate the soils be segregated on site. The soil will be excavated, placed directly into disposal containers, and shipped to Oregon to a disposal facility. The ROM cost estimate for the Option 1 is provided in Attachment 3.

The second option is to recover the lead from the soil and reuse the soil on site. The contaminated soil will be excavated and screened through a wet-gravimetric recirculation

system. The segregated lead will be placed in supersacks and recycled. The soil will be dewatered and can be reused onsite, pending confirmation sampling. Note the equipment for the second option will only be available from July to August 2009 or after May 2010.

For both options, the ROM cost estimates assume that up to 300 cubic yards of soil are considered hazardous materials, and an additional 500 cubic yards of soil is non-RCRA but contains lead concentrations that are greater than the ADEC cleanup levels.

The two options differ in cost and certainty. Option 1 is more expensive; however, the cleanup outcome is more certain. Option 2 is less expensive, but is characterized by greater uncertainty than Option 1 due to the need for post-treatment samples from the segregated soil.

SUMMARY AND CONCLUSIONS

Based on our field investigations and analytical sample results, seven of the eight analytical soil samples contained lead concentrations that exceed the ADEC cleanup level; concentrations in five samples also exceed the lead RCRA standard. The highest concentrations were reported in the samples from the berm backstop.

CLOSURE/LIMITATIONS

This report was prepared for the exclusive use of the ADOT&PF and their representatives in the study of this site. The findings presented within this report are based on the limited research, sampling, and analyses that we conducted. They should not be construed as definite conclusions regarding the site's soil. It is possible that our tests missed higher levels of total and leachable metal constituents, although our intention was to sample areas likely to be impacted in accordance with our proposal. As a result, the sampling and analysis performed can only provide you with our professional judgment as to the environmental characteristics of this site, and in no way guarantees that an agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. The data presented in this report should be considered representative of the time of our site assessment. Changes in site conditions can occur over time, due to natural forces or human activity. In addition, changes in government codes, regulations, or laws may occur. Because of such changes beyond our control, our observations and interpretations may need to be revised.

The data are not sufficient to characterize the entire site, or potential sources areas that are not specifically targeted. We tested for selected total and leachable metal constituents, although there may be other unexpected contaminants at the site. A typically baseline study includes researching historical documents to identify potential sources of contamination. In

accordance with the approved work scope, this research was not conducted; therefore, our sample locations were not targeted at specific potential sources of contamination.

The ROM estimates are provided in Attachment 3. The estimates are provided for general planning purposes. A detailed cost estimate can be provided, if requested.

Shannon & Wilson has prepared the attachments in Attachment 4, *Important Information About Your Geotechnical/Environmental Report*, to assist you and others in understanding the use and limitations of our report. You are advised that various state and federal agencies (ADEC, EPA, etc.) may require the reporting of this information. Shannon & Wilson does not assume the responsibility for reporting these findings and therefore has not, and will not, disclose the results of this study except with your permission or as required by law.

Copies of documents that may be relied upon by our client are limited to the printed copies (also known as hard copies) that are signed or sealed by Shannon & Wilson with a wet, blue ink signature. Files provided in electronic media format are furnished solely for the convenience of the client. Any conclusion or information obtained or derived from such electronic files shall be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, or you question the authenticity of the report please contact the undersigned.

We appreciate this opportunity to be of service. Please call the undersigned at (907) 561-2120 with any questions or comments concerning the contents of this report.

Sincerely,

SHANNON & WILSON, INC.

Prepared by:

Shayla Swedlund
Environmental Scientist III

Reviewed by:

Matthew Hemry, P.E.
Vice President

Encl: Tables 1 and 2
Figures 1, 2, and 3
Attachments 1, 2, and 3

TABLE 1 - SAMPLE LOCATIONS AND DESCRIPTIONS

Sample ID Number	Date	Sample Location (See Figure 3)	Depth (inches)	Sample Classification
Grid Samples				
SS1	4/28/2009	Section A; Northcentral edge of range	0-4	Brown, gravelly, sandy SILT; wet
SS2	4/28/2009	Section A; Adjacent to firing lane	0-4	Brown, gravelly, sandy SILT; wet
SS3	4/28/2009	Section A; Adjacent to firing lane	0-4	Brown, gravelly, sandy SILT; moist
SS4	4/28/2009	Section A; Adjacent to firing lane	0-4	Brown, gravelly, sandy SILT; moist
* SS5	4/28/2009	Section A; Adjacent to target	0-4	Brown, gravelly, sandy SILT; wet
SS6	4/28/2009	Section A; Between two firing lanes	0-4	Brown, gravelly, sandy SILT; wet
SS7	4/28/2009	Section A; Between two firing lanes	0-4	Brown, gravelly, sandy SILT; moist
SS8	4/28/2009	Section B; Between two firing lanes	0-4	Brown, gravelly, sandy SILT; moist
SS9	4/28/2009	Section B; Between two firing lanes	0-4	Brown, gravelly, sandy SILT; moist
SS10	4/28/2009	Section B; Adjacent to target	0-4	Brown, gravelly, sandy SILT; moist
* SS11	4/28/2009	Section B; Between two firing lanes and targets	0-4	Brown, gravelly, sandy SILT; wet
SS12	4/28/2009	Section B; Center of firing range, between lanes	0-4	Brown, gravelly, sandy SILT; wet
SS13	4/28/2009	Section B; Adjacent to firing lane	0-4	Brown, gravelly, sandy SILT; wet
SS14	4/28/2009	Section C; Northwest section of range	0-4	Brown, gravelly, sandy SILT; moist
SS15	4/28/2009	Section C; Between two firing lanes	0-4	Brown, gravelly, sandy SILT; moist
* SS16	4/28/2009	Section C; West end of firing lane	0-4	Brown, gravelly, sandy SILT; moist
SS17	4/28/2009	Section C; Between two firing lanes	0-4	Brown, gravelly, sandy SILT; moist
SS18	4/28/2009	Section C; Between two firing lanes	0-4	Brown, gravelly, sandy SILT; wet
SS19	4/28/2009	Section D; West end of firing lane	0-4	Brown, gravelly, sandy SILT; wet
SS20	4/28/2009	Section D; Center of firing range, between lanes	0-4	Brown, gravelly, sandy SILT; moist
* SS21	4/28/2009	Section D; between two firing lanes	0-4	Brown, sandy, gravelly SILT; moist
SS22	4/28/2009	Section D; Southwest section of range	0-4	Brown, gravelly, sandy SILT; wet
SS23	4/28/2009	Section D; Southcentral edge of range	0-4	Brown, gravelly, sandy SILT; wet
Berm Backstop				
SS24	4/28/2009	Approximately 5 feet above prevailing/level ground surface	0	Brown, gravelly, sandy SILT; frozen at surface
SS25	4/28/2009	Approximately 6 feet above prevailing/level ground surface	0	Brown, gravelly, sandy SILT; frozen at surface
SS26	4/28/2009	Approximately 7 feet above prevailing/level ground surface	0	Brown, gravelly, sandy SILT; frozen at surface
SS27	4/28/2009	Approximately 5 feet above prevailing/level ground surface	0-1	Brown, gravelly, sandy SILT; wet to frozen at 1 inch bgs
SS28	4/28/2009	Approximately 4 feet above prevailing/level ground surface	0-4	Brown, gravelly, sandy SILT; wet to frozen at 4 inches bgs
SS29	4/28/2009	Approximately 5 feet above prevailing/level ground surface	0-6	Brown, gravelly, sandy SILT; wet to frozen at 6 inches bgs
* SS30	4/28/2009	Approximately 5 feet above prevailing/level ground surface	0-8	Brown, gravelly, sandy SILT; wet to frozen at 8 inches bgs
SS31	4/28/2009	Approximately 4 feet above prevailing/level ground surface	0-6	Brown, gravelly, sandy SILT; wet to frozen at 6 inches bgs
* SS32	4/28/2009	Approximately 4 feet above prevailing/level ground surface	0-6	Brown, gravelly, sandy SILT; wet to frozen at 6 inches bgs
SS33	4/28/2009	Approximately 3 feet above prevailing/level ground surface	0-1	Brown, gravelly, sandy SILT; wet to frozen at 1 inch bgs

KEY	DESCRIPTION
*	Sample analyzed by the project laboratory (See Table 2)
bgs	Below ground surface

TABLE 1 - SAMPLE LOCATIONS AND DESCRIPTIONS

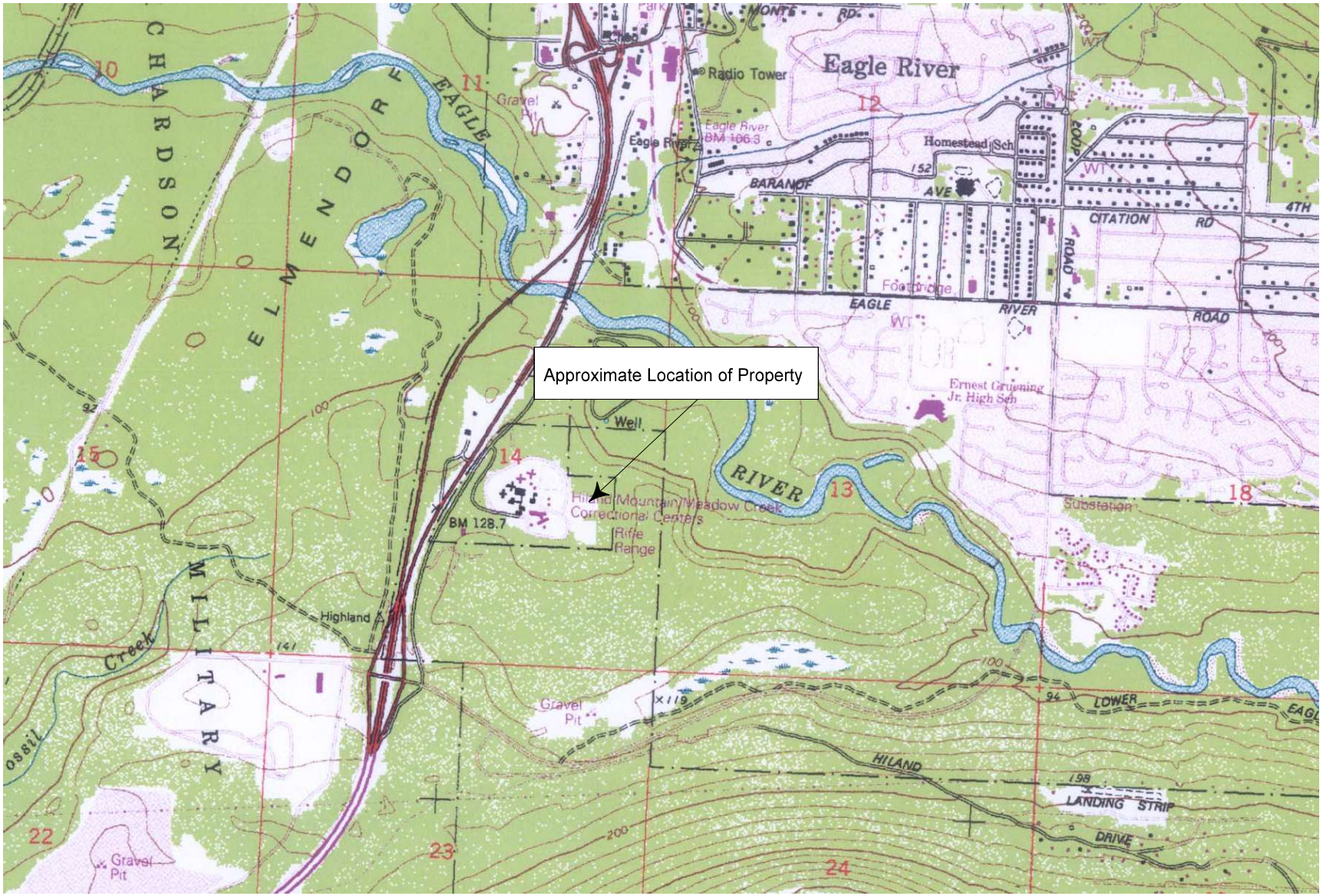
Sample ID Number	Date	Sample Location (See Figure 3)	Depth (inches)	Sample Classification
Target Line				
SS34	4/28/2009	Adjacent to former target stand	0-12	Brown, gravelly, sandy SILT; moist
SS35	4/28/2009	Beneath former target stand	0-12	Brown, gravelly, sandy SILT; wet
SS36	4/28/2009	Adjacent to former target stand	0-12	Brown, gravelly, sandy SILT; wet
SS37	4/28/2009	Beneath former target stand	0-12	Brown, gravelly, sandy SILT; wet
* SS38	4/28/2009	Adjacent to former target stand	0-12	Brown, gravelly, sandy SILT; wet
SS39	4/28/2009	Adjacent to former target stand	0-12	Brown, gravelly, sandy SILT; moist
* SS40	4/28/2009	Behind existing target	0-12	Brown, gravelly, sandy SILT; moist
SS41	4/28/2009	Beneath former target stand	0-12	Brown, gravelly, sandy SILT; moist
SS42	4/28/2009	Adjacent to former target stand	0-12	Brown, gravelly, sandy SILT; moist
SS43	4/28/2009	Beneath former target stand	0-12	Brown, gravelly, sandy SILT; moist

KEY	DESCRIPTION
*	Sample analyzed by the project laboratory (See Table 2)
bgs	Below ground surface

TABLE 2 - SUMMARY OF SOIL ANALYTICAL RESULTS

			Sample ID Number†, and Collection Depth in Inches (See Table 1, Figure 3, and Attachment 2)							
			Grid Samples				Berm Backstop Samples		Target Line Samples	
Parameter Tested	**Method***	**Cleanup Level****	SS5 0-4	SS11 0-4	SS16 0-4	SS21 0-4	SS30 0-8	SS32 0-6	SS38 0-12	SS40 0-12
Total Metals										
Arsenic - mg/kg	EPA 6020	3.9 mg/kg	-	-	-	-	-	-	**8.12**	**27.8**
Barium - mg/kg	EPA 6020	1,100 mg/kg	-	-	-	-	-	-	77.4	74.2
Cadmium - mg/kg	EPA 6020	5 mg/kg	-	-	-	-	-	-	<0.189	<0.194
Chromium - mg/kg	EPA 6020	25 mg/kg	-	-	-	-	-	-	**66.5**	**28.9**
Lead - mg/kg	EPA 6020	400 mg/kg	**427**	**1,760^**	73.6	**353**	**41,900^**	**49,800^**	**1,860^**	**27,300^**
Mercury - mg/kg	EPA 6020	1.4 mg/kg	-	-	-	-	-	-	0.0403	<0.0393
Selenium - mg/kg	EPA 6020	3.4 mg/kg	-	-	-	-	-	-	<0.472	<0.484
Silver - mg/kg	EPA 6020	11.2 mg/kg	-	-	-	-	-	-	0.144	0.788
TCLP Metals										
Arsenic - mg/L	EPA 6010B	5 mg/L		-	-	-	-	-	<0.500	<0.500
Barium - mg/L	EPA 6010B	100 mg/L		-	-	-	-	-	0.739	0.844
Cadmium - mg/L	EPA 6010B	1 mg/L		-	-	-	-	-	<0.0500	<0.0500
Chromium- mg/L	EPA 6010B	5 mg/L		-	-	-	-	-	<0.200	<0.200
Lead - mg/L	EPA 6010B	5 mg/L	**20.8**	3.66	<0.500	2.51	**684**	**329**	**68.8**	**121**
Mercury - mg/L	EPA 6010B	0.2 mg/L		-	-	-	-	-	<0.00200	<0.00200
Selenium- mg/L	EPA 6010B	1 mg/L		-	-	-	-	-	**<1.00**	**<1.00**
Silver - mg/L	EPA 6010B	5 mg/L		-	-	-	-	-	<0.200	<0.200

KEY	DESCRIPTION
†	Sample identification preceded by "32-1-17294" on the chain of custody forms
*	See Attachment 2 for compounds tested, methods, and laboratory reporting limits
**	Total metals soil cleanup level is listed in Table B1, 18 AAC 75 (October 9, 2008) for the "under 40 inches (precipitation) zone" and residential land use
**	Toxicity characteristic leaching procedure (TCLP) lead cleanup level is the Resource Conservation and Recovery Act (RCRA) characteristic waste limit listed in 40 CFR 261 (July 1, 2008)
^	Concentration exceeds both residential cleanup level (400 mg/kg) and commercial /industrial cleanup level (800 mg/kg) for ingestion and inhalation exposure routes
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
427	Analytical result exceeds regulated cleanup level
<0.500	Analyte not detected; laboratory reporting limit was 0.500
<1.00	Reporting limit equals or exceeds regulated cleanup level
-	Not applicable or not analyzed



Elevation in Meters
Contour Interval 20 Meters
Taken from Anchorage B-7 SW
U.S. Geological Survey Quadrangles

0 2000 4000
APPROXIMATE SCALE IN FEET

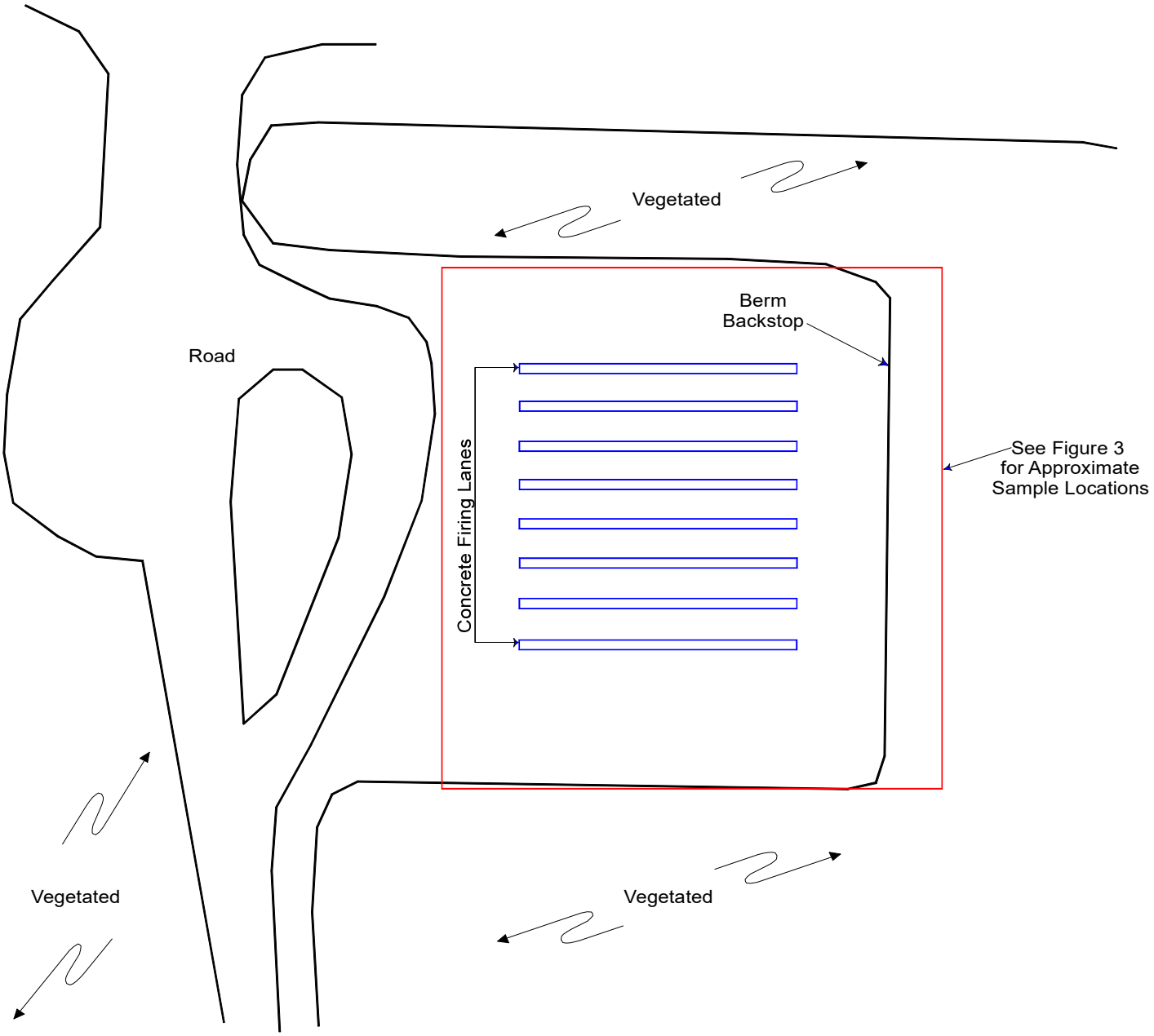
Hiland Mountain Correctional Center
Eagle River, Alaska

VICINITY MAP

July 2009 32-1-17294-001

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 1



0 50 100

APPROXIMATE SCALE IN FEET

N

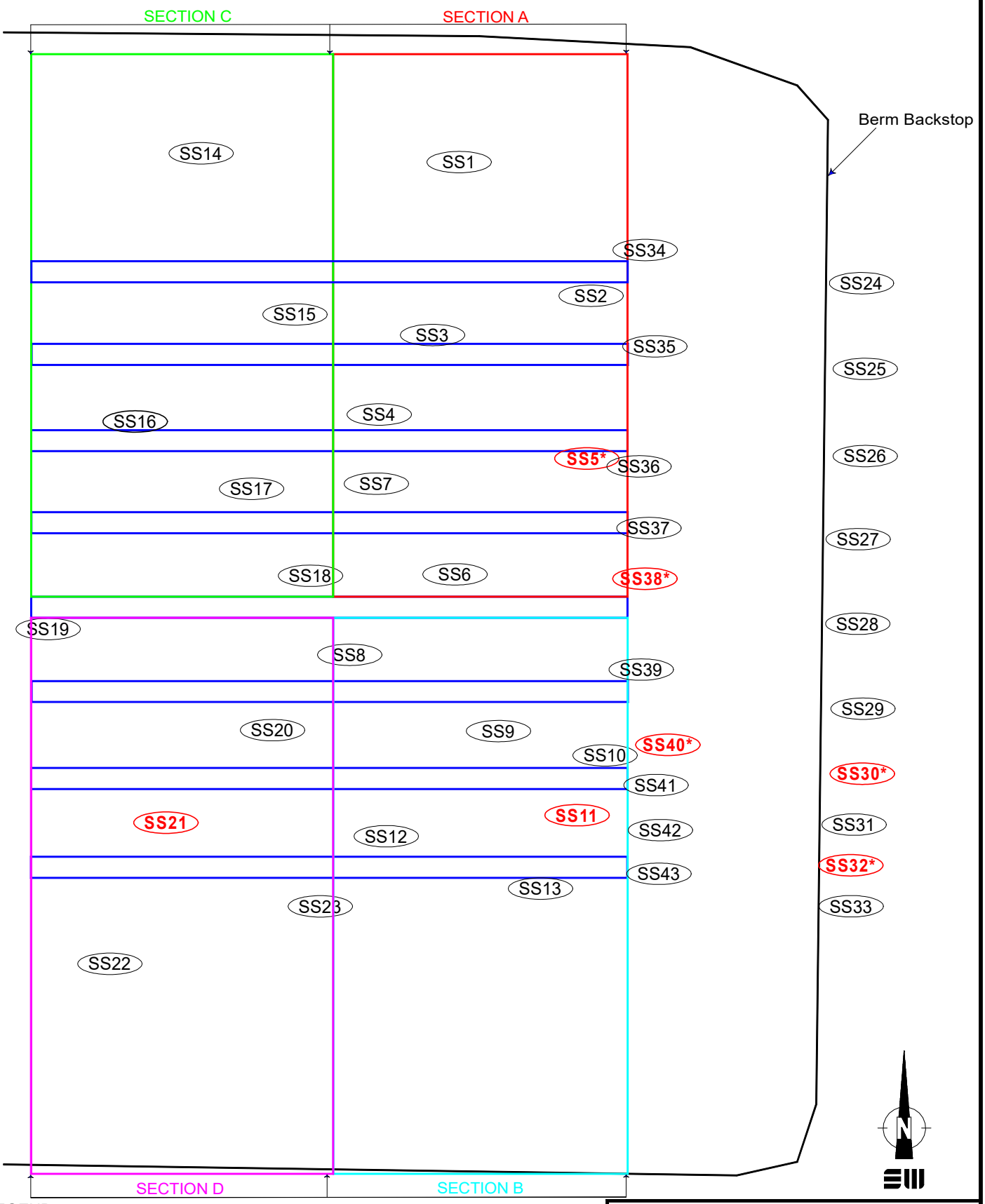
Hiland Mountain Correctional Center
Eagle River, Alaska

SITE PLAN

July 2009 32-1-17294-001

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 2



LEGEND

SS37 Screening Soil Sample SS37

SS16 Analytical Soil Sample SS16

SS38* Analytical Soil Sample SS38; Reported lead concentration exceeds ADEC Cleanup Level. Asterisk indicates sample also exceeds RCRA Cleanup Level

Note: Soil samples were collected on April 28, 2009.

0 20 40

APPROXIMATE SCALE IN FEET

Hiland Mountain Correctional Center
Eagle River, Alaska

SAMPLE LOCATIONS

July 2009

32-1-17294-001

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 3

ATTACHMENT 1

PHOTO PAGES

Photo 1: Looking east at the former firing range from the west side of the firing lanes. (April 28, 2009)

Photo 2: Dilapidated target. (April 28, 2009)

Hiland Mountain Correctional Center
Eagle River, Alaska

PHOTOS 1 AND 2

July 2009 32-1-17294-001

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Photo 3: Spent ammunition. (April 28, 2009)

Photo 4: Spent ammunition. (April 28, 2009)

ATTACHMENT 2

ANALYTICAL RESULTS FROM SGS ENVIRONMENTAL SERVICES

AND

ADEC DATA REVIEW CHECKLIST

SGS North America Inc.
Alaska Division
Level II Laboratory Data Report

Project:	32-1-17294 Highland Mtn
Client:	Shannon & Wilson Inc.
SGS Work Order:	1091642

Released by:

Contents:

Note:
Unless otherwise noted, all quality assurance/quality control criteria is in compliance with the standards set forth by the proper regulatory authority, the SGS Quality Assurance Program Plan, and the National Environmental Accreditation Conference.

Case Narrative

Client	SHANNOT	Shannon & Wilson Inc.	**Printed Date/Time**	5/19/2009	10:50
Workorder	1091642	32-1-17294 Highland Mtn			

Sample ID **Client Sample ID**

Refer to the sample receipt form for information on sample condition.

1091642016 **PS** **32-1-17294 SS40**

6010B - The PQL for arsenic was raised due to matrix interference.

894029 **MS** **32-1-17294 SS16(1091642003MS)**

6020 - MS recovery for barium is outside of acceptance criteria. Post-digestion spike was successful.

894030 **MSD** **32-1-17294 SS16(1091642003MSD)**

6020 - MSD recovery for barium is outside of acceptance criteria. Post-digestion spike was successful.

Laboratory Analysis Report

200 W. Potter Drive
Anchorage, AK 99518-1605
Tel: (907) 562-2343
Fax: (907) 561-5301
Web: http://www.us.sgs.com

Shayla Swedlund
Shannon & Wilson Inc.
5430 Fairbanks St Ste 3
Anchorage, AK 99518

Work Order:	1091642	
	32-1-17294 Highland Mtn	**Released by:**
Client:	Shannon & Wilson Inc.	
Report Date:	May 19, 2009	

Enclosed are the analytical results associated with the above workorder.

As required by the state of Alaska and the USEPA, a formal Quality Assurance/Quality Control Program is maintained by SGS. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request.

The laboratory certification numbers are AK971-05 (DW), UST-005 (CS) and AK00971 (Micro) for ADEC and AK100001 for NELAP (RCRA methods: 1020A, 1311, 6010B, 7470A, 7471A, 9040B, 9045C, 9056, 9060, 9065, 8015B, 8021B, 8081A/8082, 8260B, 8270C).

Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP, the National Environmental Laboratory Accreditation Program and, when applicable, other regulatory authorities.

If you have any questions regarding this report or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is being provided under SGS general terms and conditions (http://www.sgs.com/terms_and_conditions.htm) unless other written agreements have been accepted by both parties.

PQL	Practical Quantitation Limit (reporting limit).
U	Indicates the analyte was analyzed for but not detected.
F	Indicates value that is greater than or equal to the MDL.
J	The quantitation is an estimation.
ND	Indicates the analyte is not detected.
B	Indicates the analyte is found in a blank associated with the sample.
*	The analyte has exceeded allowable regulatory or control limits.
GT	Greater Than
D	The analyte concentration is the result of a dilution.
LT	Less Than
!	Surrogate out of control limits.
Q	QC parameter out of acceptance range.
M	A matrix effect was present.
JL	The analyte was positively identified, but the quantitation is a low estimation.
E	The analyte result is above the calibrated range.
R	Rejected

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content.

SGS Ref.#	1091642001		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 12:00
Client Sample ID	32-1-17294 SS5	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Metals by ICP/MS									
Lead	427	0.197	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB

SGS Ref.#	1091642002		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 12:07
Client Sample ID	32-1-17294 SS11	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Metals by ICP/MS									
Lead	1760	0.978	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB

SGS Ref.#	1091642003		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 12:35
Client Sample ID	32-1-17294 SS16	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Metals by ICP/MS									
Lead	73.6	0.193	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB

SGS Ref.#	1091642004		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 12:40
Client Sample ID	32-1-17294 SS21	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Metals by ICP/MS									
Lead	353	0.193	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB

SGS Ref.#	1091642005		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 13:30
Client Sample ID	32-1-17294 SS30	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Metals by ICP/MS									
Lead	41900	19.7	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB

SGS Ref.#	1091642006		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 13:35
Client Sample ID	32-1-17294 SS32	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Metals by ICP/MS									
Lead	49800	39.7	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB

SGS Ref.#	1091642007
Client Name	Shannon & Wilson Inc.
Project Name/#	32-1-17294 Highland Mtn
Client Sample ID	32-1-17294 SS38
Matrix	Solid/Soil (Wet Weight)

Printed Date/Time	05/19/2009 10:50
Collected Date/Time	04/28/2009 14:00
Received Date/Time	04/28/2009 15:40
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Metals Department									
Mercury	40.3	39.8	ug/Kg	SW7471B	A		05/09/09	05/09/09	RTS
Metals by ICP/MS									
Arsenic	8.12	0.944	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB
Barium	77.4	0.283	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB
Cadmium	ND	0.189	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB
Chromium	66.5	0.378	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB
Lead	1860	0.944	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB
Selenium	ND	0.472	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB
Silver	0.144	0.0944	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB

SGS Ref.#	1091642008
Client Name	Shannon & Wilson Inc.
Project Name/#	32-1-17294 Highland Mtn
Client Sample ID	32-1-17294 SS40
Matrix	Solid/Soil (Wet Weight)

Printed Date/Time	05/19/2009 10:50
Collected Date/Time	04/28/2009 14:05
Received Date/Time	04/28/2009 15:40
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Metals Department									
Mercury	ND	39.3	ug/Kg	SW7471B	A		05/09/09	05/09/09	RTS
Metals by ICP/MS									
Arsenic	27.8	0.969	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB
Barium	74.2	0.291	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB
Cadmium	ND	0.194	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB
Chromium	28.9	0.388	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB
Lead	27300	19.4	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB
Selenium	ND	0.484	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB
Silver	0.788	0.0969	mg/Kg	SW6020	A		05/08/09	05/13/09	NRB

SGS Ref.#	1091642009		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 12:00
Client Sample ID	32-1-17294 SS5	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results		PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Characterization										
Aqueous Phase, Total	0.0			%	TCLP	A			05/05/09	BJS
Oil Phase, Total	0.0			%	TCLP	A			05/05/09	BJS
Solid Phase, Total	100			%	TCLP	A			05/05/09	BJS
TCLP Constituents Metals										
Lead	20.8	*	0.500	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR

SGS Ref.#	1091642010		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 12:07
Client Sample ID	32-1-17294 SS11	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Characterization									
Aqueous Phase, Total	0.0		%	TCLP	A			05/05/09	BJS
Oil Phase, Total	0.0		%	TCLP	A			05/05/09	BJS
Solid Phase, Total	100		%	TCLP	A			05/05/09	BJS
TCLP Constituents Metals									
Lead	3.66	0.500	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR

SGS Ref.#	1091642011		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 12:35
Client Sample ID	32-1-17294 SS16	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Characterization									
Aqueous Phase, Total	0.0		%	TCLP	A			05/05/09	BJS
Oil Phase, Total	0.0		%	TCLP	A			05/05/09	BJS
Solid Phase, Total	100		%	TCLP	A			05/05/09	BJS
TCLP Constituents Metals									
Lead	ND	0.500	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR

SGS Ref.#	1091642012		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 12:40
Client Sample ID	32-1-17294 SS21	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Characterization									
Aqueous Phase, Total	0.0		%	TCLP	A			05/05/09	BJS
Oil Phase, Total	0.0		%	TCLP	A			05/05/09	BJS
Solid Phase, Total	100		%	TCLP	A			05/05/09	BJS
TCLP Constituents Metals									
Lead	2.51	0.500	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR

SGS Ref.#	1091642013		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 13:30
Client Sample ID	32-1-17294 SS30	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results		PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Characterization										
Aqueous Phase, Total	0.0			%	TCLP	A			05/05/09	BJS
Oil Phase, Total	0.0			%	TCLP	A			05/05/09	BJS
Solid Phase, Total	100			%	TCLP	A			05/05/09	BJS
TCLP Constituents Metals										
Lead	684	*	0.500	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR

SGS Ref.#	1091642014		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 13:35
Client Sample ID	32-1-17294 SS32	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results		PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Characterization										
Aqueous Phase, Total	0.0			%	TCLP	A			05/05/09	BJS
Oil Phase, Total	0.0			%	TCLP	A			05/05/09	BJS
Solid Phase, Total	100			%	TCLP	A			05/05/09	BJS
TCLP Constituents Metals										
Lead	329	*	0.500	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR

SGS Ref.#	1091642015		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 14:00
Client Sample ID	32-1-17294 SS38	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results		PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Characterization										
Aqueous Phase, Total	0.0			%	TCLP	A			05/05/09	BJS
Oil Phase, Total	0.0			%	TCLP	A			05/05/09	BJS
Solid Phase, Total	100			%	TCLP	A			05/05/09	BJS
TCLP Constituents Metals										
Arsenic	ND		0.500	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR
Barium	0.739		0.500	mg/L	SW6010B TCLP	A	(<100)	05/14/09	05/18/09	KAR
Cadmium	ND		0.0500	mg/L	SW6010B TCLP	A	(<1)	05/14/09	05/18/09	KAR
Chromium	ND		0.200	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR
Lead	68.8	*	0.500	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR
Mercury	ND		0.00200	mg/L	SW7470A TCLP	A	(<0.2)	05/13/09	05/13/09	RTS
Selenium	ND		1.00	mg/L	SW6010B TCLP	A	(<1)	05/14/09	05/18/09	KAR
Silver	ND		0.200	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR

SGS Ref.#	1091642016		
Client Name	Shannon & Wilson Inc.	**Printed Date/Time**	05/19/2009 10:50
Project Name/#	32-1-17294 Highland Mtn	**Collected Date/Time**	04/28/2009 14:05
Client Sample ID	32-1-17294 SS40	**Received Date/Time**	04/28/2009 15:40
Matrix	Solid/Soil (Wet Weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

6010B - The PQL for arsenic was raised due to matrix interference.

Parameter	Results		PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Characterization										
Aqueous Phase, Total	0.0			%	TCLP	A			05/05/09	BJS
Oil Phase, Total	0.0			%	TCLP	A			05/05/09	BJS
Solid Phase, Total	100			%	TCLP	A			05/05/09	BJS
TCLP Constituents Metals										
Arsenic	ND		5.00	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR
Barium	0.844		0.500	mg/L	SW6010B TCLP	A	(<100)	05/14/09	05/18/09	KAR
Cadmium	ND		0.0500	mg/L	SW6010B TCLP	A	(<1)	05/14/09	05/18/09	KAR
Chromium	ND		0.200	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR
Lead	121	*	0.500	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR
Mercury	ND		0.00200	mg/L	SW7470A TCLP	A	(<0.2)	05/13/09	05/13/09	RTS
Selenium	ND		1.00	mg/L	SW6010B TCLP	A	(<1)	05/14/09	05/18/09	KAR
Silver	ND		0.200	mg/L	SW6010B TCLP	A	(<5)	05/14/09	05/18/09	KAR

SGS Ref.#	893983	Method Blank	**Printed Date/Time**		05/19/2009 10:50
Client Name	Shannon & Wilson Inc.		**Prep**	**Batch**	MXX21642
Project Name/#	32-1-17294 Highland Mtn			**Method**	METHOD
Matrix	Soil/Solid (dry weight)			**Date**	05/09/2009

QC results affect the following production samples:

1091642007, 1091642008

Parameter	Results	Reporting/Control Limit	MDL	Units	Analysis Date
Metals Department					
Mercury	ND	40.0	12.0	ug/Kg	05/09/09
Batch MCV4171					
Method SW7471B					
Instrument PSA Millennium mercury AA					

SGS Ref.#	894027 Method Blank	**Printed Date/Time**		05/19/2009 10:50
Client Name	Shannon & Wilson Inc.	**Prep**	**Batch**	MXX21644
Project Name/#	32-1-17294 Highland Mtn		**Method**	SW3050B
Matrix	Soil/Solid (dry weight)		**Date**	05/08/2009

QC results affect the following production samples:

1091642001, 1091642002, 1091642003, 1091642004, 1091642005, 1091642006, 1091642007, 1091642008

Parameter	Results	Reporting/Control Limit	MDL	Units	Analysis Date
Metals by ICP/MS					
Arsenic	ND	1.00	0.310	mg/Kg	05/13/09
Barium	ND	0.300	0.0940	mg/Kg	05/13/09
Cadmium	ND	0.200	0.0620	mg/Kg	05/13/09
Chromium	0.170 J	0.400	0.120	mg/Kg	05/13/09
Lead	ND	0.200	0.0620	mg/Kg	05/13/09
Selenium	ND	0.500	0.150	mg/Kg	05/13/09
Silver	ND	0.100	0.0310	mg/Kg	05/13/09

Batch MMS5903
Method SW6020
Instrument Perkin Elmer Sciex ICP-MS P3

SGS Ref.#	894596 Method Blank	**Printed Date/Time**		05/19/2009 10:50
Client Name	Shannon & Wilson Inc.	**Prep**	**Batch**	MXX21660
Project Name/#	32-1-17294 Highland Mtn		**Method**	METHOD
Matrix	Water (Surface, Eff., Ground)		**Date**	05/13/2009

QC results affect the following production samples:

1091642015, 1091642016

Parameter	Results	Reporting/Control Limit	MDL	Units	Analysis Date
Metals Department					
Mercury	ND	0.000200	0.0000620	mg/L	05/13/09
Batch MCV4175					
Method SW7470A TCLP					
Instrument PSA Millennium mercury AA					

SGS Ref.#	895041 Method Blank	**Printed Date/Time**		05/19/2009 10:50
Client Name	Shannon & Wilson Inc.	**Prep**	**Batch**	MXT4208
Project Name/#	32-1-17294 Highland Mtn		**Method**	SW3010A
Matrix	Water (Surface, Eff., Ground)		**Date**	05/14/2009

QC results affect the following production samples:

1091642009, 1091642010, 1091642011, 1091642012, 1091642013, 1091642014, 1091642015, 1091642016

Parameter	Results	Reporting/Control Limit	MDL	Units	Analysis Date
TCLP Constituents Metals					
Arsenic	ND	0.0500	0.0150	mg/L	05/18/09
Barium	ND	0.0500	0.0155	mg/L	05/18/09
Cadmium	0.00151 J	0.00500	0.00150	mg/L	05/18/09
Chromium	ND	0.0200	0.00620	mg/L	05/18/09
Lead	ND	0.0500	0.0250	mg/L	05/18/09
Selenium	ND	0.100	0.0500	mg/L	05/18/09
Silver	ND	0.0200	0.00620	mg/L	05/18/09

Batch MIP5775
Method SW6010B TCLP
Instrument TJA Enviro II ICP P2

SGS Ref.#	893984	Lab Control Sample	**Printed Date/Time**	05/19/2009	10:50
			Prep Batch	MXX21642	
Client Name	Shannon & Wilson Inc.		**Method**	METHOD	
Project Name/#	32-1-17294 Highland Mtn		**Date**	05/09/2009	
Matrix	Soil/Solid (dry weight)				

QC results affect the following production samples:

1091642007, 1091642008

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Metals Department								
Mercury	LCS	159	95	(80-120)			167 ug/Kg	05/09/2009

Batch MCV4171
Method SW7471B
Instrument PSA Millennium mercury AA

SGS Ref.#	894028	Lab Control Sample	**Printed Date/Time**	05/19/2009 10:50
			Prep Batch	MXX21644
Client Name	Shannon & Wilson Inc.		**Method**	SW3050B
Project Name/#	32-1-17294 Highland Mtn		**Date**	05/08/2009
Matrix	Soil/Solid (dry weight)			

QC results affect the following production samples:

1091642001, 1091642002, 1091642003, 1091642004, 1091642005, 1091642006, 1091642007, 1091642008

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Metals by ICP/MS								
Arsenic	LCS	53.2	106	(80-120)			50 mg/Kg	05/13/2009
Barium	LCS	49.8	100	(80-120)			50 mg/Kg	05/13/2009
Cadmium	LCS	5.35	107	(80-120)			5 mg/Kg	05/13/2009
Chromium	LCS	20.5	102	(80-120)			20 mg/Kg	05/13/2009
Lead	LCS	53.8	108	(80-120)			50 mg/Kg	05/13/2009
Selenium	LCS	51.6	103	(80-120)			50 mg/Kg	05/13/2009
Silver	LCS	5.59	112	(80-120)			5 mg/Kg	05/13/2009

Batch MMS5903
Method SW6020
Instrument Perkin Elmer Sciex ICP-MS P3

SGS Ref.#	894597	Lab Control Sample	**Printed Date/Time**	05/19/2009	10:50
			Prep Batch	MXX21660	
Client Name	Shannon & Wilson Inc.		**Method**	METHOD	
Project Name/#	32-1-17294 Highland Mtn		**Date**	05/13/2009	
Matrix	Water (Surface, Eff., Ground)				

QC results affect the following production samples:

1091642015, 1091642016

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Metals Department								
Mercury	LCS	0.00415	104	(85-115)			0.00400 mg/L	05/13/2009

Batch MCV4175
Method SW7470A TCLP
Instrument PSA Millennium mercury AA

SGS Ref.#	895042	Lab Control Sample	**Printed Date/Time**	05/19/2009 10:50
			Prep Batch	MXT4208
Client Name	Shannon & Wilson Inc.		**Method**	SW3010A
Project Name/#	32-1-17294 Highland Mtn		**Date**	05/14/2009
Matrix	Water (Surface, Eff., Ground)			

QC results affect the following production samples:

1091642009, 1091642010, 1091642011, 1091642012, 1091642013, 1091642014, 1091642015, 1091642016

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
TCLP Constituents Metals								
Arsenic	LCS	0.981	98	(80-120)			1 mg/L	05/18/2009
Barium	LCS	0.968	97	(80-120)			1 mg/L	05/18/2009
Cadmium	LCS	0.108	108	(80-120)			0.1 mg/L	05/18/2009
Chromium	LCS	0.408	102	(80-120)			0.4 mg/L	05/18/2009
Lead	LCS	1.06	106	(80-120)			1 mg/L	05/18/2009
Selenium	LCS	0.962	96	(80-120)			1 mg/L	05/18/2009
Silver	LCS	0.103	103	(80-120)			0.1 mg/L	05/18/2009

Batch MIP5775
Method SW6010B TCLP
Instrument TJA Enviro II ICP P2

SGS Ref.#	893985	Matrix Spike	**Printed Date/Time**	05/19/2009 10:50
	893986	Matrix Spike Duplicate	**Prep Batch**	MXX21642
			Method	Digestion Mercury (S)
			Date	05/09/2009
Original	1091642007			
Matrix	Solid/Soil (Wet Weight)			

QC results affect the following production samples:

1091642007, 1091642008

Parameter	Qualifiers	Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Metals Department									
Mercury	MS	40.3	330	88	(80-120)			328 ug/Kg	05/09/2009
	MSD		325	87		2	(< 20)	329 ug/Kg	05/09/2009

Batch	MCV4171
Method	SW7471B
Instrument	PSA Millennium mercury AA

SGS Ref.#	894029	Matrix Spike	**Printed Date/Time**	05/19/2009 10:50
	894030	Matrix Spike Duplicate	**Prep Batch**	MXX21644
			Method	Soils/Solids Digest for Metals b
			Date	05/08/2009
Original	1091642003			
Matrix	Solid/Soil (Wet Weight)			

QC results affect the following production samples:

1091642001, 1091642002, 1091642003, 1091642004, 1091642005, 1091642006, 1091642007, 1091642008

Parameter	Qualifiers		Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount		Analysis Date
Metals by ICP/MS											
Lead		MS	73.6	129	112	(80-120)			49.1	mg/Kg	05/13/2009
		MSD		124	105		3	(< 20)	48.4	mg/Kg	05/13/2009

Batch	MMS5903
Method	SW6020
Instrument	Perkin Elmer Sciex ICP-MS P3

SGS Ref.#	894598	Matrix Spike	**Printed Date/Time**	05/19/2009 10:50
	894599	Matrix Spike Duplicate	**Prep Batch**	MXX21660
			Method	Digestion Mercury (W)
			Date	05/13/2009
Original	1091642015			
Matrix	Solid/Soil (Wet Weight)			

QC results affect the following production samples:

1091642015, 1091642016

Parameter	Qualifiers	Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Metals Department									
Mercury	MS	ND	0.0766	96	(85-115)			0.0800 mg/L	05/13/2009
	MSD		0.0770	96		1	(< 15)	0.0800 mg/L	05/13/2009

Batch	MCV4175
Method	SW7470A TCLP
Instrument	PSA Millennium mercury AA

SGS Ref.#	895252	Matrix Spike	**Printed Date/Time**	05/19/2009 10:50
	895253	Matrix Spike Duplicate	**Prep Batch**	MXT4208
			Method	Waters Digest for Metals by ICl
			Date	05/14/2009
Original	1091658001			
Matrix	Solid/Soil (Wet Weight)			

QC results affect the following production samples:

1091642009, 1091642010, 1091642011, 1091642012, 1091642013, 1091642014, 1091642015, 1091642016

Parameter	Qualifiers		Original Result	QC Result	Pct Recov	MS/MSD Limits	RPD	RPD Limits	Spiked Amount		Analysis Date
TCLP Constituents Metals											
Arsenic		MS	0.150 J	10.3	101	(50-125)			10.0	mg/L	05/18/2009
		MSD		9.97	98		3	(< 20)	10.0	mg/L	05/18/2009
Barium		MS	1.44	10.8	93	(50-125)			10.0	mg/L	05/18/2009
		MSD		10.9	94		1	(< 20)	10.0	mg/L	05/18/2009
Chromium		MS	ND	4.21	105	(50-125)			4.00	mg/L	05/18/2009
		MSD		4.20	105		0	(< 20)	4.00	mg/L	05/18/2009
Lead		MS	ND	11	110	(50-125)			10.0	mg/L	05/18/2009
		MSD		10.8	108		1	(< 20)	10.0	mg/L	05/18/2009
Selenium		MS	ND	10.1	101	(50-125)			10.0	mg/L	05/18/2009
		MSD		10.6	106		5	(< 20)	10.0	mg/L	05/18/2009

Batch	MIP5775
Method	SW6010B TCLP
Instrument	TJA Enviro II ICP P2

Geri, Heidi (Anchorage)

From: Shayla Swedlund [SIS@shanwil.com]
Sent: Tuesday, May 05, 2009 10:46 AM
To: Geri, Heidi (Anchorage)
Subject: RE: Yes

Nope. Those samples are Pb only. Samples 7 and 8 are RCRA, including Hg...

shayla

From: Geri, Heidi (Anchorage) [mailto:Heidi.Geri@sgs.com]
Sent: Tuesday, May 05, 2009 10:43 AM
To: Shayla Swedlund
Subject: RE: Yes
Importance: High

Hi Shayla,

RCRA is only listed for samples # 7 and # 8.

Samples 1 – 6 are also requesting 7470. Do you also want mercury run on the 6 samples labeled 'Total & Leachable Pb EPA 6020/7470/1311' Please find attached COC.

Thank you,

Heidi

Heidi Geri, BS
Alaska Division Project Manager
SGS North America Inc.
200 W Potter Drive
Anchorage, AK 99518
Phone: (907) 562-2343
Direct: (907) 550-3211
Fax: (907) 561-5301
e-mail: heidi.geri@SGS.com

From: Shayla Swedlund [mailto:SIS@shanwil.com]
Sent: Tuesday, May 05, 2009 10:25 AM
To: Geri, Heidi (Anchorage)
Subject: Yes

Please test for Hg under the RCRA metals for the Highland Mtn samples....

Thanks.

Shayla Swedlund
Environmental Scientist III
Shannon & Wilson
5430 Fairbanks Street, Suite 3

Anchorage, AK 99518

(907) 561-2120 - phone
(907) 561-4483 - fax

1091642

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY RECORD

Laboratory SGS
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Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	Total+Leachable Pb EPA 6020/7470/1311 No Pres	Total+Leachable RCRA Metals EPA 6020/7470/4 no Pres. 1311.					Total Number of Containers	Remarks/Matrix
32-1-17294 SS5	① A 9A	1200	4/28/09			X						1	SOIL
32-1-17294 SS11	② 10	1207	↓			X						1	↓
32-1-17294 SS16	③ 11	1235				X						1	
32-1-17294 SS21	④ 12	1240				X						1	
32-1-17294 SS30	⑤ 13	1330				X						1	
32-1-17294 SS32	⑥ 14	1335				X						1	
32-1-17294 SS38	⑦ 15	1400					X					1	
32-1-17294 SS40	⑧ ↓ 16 ↓	1405	↓				X					1	↓

Project Information		Sample Receipt	
Project Number:	32-1-17294	Total Number of Containers	
Project Name:	Highland Mtn	COC Seals/Intact? Y/N/NA	
Contact:	Shayla Swedlund	Received Good Cond./Cold	
Ongoing Project?	Yes ☒ No ☐	Delivery Method:	
Sampler:	Shayla Swedlund	(attach shipping bill, if any)	

Instructions	
Requested Turnaround Time:	Standard TAT
Special Instructions:	

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1540	Signature: Time:	Signature: Time:
Printed Name: Shayla Swedlund Date: 4/28/09	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time: 1540
Printed Name: Date:	Printed Name: Date:	Printed Name: Joe Rud. Date: 4/28/09
Company:	Company:	Company: SGS

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

70d TB= — C= 8.1

No. 29132

SGS

1091642

SAMPLE RECEIPT FORM

SGS WO#:

Yes	No	NA		
___	✓	___	Are samples **RUSH**, priority or *w/in 72 hrs* of **hold time**?	
___	___	✓	If yes, have you done *e-mail ALERT notification*?	
___	✓	___	Are samples *within 24 hrs.* of **hold time** or **due date**?	
___	___	✓	If yes, have you also *spoken with* supervisor?	
___	___	✓	Archiving bottles: Are lids marked w/ red "X"?	
___	___	✓	Were samples collected with proper preservative?	
___	✓	___	**Any problems (ID, cond'n, HT, etc)? Explain:**	
___	___	✓	If this is for PWS, provide **PWSID:**_____	
___	___	✓	Payment received: $_____ by Check or Credit Card	
___	✓	___	Will courier charges apply?	
___	✓	___	Data package required? (Level: 1 / 2 / 3 / 4)	
			Notes: _____	
___	✓	___	Is this a DoD project? (USACE, Navy, AFCEE)	

TAT (circle one): (Standard) -or- Rush
Received Date: 4-28-09
Received Time: 1540
Thermometer ID: 70d

Cooler ID	Temp Blank	Cooler Temp
1	/°C	8.1 °C
	°C	°C
	°C	°C
	°C	°C

Note: Temperature readings include thermometer correction factors

Delivery method (circle all that apply):
(Client) / Alert Courier / Lynden / SGS
UPS / FedEx / USPS / DHL / Carlile
AkAir Goldstreak / NAC / ERA / PenAir
Other: _____

Additional Sample Remarks: *(√ if applicable)*
_____Extra Sample Volume?
_____Limited Sample Volume?
_____Multi-Incremental Samples?
_____Lab-filtered for dissolved_____
_____Ref Lab required for_____
_____Foreign Soil?

This section must be filled out for DoD projects (USACE, Navy, AFCEE):

Yes	No	
___	___	Is received temperature ≤6°C?
___	___	Were containers ice-free? *Notify PM **immediately** of any ice in samples.* If some cooler temperatures are non-compliant, see form FS-0029 (attached) for samples/analyses affected.
___	___	Was there an airbill? *(If "yes," see attached.)*
___	___	Was cooler sealed with custody seals & were they intact? # / where: _____
___	___	Was there a COC with cooler?
___	___	Was COC sealed in plastic bag & taped inside lid of cooler?
___	___	Was the COC filled out properly? Did labels correspond?
___	___	Did the COC indicate USACE / Navy / AFCEE project?
		Samples were packed to prevent breakage with *(circle one)*: Bubble Wrap Vermiculite Other (specify): _____
___	___	Were all samples sealed in separate plastic bags?
___	___	Were all VOCs free of headspace and/or MeOH preserved?
___	___	Were correct container / sample sizes submitted?
___	___	Was the PM notified of arrival so they can send Sample Receipt Acknowledgement to client?

This section must be completed if problems are noted.

Was client notified of problems? Yes / No

By (SGS PM): _____

Individual contacted: _____
Via: Phone / Fax / E-mail *(circle one)*
Date/Time: _____
Reason for contact: _____

Change Order Required? Yes / No

Notes: _____

Completed by (sign): _____ **(print):** JAMES DOUGHTY

Login proof: Self-check completed ✓ **Peer-reviewer's Initials** JSK

SGS

SAMPLE RECEIPT FORM (page 2) SGS WO#: 1091642

#	Container ID	Matrix	Test	QC	TB	Container Volume: 1 L	500 mL	250 mL or 8oz	125 mL or 4oz	60 mL	40 mL	Other	Container Type: AG	CG	HDPE	Nalgene	Coli	Septa	Other	Preservative: None	HCl	HNO_3	H_2SO_4	MeOH	$Na_2S_2O_3$	NaOH	NaOH+ZnAc	Other (specify)	Notes *
1-6	A	~~2~~ JGK	TOTAL ~~TCLP~~ LEACHABLE Pb					6					✓							✓									
7,8	A	~~2~~ JGK	TOTAL ~~TCLP~~ LEACHABLE RCRA METALS					2					✓							✓									
9-16	A		TCLP					8					✓							✓									
Bottle Totals								8																					

* Note: Containers which require (additional) chemical preservation upon receipt must be documented per SOP#106.

Completed by: [signature] Date: 4.28.09

Form # F004r18 revised 03/17/2009

SGS Environmental Services

TCLP SAMPLE CHARACTERIZATION

HSN#: 1642-1a ***Date:*** 5/5/09 ***Analyst:*** BJ

Sample Vol. (mL): 250 Container Volume (mL): 250

Top _____% (xylene miscible) Description / Notes: _____

Middle _____% (water miscible) Description / Notes: _____

Bottom 100 % (solids) Description / Notes: Moist Sludge

Percent Solids Determination:

Original Sample & Container weight (g):		Solid % of sample:	
Empty Original Container weight (g):		Liquid % of sample:	
Clean Container weight (g):		Weight solids extracted (g):	
Original Sample weight (g):		Extraction Fluid:	
Filter weight (g):		Vol. Original Liquid Added Back (mL)	
Clean Container & Liquid weight (g):		Liquid Volume (mL):	
Liquid weight (g):			
Filter & Solid Sample weight (g):			
Solid weight (g):			

Notes: _____

HSN#: 1642-2a ***Date:*** 5/5/09 ***Analyst:*** BJ

Sample Volume (mL): 250 Container Volume (mL): 250

Top _____% (xylene miscible) Description / Notes: _____

Middle _____% (water miscible) Description / Notes: _____

Bottom 100 % (solids) Description / Notes: Moist Sludge

Percent Solids Determination:

Original Sample & Container weight (g):		Solid % of sample:	
Empty Original Container weight (g):		Liquid % of sample:	
Clean Container weight (g):		Weight solids extracted (g):	
Original Sample weight (g):		Extraction Fluid:	
Filter weight (g):		Vol. Original Liquid Added Back (mL)	
Clean Container & Liquid weight (g):		Liquid Volume (mL):	
Liquid weight (g):			
Filter & Solid Sample weight (g):			
Solid weight (g):			

Notes: _____

SGS Environmental Services

TCLP SAMPLE CHARACTERIZATION

HSN#: 1642-3a ***Date:*** 5/5/09 ***Analyst:*** BJS

Sample Vol. (mL): _____ Container Volume (mL): 250

Top _____ % (xylene miscible) Description / Notes: _____

Middle _____ % (water miscible) Description / Notes: _____

Bottom 100 % (solids) Description / Notes: Brown mud

Percent Solids Determination:

Original Sample & Container weight (g):		Solid % of sample:	
Empty Original Container weight (g):		Liquid % of sample:	
Clean Container weight (g):		Weight solids extracted (g):	
Original Sample weight (g):		Extraction Fluid:	
Filter weight (g):		Vol. Original Liquid Added Back (mL)	
Clean Container & Liquid weight (g):		Liquid Volume (mL):	
Liquid weight (g):			
Filter & Solid Sample weight (g):			
Solid weight (g):			

Notes: _____

HSN#: 1642-4a ***Date:*** 5/5/09 ***Analyst:*** BJS

Sample Volume (mL): 250 Container Volume (mL): 250

Top _____ % (xylene miscible) Description / Notes: _____

Middle _____ % (water miscible) Description / Notes: _____

Bottom 100 % (solids) Description / Notes: Sludge

Percent Solids Determination:

Original Sample & Container weight (g):		Solid % of sample:	
Empty Original Container weight (g):		Liquid % of sample:	
Clean Container weight (g):		Weight solids extracted (g):	
Original Sample weight (g):		Extraction Fluid:	
Filter weight (g):		Vol. Original Liquid Added Back (mL)	
Clean Container & Liquid weight (g):		Liquid Volume (mL):	
Liquid weight (g):			
Filter & Solid Sample weight (g):			
Solid weight (g):			

Notes: _____

SGS Environmental Services

TCLP SAMPLE CHARACTERIZATION

HSN#: 1642-5a ***Date:*** 5/5/09 ***Analyst:*** BJS

Sample Vol. (mL): 250 Container Volume (mL): 250

Top _____% (xylene miscible) Description / Notes: _____

Middle _____% (water miscible) Description / Notes: _____

Bottom 100 % (solids) Description / Notes: Wet Bleedyc

Percent Solids Determination:

Original Sample & Container weight (g):		Solid % of sample:	
Empty Original Container weight (g):		Liquid % of sample:	
Clean Container weight (g):		Weight solids extracted (g):	
Original Sample weight (g):		Extraction Fluid:	
Filter weight (g):		Vol. Original Liquid Added Back (mL)	
Clean Container & Liquid weight (g):		Liquid Volume (mL):	
Liquid weight (g):			
Filter & Solid Sample weight (g):			
Solid weight (g):			

Notes: _____

HSN#: 1642-6a ***Date:*** 5/5/09 ***Analyst:*** BJS

Sample Volume (mL): 250 Container Volume (mL): 250

Top _____% (xylene miscible) Description / Notes: _____

Middle _____% (water miscible) Description / Notes: _____

Bottom 100 % (solids) Description / Notes: Mud Rocks

Percent Solids Determination:

Original Sample & Container weight (g):		Solid % of sample:	
Empty Original Container weight (g):		Liquid % of sample:	
Clean Container weight (g):		Weight solids extracted (g):	
Original Sample weight (g):		Extraction Fluid:	
Filter weight (g):		Vol. Original Liquid Added Back (mL)	
Clean Container & Liquid weight (g):		Liquid Volume (mL):	
Liquid weight (g):			
Filter & Solid Sample weight (g):			
Solid weight (g):			

Notes: _____

SGS Environmental Services

TCLP SAMPLE CHARACTERIZATION

HSN#: 164227a **Date:** 5/5/09 **Analyst:** BJS

Sample Vol. (mL): 250 Container Volume (mL): 250

Top _____ % (xylene miscible) Description / Notes: _____

Middle _____ % (water miscible) Description / Notes: _____

Bottom 100 % (solids) Description / Notes: Wet mud

Percent Solids Determination:

Original Sample & Container weight (g):		Solid % of sample:	
Empty Original Container weight (g):		Liquid % of sample:	
Clean Container weight (g):		Weight solids extracted (g):	
Original Sample weight (g):		Extraction Fluid:	
Filter weight (g):		Vol. Original Liquid Added Back (mL)	
Clean Container & Liquid weight (g):		Liquid Volume (mL):	
Liquid weight (g):			
Filter & Solid Sample weight (g):			
Solid weight (g):			

Notes: _____

HSN#: 1642-8a **Date:** 5/5/09 **Analyst:** BJS

Sample Volume (mL): 250 Container Volume (mL): 250

Top _____ % (xylene miscible) Description / Notes: _____

Middle _____ % (water miscible) Description / Notes: _____

Bottom 100 % (solids) Description / Notes: Muddy, roots

Percent Solids Determination:

Original Sample & Container weight (g):		Solid % of sample:	
Empty Original Container weight (g):		Liquid % of sample:	
Clean Container weight (g):		Weight solids extracted (g):	
Original Sample weight (g):		Extraction Fluid:	
Filter weight (g):		Vol. Original Liquid Added Back (mL)	
Clean Container & Liquid weight (g):		Liquid Volume (mL):	
Liquid weight (g):			
Filter & Solid Sample weight (g):			
Solid weight (g):			

Notes: _____

LABORATORY DATA REVIEW CHECKLIST

CS Report Name: Hiland Mountain Correctional Center, Eagle River, AK
Date: July 2009

Laboratory Report Date: 5/1/2009

Consultant Firm: Shannon & Wilson, Inc.

Completed by: Shayla Swedlund
Title: Environmental Scientist III

Laboratory Name: SGS Environmental Services, Inc.
Work Order Number: 1091642

ADEC File Number: Not Applicable
ADEC RecKey Number: Not Applicable
(**NOTE**: ***NA*** = not applicable; Text in *italics* added by Shannon & Wilson, Inc.)

1. Laboratory

a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses? **Yes / No**
Comments:

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS-approved?
NA **/ Yes / No**
Comments:

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?
Yes / No
Comments**:**

b. Correct analyses requested? **Yes / No**
Comments**:**

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
Yes / No
Comments: **Cooler Temp was 8.1° C; Samples submitted shortly after collection**

b. Sample preservation acceptable - acidified waters, Methanol-preserved VOC soil (GRO, BTEX, VOCs, etc.)? ***NA*** **/ Yes / No**
Comments:

c. Sample condition documented - broken, leaking (soil MeOH), zero headspace (VOC vials)? **Yes / No**
Comments: **No problematic conditions noted**

d. If there were any discrepancies, were they documented (e.g., incorrect sample containers/preservation, sample temperatures outside range, insufficient sample size, missing samples)? ***NA*** **/ Yes / No**
Comments: **Sample temperature noted**

e. Data quality or usability affected? Explain. ***NA***
Comments: **No. Samples collected shortly before sample submittal.**

4. Case Narrative

a. Present and understandable? **Yes / No**
Comments:

b. Discrepancies, errors or QC failures noted by the lab? ***None Noted*** **/ Yes**
Comments: **PQL for arsenic in Sample SS40 was elevated**

c. Were corrective actions documented? ***None Noted*** **/ Yes**
Comments: **Barium post digestive spike was run**.

d. What is the effect on data quality/usability, according to the case narrative?
Comments: **PQL for arsenic in Sample SS40 was elevated, however the reported concentration was greater than the cleanup level.**

5. Sample Results

a. Correct analyses performed/reported as requested on COC? **Yes / No**
Comments:

b. All applicable holding times met? **Yes / No**
Comments:

c. All soils reported on a dry-weight basis? ***NA*** **/ Yes / No**
Comments: **According to Heidi Geri, SGS, some soil samples were too wet to have the dry-weight measured; the sample results may be biased low.**

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project? **Yes / No**
Comments: **TCLP selenium PQL is the same as the TCLP MCL/Cleanup Level.**

e. Data quality or usability affected? Explain.
Comments: **Total selenium was not reported in the project samples and is unlikely to be present in leachable concentrations greater than the TCLP MCL.**

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis, and 20 samples?
Yes / No
Comments:

ii. All method blank results less than PQL? **Yes / No**
Comments:

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

iv. Do the affected sample(s) have data flags? *NA* **/ Yes / No**
Comments:

If so, are the data flags clearly defined? *NA* **/ Yes / No**
Comments:

v. Data quality or usability affected? Explain. *NA*
Comments:

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

i. Organics - One LCS/LCSD reported per matrix, analysis, and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846) *NA* **/ Yes / No**
Comments:

ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples? *NA* **/ Yes / No**
Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages) **Yes / No**
Comments:

iv. Precision – All relative percent differences (RPDs) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods

20%; all other analyses see the laboratory QC pages) **Yes / No**
Comments:

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

vi. Do the affected samples(s) have data flags? ***NA*** **/ Yes / No**
Comments:

If so, are the data flags clearly defined? ***NA*** **/ Yes / No**
Comments:

vii. Data quality or usability affected? Explain. ***NA***
Comments:

c. Surrogates - Organics Only

i. Are surrogate recoveries reported for organic analyses, field, QC and laboratory samples? ***NA*** **/ Yes / No**
Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages) ***NA*** **/ Yes / No**
Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? ***NA*** **/ Yes / No**
Comments:

If so, are the data flags clearly defined? ***NA*** **/ Yes / No**
Comments:

iv. Data quality or usability affected? Explain. ***NA***
Comments:

d. Trip Blank - Volatile analyses only (GRO, BTEX, VOCs, etc.) [soil and water]

i. One trip blank reported per matrix, analysis and cooler? ***NA*** **/ Yes / No**
Comments:

ii. Is the cooler used to transport the trip blank and volatile samples clearly indicated on the CoC? ? ***NA*** **/ Yes / No (if no explain)**

iii. All results less than PQL? ***NA*** **/ Yes / No**
Comments:

iv. If above PQL, what samples are affected? ***NA***
Comments**:**

v. Data quality or usability affected? Explain. ***NA***
Comments:

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
Yes / No
Comments:

ii. Were the field duplicates submitted blind to the lab? ***NA*** **/ Yes / No**
Comments:

iii. Precision – All relative percent differences (RPDs) less than specified DQOs?
(Recommended: 30% for water, 50% for soil) ***NA*** **/ Yes / No**
Comments:

iv. Data quality or usability affected? Explain. ***NA***

f. Decontamination or Equipment Blank (if not applicable, a comment stating why must be entered below)
NA **/ Yes / No**
Samples collected for screening purposes; this level of quality control not necessary.

i. All results less than PQL? ***NA*** **/ Yes / No**
Comments:

ii. If results are above PQL, what samples are affected? ***NA***
Comments:

iii. Data quality or usability affected? Explain. ***NA***
Comments:

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

a. Are they defined and appropriate? ***NA*** **/ Yes / No**
Comments:

ATTACHMENT 3

BUDGETARY COST ESTIMATE

Hiland Mountain Correctional Center, Eagle River, Alaska

Project Tasks	Option 1: Soil Disposal	Option 2: Lead and Soil Reclaimation
Task 1. Cleanup Plan and RCRA ID Number Coordination	$4,100	$4,100
Task 2. Soil Disposal or Reclaimation - Field Activities *	$638,000	$539,000
Task 3. Confirmation Sampling **	$8,000	$9,500
Task 4. Reporting	$3,000	$3,000
Project Total:	$653,100	$555,600

*Assumes 800 cubic yards of lead-impacted soil and that the impacted soil can be addressed with a single field effort (i.e. confirmation results verify complete removal)

**A minimum of 40 analytical samples and 4 duplicate samples will be collected from the excavation base (Options 1 and 2)
In addition, a minimum of 7 analytical samples and one duplicate will be collected from the post-treatment soil (Option 2)
(Guidance for Cleanup of Petroleum Contaminated Sites, September 2000)
For Option 1, samples will be collected from the base of the excavation to confirm impacted material has been removed
For Option 2, samples will be collected from the base of the excavation and post-treatment

ATTACHMENT 4

IMPORTANT INFORMATION ABOUT YOUR

GEOTECHNICAL/ENVIRONMENTAL REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 32-1-17294-001

Date: July 2009
To: ADOT&PF
Re: Hiland Mountain Correctional Center, Eagle River, Alaska

Important Information About Your Geotechnical/Environmental Report

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors, which were considered in the development of the report, have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

Shooting Range Site Characterization
Hiland Mountain Correctional Center
Eagle River, Alaska

October 2018

SHANNON & WILSON, INC.

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Excellence. Innovation. Service. Value.

Since 1954.

Submitted To:
Alaska Department of Transportation & Public Facilities
2200 East 42nd Avenue
Anchorage, Alaska 99508

By:
Shannon & Wilson, Inc.
AEL C125
5430 Fairbanks Street, Suite 3
Anchorage, Alaska 99518
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FIGURES

APPENDICES

SHOOTING RANGE SITE CHARACTERIZATION
HILAND MOUNTAIN CORRECTIONAL CENTER
EAGLE RIVER, ALASKA

1.0 INTRODUCTION

This report presents the results of Shannon & Wilson's site characterization and solid waste removal activities conducted at the Southcentral Law Enforcement Shooting Range (Property). This work was performed as part of our July 6, 2016 *Workplan for Site Characterization, Hiland Mountain Correctional Center Shooting Range, Eagle River, Alaska,* which was approved by Mr. Grant Lidren of the Alaska Department of Environmental Conservation (ADEC) in the form of an email on July 7, 2016. Authorization was received from the Department of Transportation & Public Facilities (ADOT&PF) through Notice to Proceed (NTP) 20 under our Professional Services Agreement No. 02532064. The work was conducted in accordance with out April 13, 2018 proposal.

2.0 SITE AND PROJECT DESCRIPTION

The project site is located east of the Glenn Highway frontage road, in the southeast ¼ of Section 14, Township 14 North, Range 2 West, Seward Meridian, Alaska. For the purposes of this report, the "project site" is defined as the former shooting range located east of the Hiland Mountain Correctional Center (HMCC) structures. A vicinity map showing the site and surrounding area is included as Figure 1. A site plan of the area is included as Figure 2.

The site was used as a shooting range by the Alaska Department of Corrections between 1980 and 1998. It is our understanding that the range was used by the DOC staff and other law enforcement personnel. Weapons used at the range were primarily handguns (.38 and .40 S&W) and shotguns (12 gage). The range is approximately 30 yards long. Weapons were fired at stationary targets set in steel brackets mounted in the concrete firing lanes. The range is currently inactive. Current DOC staff are unaware of any regrading activities at the range backstop.

2.1 Prior Investigations

On April 28, 2009, a representative from Shannon & Wilson collected and screened surface soil samples from the former firing range. The samples were collected from three separate areas: grid area, target line, and berm backstop. The grid comprised of four approximately equal areas, between the firing line and the target line. Using hand tools, the samples were collected from the upper 4 inches of surface soil to qualitatively evaluate and document the extent of lead impact.

The target line and the berm backstop area soils were qualitatively evaluated to a maximum depth of 12 inches below ground surface (bgs). Spent ammunition casings were observed throughout the project site, although no visible lead fragments were noted in the sample areas.

A total of 43 surface soil samples were visually screened for lead fragments, and eight analytical samples were collected. Analytical samples were collected from four locations within the grid—one sample from each of the four areas. Within each grid, analytical samples were collected from areas where the most spent cartridges were observed. Samples were also collected from two locations along the former target line and two locations from the backstop berm.

Six of the eight analytical soil samples contained lead concentrations that exceed the ADEC Method 2 cleanup level for residential soil. Additionally, lead concentrations in five samples also exceed the Resource Conservation and Recovery Act (RCRA) standard for leachable lead. The highest concentrations were reported in the samples from the berm backstop.

2.2 Regulatory Status

Under traditional interpretations of ADEC and Resource Conservation, and Recovery Act (RCRA) regulations, lead shot and lead-contaminated soil that is moved, excavated or otherwise managed is a generated waste, and subject to 40 CFR 262.11 requiring evaluation for hazardous characteristics that may cause it to be classified as a hazardous waste. Based on the sampling conducted on the Property, soil excavated would likely be classified as a characteristic hazardous waste. This classification would necessitate obtaining an Environmental Protection Agency (EPA) identification number, conducting cradle-to-grave tracking of the generated material, and disposing the material in a permitted RCRA Subtitle C landfill if it fails the RCRA criteria for leachable lead.

Moreover, recent court cases and EPA interpretations suggest that lead shot in the environment, even if undisturbed by human activities, can become a RCRA waste, if present at a closed or abandoned shooting range. This changes the traditional interpretation and can require removing all lead shot from the range; regardless if the soil samples pass the ADEC and RCRA criteria.

The site is currently classified as an inactive range. No changes to the range have occurred that would prevent the range from becoming active in the future. The long-term intent of DOC is to close this range and use other facilities for training. The purpose of this project is to evaluate the potential costs associated with range closure.

3.0 FIELD ACTIVITIES

The field activities during this portion of the project included further identifying areas containing spent bullets and bullet fragments, documenting the extent of lead contamination in soil, and

conducting bench-scale testing to evaluate the effectiveness of stabilizing the lead in soil. Work on this project was conducted by ADEC-Qualified Environmental Professionals, as defined by 18 Alaska Administrative Code (AAC) 75.990. SGS North America Inc. (SGS) of Anchorage, Alaska performed the laboratory testing of analytical soil samples under subcontract to Shannon & Wilson. Site photographs are included in Appendix A. Field notes are provided in Appendix B.

3.1 Work Plan Modifications

The field activities were performed in general accordance with our July 6, 2016 *Workplan for Site Characterization, Hiland Mountain Correctional Center Shooting Range, Eagle River, Alaska.* A metal detector was used to evaluate the lateral extents of the backstop impact areas. This survey indicated the presence of lead fragments in a horizontal band across the backstop and not in individual impact areas in line with the shooting lanes. The area of the backstop excluded from the backstop decision unit is shown on Figure 2. This modification was approved by ADEC via email on June 19, 2018.

3.2 Decision Unit Characterization

As described in the work plan the following decision units were identified:

- Decision Unit 1. Firing line to 5 yards downrange.
- Decision Unit 2. Five yards downrange to 25 yards downrange.
- Decision Unit 3. Twenty-five yards downrange to the toe of the backstop.
- Decision Unit 4. Backstop outside of bullet impact areas.

A Multi-increment (MI) sampling method was used to obtain representative samples of the surface soil. Non-volatile MI sampling was conducted in general accordance with the ADEC's *Draft Guidance on Multi-Increment Soil Sampling* (May 2009) and the U.S. Army Corps of Engineers' *Interim Guidance 09-02, Implementation of Incremental Sampling (IS) of Soil for the Military Munitions Response Program* (July 2009). One MI sample was collected from each decision unit.

A square-based grid system was used to overlay each decision unit. The grid system was sized such that each decision unit contained at least 100 possible sampling locations. The Shannon & Wilson representatives marked the approximate grid centers with labeled pin flags as shown in Photo 1 in Appendix A. For each decision unit, a random number generator was used to select 50 sub-portion sample locations. Primary sub-portion samples were collected from the center of the grid square as shown in Photo 2. Duplicate and replicate samples were collected from Decision Unit 3 as described in the work plan. The duplicate sub-portion samples were collected

from the same grid square as the primary sample and 8 inches north of each primary sub-portion sample. Replicate sub-portion sample locations were determined using a random number generator to select new grid squares.

At each sub-sample location, approximately 20 grams of soil were collected using a decontaminated sampling spoon and field scale. Effort was taken to collect silt and fine-grained sand with particle diameters of less than 2 millimeters. Due to the moisture content, each sub-portion sample was dried on site using a portable stove as shown in Photo 3. Once the sub-portion sample was sufficiently friable for sieving, the Shannon & Wilson representatives used a portable #10 sieve to remove material with grain size diameter greater than 2 millimeters as shown in Photo 4. The material larger than the #10 sieve was visually evaluated for bullet fragments. A single lead fragment was observed in the samples collect from Decision Unit 4. Lead fragments were not observed in the samples collected from the other decision units.

Following sieving, the sub-portion samples were placed into a common container. Once all 50 sub-portion samples were collected, the entire bulk sample was spread on a new piece of visqueen. The Shannon & Wilson representatives lifted each corner of the visqueen at least four times to homogenize the material. The homogenized material was spread out across the visqueen to a depth of about 0.5-inch and divided into 30 equal sections as shown in Photo 5. Soil was collected from the center of each section (30 portions) to develop a laboratory sample with a mass of 1 gram. Shannon & Wilson's field representatives used clean stainless-steel spoons and wore new nitrile gloves to transfer analytical soil samples into laboratory-supplied containers. The sample jars were placed in coolers and transferred to the laboratory using chain of custody procedures. The MI samples were analyzed for total lead by EPA Method 6020. A sample from the homogenized sample was also collected and analyzed for leachable lead by EPA Method 1311/6020. Descriptions of the sample depths and sample descriptions are presented in Table 1.

3.3 Impact Area Characterization

The bullet impact area near the central firing lane was characterized by collecting samples in six-inch increments horizontally into the backstop. These samples, from 0 to 6 inches, 6 to 12 inches, 12 to 18 inches, and 18 to 24 inches, were individually screened with a #10 sieve. The material larger than the #10 sieve was then visually evaluated for bullet fragments. The number of bullets and fragments decreased in each sample with depth. Table 1 contains a description of the samples collected.

After review of the analytical results and sample description it appears that samples IA1-12-18 and IA1-18-24 were mis-identified in the field. This is based on the observation of bullets in one

sample and the analytical sample results. In reviewing the field notes it was observed that the sample labeled as IA1-18-24 (deeper) was collected at an earlier time than the sample labeled IA1-12-18 (shallower). In the report and tables we are reporting the corrected sample numbers.

No bullets were found in the sample from 18-24 inches and fragments were only observed in the samples collected shallower than 12 inches. Photo 6 shows representative bullets and lead fragments recovered from the impact area. The soil finer than the #10 sieve from each sample interval was collected and analyzed for total lead by EPA Method 6020 and leachable lead by EPA Method 1311/6020.

3.4 Bench Scale Testing

Shannon & Wilson conducted bench scale testing of lead stabilization using soil from Decision Units 3 and 4 and an impact area. The soil for testing was a grab sample taken from the approximate midpoint of the decision units. The impact area just to the south of the one characterized was selected for bench scale testing. This location was selected because it was undisturbed and was assumed to have similar bullet concentrations.

The soil from the decision units was amended with rock phosphorous at 4 and 10 times the stoichiometric ratio for generating lead phosphate based on the characterization sampling results. Due to the amount of lead in the impact area soil, rock phosphorous was applied at approximately 8 times the stoichiometric ratio. As shown in Photos 7 and 8 this resulted in approximately equal volumes of soil and rock phosphorous. The soil and phosphate were mixed by hand and allowed to react for approximately 22 days before analysis. A second round of performance samples were analyzed approximately 40 days after application of the rock phosphorous. The performance samples were analyzed for leachable lead by EPA Method 1311/6020.

4.0 LABORATORY ANALYSIS

A total of 10 characterization soil samples were analyzed for total lead by EPA Method 6020A and leachable lead by EPA Method 1311/6020. Note that all MI analytical samples were collected from the material that passed through a #10 sieve. Eight soil samples collected from the bench scale testing locations following phosphate stabilization were analyzed for TCLP lead by EPA Method 1311/6020. Two samples were also collected for soil parameters including pH, phosphorus, and sulfate. Analytical samples were submitted to SGS using chain-of-custody procedures and tested on a standard 10-day turnaround time.

5.0 DISCUSSION OF ANALYTICAL RESULTS

According to the ADEC's *Oil and Other Hazardous Substances Pollution Control Regulations* (18 AAC 75, November 2017), the cleanup level for lead in soil is 400 mg/kg based on a residential exposure scenario and 800 mg/kg based on a commercial/industrial exposure scenario. TCLP lead soil results were compared to the RCRA characteristic waste standard of 5 milligrams per liter (mg/L) leachable lead listed in 40 Code of Federal Regulations (CFR) 261.

5.1 Decision Unit Characterization Results

A coefficient of variation (CV) of 0.22 was calculated for the duplicate and replicate MI samples from Decision Unit 3. Based on the results of this calculation, the Student T-test (CV less than 1.5) was used to calculate the 95-percent upper confidence level (UCL) of the mean concentration of lead in the soil. Because the Decision Units are expected to contain similar contaminant distributions, this CV was applied to the other Decision Units to calculate the 95-percent UCL. A summary of the sample results and calculated 95-percent UCL is included in Table 2.

Based on the sampling conducted, Decision Units 1 and 2 both have a total lead and a 95-percent UCL lead concentration less than the ADEC's residential cleanup level. The samples collected did not contain observable bullets or lead fragments. The samples from these two decision units contained leachable lead less than the EPA's criterion of 5 milligrams per liter (mg/L).

While bullets or lead fragments were not observed in the samples collected from Decision Unit 3, both the total lead and the 95-percent UCL lead concentration exceeds the ADEC criteria for residential and commercial exposure scenarios. The samples also failed the leachable lead criterion with a maximum concentration of 26.7 mg/L reported.

One bullet was found in the Decision Unit 4 sample and the sample contained a 95-percent UCL lead concentration of 16,187 mg/kg which exceeds the ADEC criterion. The Decision Unit 4 sample also failed the leachable lead criterion with a concentration of 27.6 mg/L.

5.2 Impact Area Characterization Results

Each sample collected in the Impact Area shallower than 18 inches contained total and leachable lead above the applicable criteria. The concentrations of total lead decreased from 69,000 mg/kg in the shallow sample to 1,190 mg/kg in the sample from 12 to 18 inches. The number of bullets observed followed this same pattern with more than 40 observed in the shallow sample to 1 observed in the sample from 12 to 18 inches.

The sample collected from 18-24 inches contained 185 mg/kg lead and 0.252 mg/L leachable lead which meet the ADEC and EPA criteria.

5.3 Bench Scale Testing Results

Two soil samples were collected for general soil chemistry evaluation. The sample results indicated low concentrations of naturally occurring phosphorus and sulfate. The measured pH ranged from 5.90 to 6.00 su which is fairly low for mineral soil in southcentral Alaska.

While the bench scale testing results show some reduction in leachable lead concentrations, none of the samples tested met the EPA's 5.0 mg/L criterion for leachable lead.

5.4 Quality Assurance Summary

The project laboratory follows on-going quality assurance/quality control procedures to evaluate conformance to applicable ADEC data quality objectives (DQOs). Internal laboratory controls to assess data quality for this project included surrogates, method blanks, laboratory control sample/laboratory control sample duplicates (LCS/LCSD), and matrix spike/matrix spike (MS/MSD) duplicates. If a DQO was not met, the project laboratory provides a notation identifying the problem in the case narrative section of their (See Appendix C).

External quality controls include a duplicate sample and replicate sample set collected from Decision Unit 3. The coefficient of variation (CV) for this MI sample set was calculated at 0.22. A CV greater than 3 indicates that the data is not usable due to errors in the sampling process or the presence of areas of significantly higher contaminant concentration. Therefore, the MI sample results are considered representative of the decision units.

Shannon & Wilson reviewed the SGS data deliverables and completed the ADEC's laboratory data review checklist (LDRC) for each laboratory report, which are included in Appendix C. Quality control non-conformances and the impact to data quality/usability are described in further detail in the LDRCs. In our opinion, no non-conformances that would adversely impact data usability were noted, and we find the project data to be complete and useable to support the project purpose and objective.

6.0 GENERATED WASTE

The bullets and bullet fragments observed during sampling are stored at the site for future recycling. They are stored in a labeled, five-gallon bucket stored in a storage shed on the west side of the range. Personal protective and disposable sampling equipment was placed in a dumpster for disposal as solid waste.

7.0 CONCLUSIONS

Based on the sampling conducted, the soil in Decision Units 1 and 2 meet the ADEC criteria for allowable lead concentration and no remedial activities are required. While bullets and lead

fragments were not observed in this area, bullet casings and spent shells were observed. This solid waste should be collected and properly disposed.

The soil in Decision Units 3 and 4, and the Impact Area, exceed the ADEC criterion for lead in soil for residential and commercial exposure scenarios. The soil also exceeds the EPA's criteria for leachable lead and would be considered a characteristic waste when generated. These results are consistent with the results of the discreet sampling conducted in July 2009. Based on the bench scale testing conducted, the addition of rock phosphate will not adequately stabilize the lead to meet the leachability criteria. Bullets and lead fragments were observed in the samples collected from Decision Unit 4 and the Impact Area. Sieving was effective at collecting bullets and bullet fragments, however the soil that passed through the sieve failed the leachability criterion for lead.

A range closure plan should be developed to remove and properly dispose the lead-impacted soil in Decision Units 3 and 4 and the Impact Area. Based on the sampling conducted there is no benefit to handling soil from the three areas separately. Due to the low pH of the soil, we recommend removing the upper four-inches of soil from Decision Unit 3, the upper 18-inches of soil from Decision Unit 4, and the upper 18-inches of soil from the Impact Areas and disposed as a D008 characteristic hazardous waste. Following removal of this soil a metal detector should be used to evaluate the resulting surface for bullets and lead fragments using a random grid. If bullets or lead fragments are observed, addition soil should be removed and disposed as above. Once the bullets and lead fragments are removed from the area, MI samples should be collected from the three decision units (Decision Units 3 and 4 and the Impact Area) to evaluate the effectiveness of the lead removal.

ADEC approval of the range closure plan will be required. Additionally, the range closure plan will have to comply with the requirements of 40 CFR 261 including obtaining an EPA identification number, preparing waste manifests, and disposal in a RCRA Subtitle C landfill.

8.0 CLOSURE/LIMITATIONS

This report was prepared for the exclusive use of ADOT&PF, herein referred to as the Client, and their representatives. The findings within this report are based on the limited sampling and analyses that were conducted. They should not be construed as definite conclusions regarding the site's soil conditions. It is possible that our tests missed higher levels, although our intention was to sample in accordance with the ADEC-approved work plan. As a result, the sampling, analyses, and data interpretations can provide you with only our professional judgment as to the environmental characteristics of this site, and in no way guarantees that an agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. The data presented in this report should

be considered representative of the time of our site assessment. Changes in site conditions can occur over time, due to natural forces or human activity. In addition, changes in government codes, regulations, or laws may occur. Because of such changes beyond our control, our observations and interpretations may need to be revised.

Shannon & Wilson has prepared the document in Appendix D, Important Information About Your Geotechnical/Environmental Report, to assist you and others in understanding the use and limitations of our reports. You are advised that various state and federal agencies (ADEC, EPA, etc.) may require the reporting of this information. Shannon & Wilson does not assume the responsibility for reporting these findings and therefore has not, and will not, disclose the results of this study unless specifically requested and authorized by you, or as required by law.

We appreciate the opportunity to be of service to you. Please contact the undersigned at (907) 561-2120 with questions or comments concerning this report.

Sincerely,

SHANNON & WILSON, INC.

Stafford Glashan, P.E.
Senior Engineer

TABLE 1
SAMPLE LOCATIONS AND DESCRIPTIONS

Sample Number	Date	Sample Location and Description (See Figure 2)	Depth (inches bgs)
Decision Unit Samples			
* DU1	6/18/2018	Decision Unit 1 MI sample, no bullets or fragments observed	1.0
* DU2	6/19/2018	Decision Unit 2 MI sample, no bullets or fragments observed	1.0
* DU3	6/19/2018	Decision Unit 3 MI sample, no bullets or fragments observed	1.0
* DU3R	6/19/2018	Decision Unit 3 replicate sample, no bullets or fragments observed	1.0
* DU39	6/19/2018	Decision Unit 3 duplicate sample, no bullets or fragments observed	1.0
* DU3-44	6/19/2018	Decision Unit 3 grab sample for soil chemistry	1.0
* DU4	6/20/2018	Decision Unit 4 MI sample, one bullet and no fragments observed	1.0
Impact Area Samples			
* IA1-0-6	6/20/2018	Impact Area 1, >20 bullets and numerous fragments recovered	0-6
* IA1-6-12	6/20/2018	Impact Area 1, 4 bullets and few fragments recovered	6-12
* IA1-12-18~	6/20/2018	Impact Area 1, 1 bullet and no fragments recovered	12-18
* IA1-18-24~	6/20/2018	Impact Area 1, no bullets or fragments recovered	18-24
* IA1-12-18NV	6/20/2018	Impact Area 1 grab sample for soil chemistry	1.0

Notes:

* = Sample analyzed by the project laboratory (See Table 2)

~ = Samples apparently mis-labeled in field. See Report.

bgs = below ground surface

MI = Multi Increment

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level**	Sample ID Number^, and Collection Depth in Inches bgs (See Table 1 and Figure 2)						
			Decision Units						
			DU1 1.0	DU2 1.0	DU3 1.0	DU3R 1.0	DU39 1.0	DU344 1.0	DU4 1.0
Total Lead -mg/kg	EPA 6020A	400	**61.4**	**193**	**1,570**	**1,960**	**2,420**	-	**11,900**
95% UCL Lead - mg/kg	Calculation‡	400	**83.5**	**262**	**2,700**	**2,700**	**2,700**	-	**16,184**
TCLP Lead - mg/L	EPA 1311/6020A	5	**0.556**	**0.799**	**17.7**	**26.7**	**15.9**	-	**27.6**
pH - Standard Units		NA	-	-	-	-	-	**6.00**	-
Phosphorus - mg/kg		NA	-	-	-	-	-	**635**	-
Sulfate - mg/kg		NA	-	-	-	-	-	**4.44**	-
4x Phosphate - 22 days post application									
TCLP Lead - mg/L	EPA 1311/6020A	5	-	-	**25.2**	-	-	-	**75.6**
10x Phosphate - 22 days post application									
TCLP Lead - mg/L	EPA 1311/6020A	5	-	-	**29.3**	-	-	-	**29.5**
10x Phosphate - 40 days post application									
TCLP Lead - mg/L	EPA 1311/6020A	5	-	-	**22.1**	-	-	-	**85.8**

Notes:

* = See Appendix C for compounds tested, methods, and laboratory reporting limits.

** = Soil cleanup levels are the most stringent ADEC Method Two standards listed in Tables B1 and B2, 18 Alaska Administrative Code (AAC) 75, for the "over 40 inches (precipitation) zone" (November 2017).

‡ = Based on Coefficient of Variability of 0.22 and Student-t test calculated from Decision Unit 3 samples

^ = Sample ID number preceded by "100200-" on the chain of custody form

mg/kg = Milligrams per kilogram

mg/L = Milligrams per liter

61.4 = Analyte detected at a concentration less than the applicable ADEC cleanup level

- = Analyte concentration exceeds most stringent ADEC or EPA criterion

- = Sample not tested for this analyte

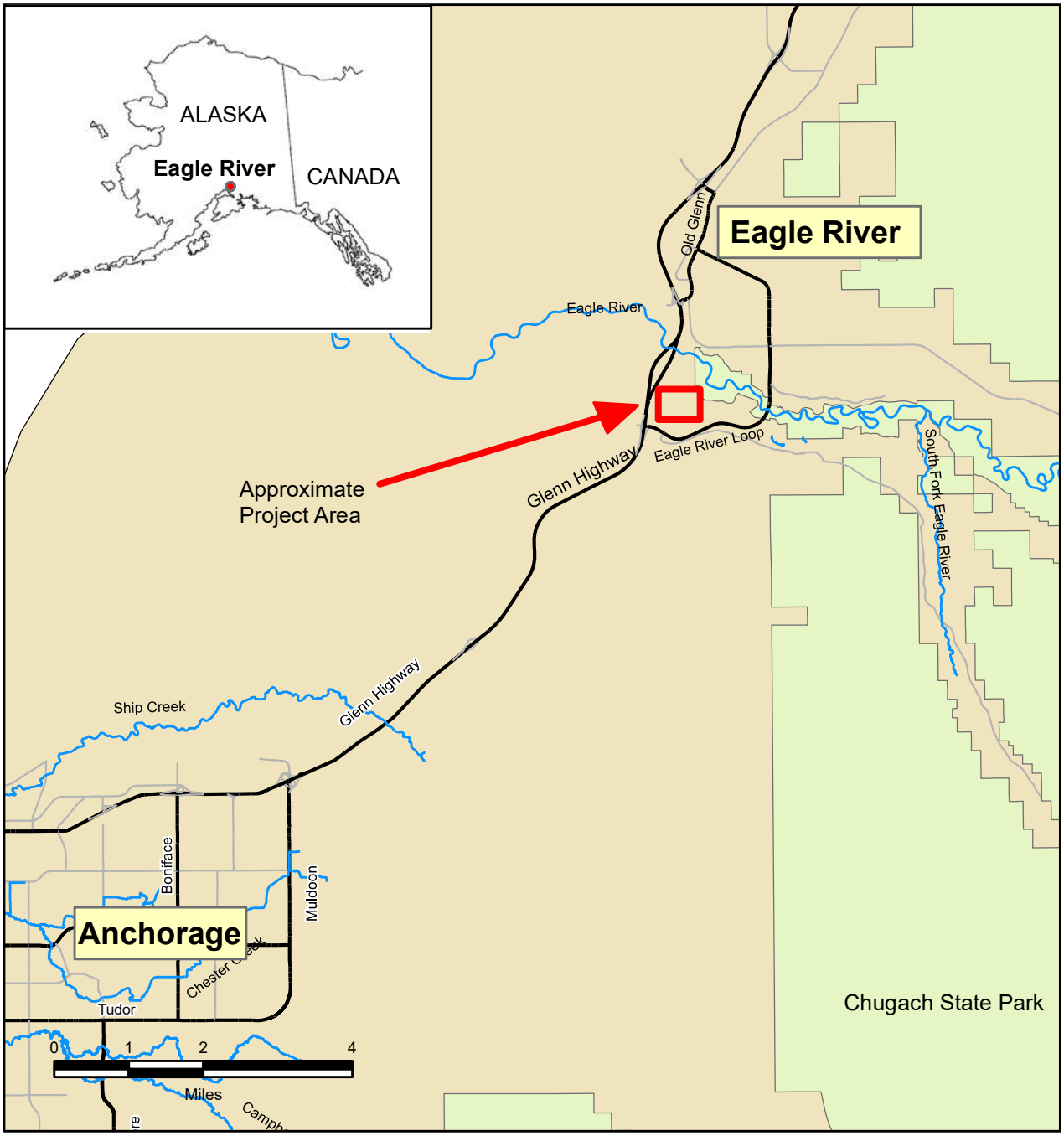
bgs = below ground surface

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level**	Sample ID Number^, and Collection Depth in Inches bgs (See Table 1 and Figure 2)				
			Impact Areas				
			IA1-0-6 0-6	IA1-6-12 6-12	IA1-12-18~ 12-18	IA1-18-24~ 18-24	IA1-12-18NV 1.0
Total Lead -mg/kg	EPA 6020A	400	**69,000**	**2,970**	**1,190**	**185**	-
TCLP Lead - mg/L	EPA 1311/6020A	5	**788**	**8.13**	**15.8**	**0.252**	-
pH - Standard Units		NA	-	-	-	-	**5.90**
Phosphorus - mg/kg		NA	-	-	-	-	**742**
Sulfate - mg/kg		NA	-	-	-	-	**11.2**
8x Phosphate - 22 day post application TCLP Lead - mg/L	EPA 1311/6020A	5	**656**	-	-	-	-
8x Phosphate - 40 days post application TCLP Lead - mg/L	EPA 1311/6020A	5	**455**	-	-	-	-

Notes:

*	= See Appendix C for compounds tested, methods, and laboratory reporting limits.
**	= Soil cleanup levels are the most stringent ADEC Method Two standards listed in Tables B1 and B2, 18 Alaska Administrative Code (AAC) 75, for the "over 40 inches (precipitation) zone" (November 2017).
‡	= Based on Coefficient of Variability of 0.215 and Student-t test calculated from Decision Unit 3 samples
^	= Sample ID number preceded by "100200-" on the chain of custody form
mg/kg	= Milligrams per kilogram
mg/L	= Milligrams per liter
61.4	= Analyte detected at a concentration less than the applicable ADEC cleanup level
788	= Analyte concentration exceeds most stringent ADEC or EPA criterion
-	= Sample not tested for this analyte
~	= Samples apparently mis-labeled in field. See Report.
bgs	= below ground surface



Map adapted from files provided by the Municipality of Anchorage, Geographical Information Systems website

LEGEND

Streams

Streets and Roads

Major

Secondary

N

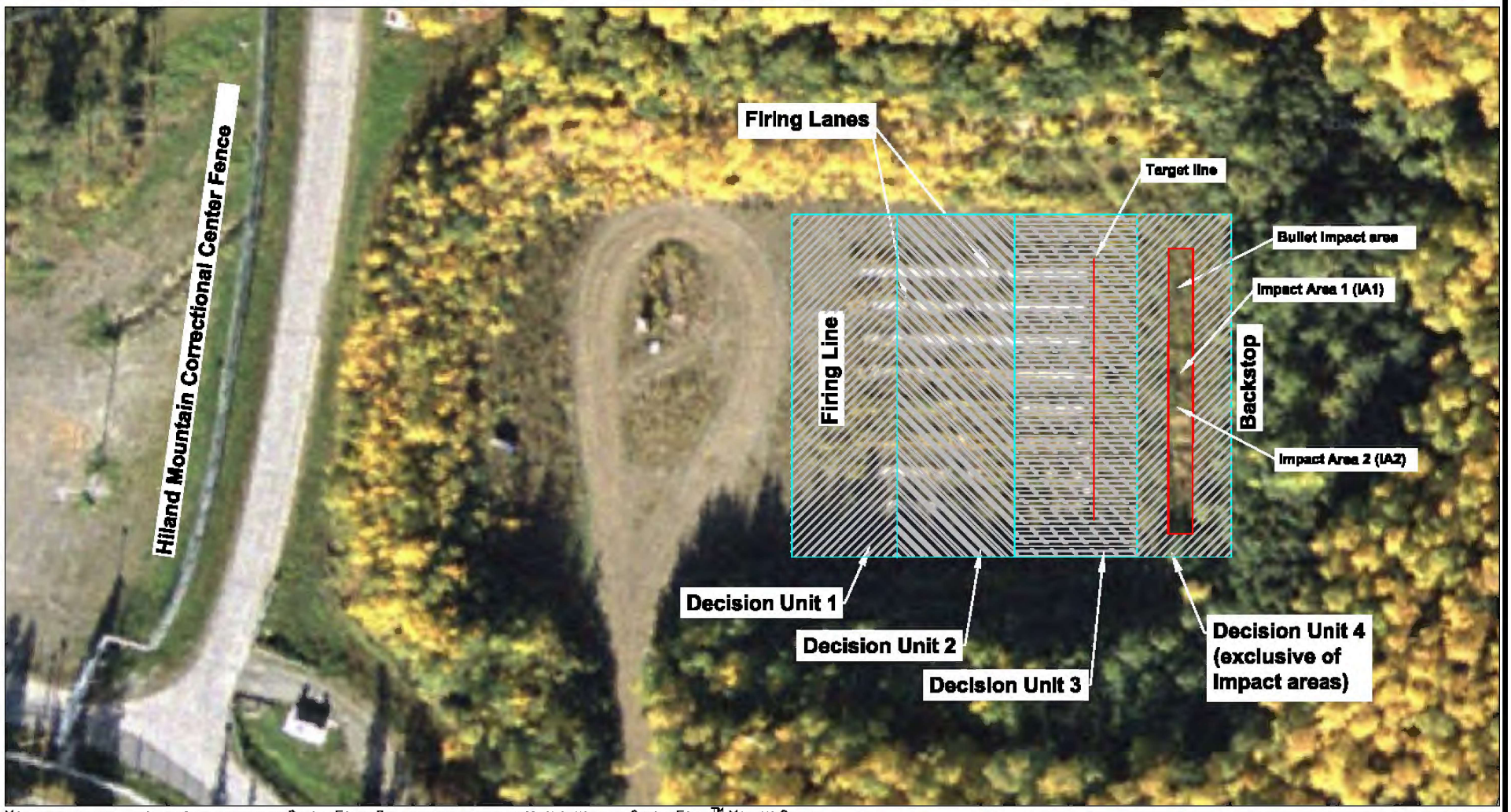
HMCC Shooting Range
Eagle River, Alaska

VICINITY MAP

October 2018 100200-001

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 1



0 30 60 120

APPROXIMATE SCALE IN FEET

N

HMCC Shooting Range
Eagle River, Alaska

SITE PLAN

October 2018 100200-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2

APPENDIX A

SITE PHOTOGRAPHS

Photo 1: Looking south across the firing lanes with grid for Decision Unit 2 being set up.

Photo 2: Collecting sample from Decision Unit 1.

HMCC Shooting Range Eagle River, Alaska	
PHOTOS 1 AND 2	
October 2018	100200
SHANNON & WILSON, INC. Geotechnical & Environmental Consultants	A-1

Photo 3: Drying the sub-portion sampling prior to sieving.

Photo 4: Hand sieving sub-portion through a #10 (2mm) sieve.

HMCC Shooting Range Eagle River, Alaska	
PHOTOS 3 AND 4	
October 2018	100200
SHANNON & WILSON, INC. Geotechnical & Environmental Consultants	A-1

Photo 5: Preparing to collect a 1 mg sample for lab analysis.

Photo 6: Lead fragments found in the impact area.

HMCC Shooting Range
Eagle River, Alaska

PHOTOS 5 AND 6

October 2018 100200

Photo 7: Bench scale impact area sample (left) and phosphate (right).

Photo 8: Impact Area bench scale sample after mixing.

APPENDIX B

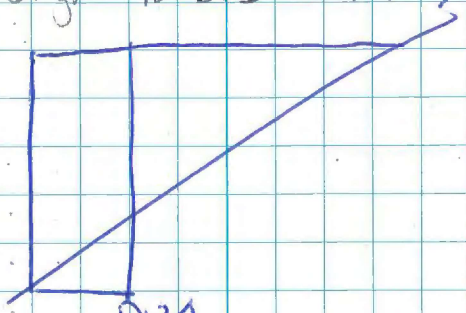
FIELD NOTES

Stetford, Jeff, JSA — HMCC Shooting Range

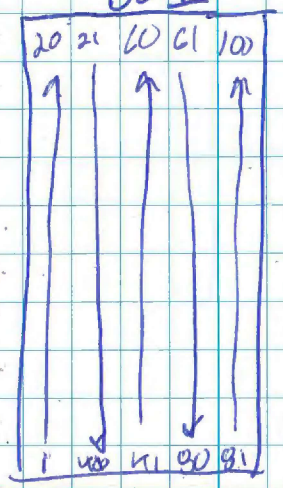
0900 — Arrive onsite, complete verbal JSA

0926 — Stetford uses metal detector to locate lead [illegible] location of bullets in berm. Begin marking out grids

0939 — Set grid for DU1 140'x40'



1033 — DU1



each unit 18'1 2'

not to scale

1120 Jake completes flag placement per random # generator sheet
photos 167 & 166 at DU1
MV

1144 Begin sampling DU1
samples collect from 0-2" below ground surface and under vegetated mats (when applicable)
photo 168

1209 photo 169 of Jake sampling DU1

1216 Matt begins setting up DU2 while Jake continues soil aliquot collection

1252 Complete sample DU1 aliquot collection. Start drying
photo 170 at drying
~~Sample 1~~ MV Sample 1 moist brown silt w/ sand. 1

1323 Break up "moist clumps" during sifting
This process will be used on all future samples

1328 Sieve DU1 sample

1343 photo of sieving process 171

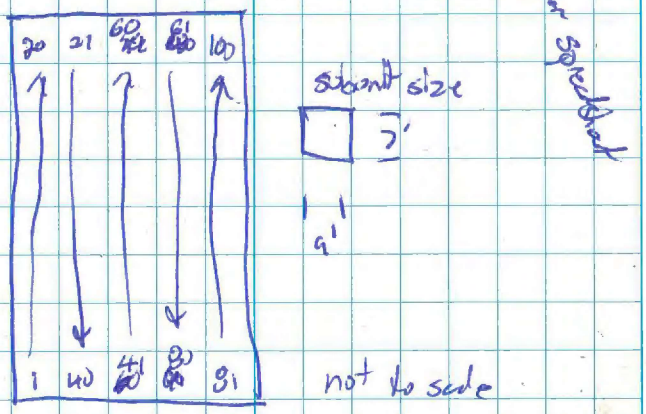
1352 Divide sieved sample into 30 pt grid
collect 1 kg of sample
photo ~~170~~ MV 172
fill 8oz jar for TCLP

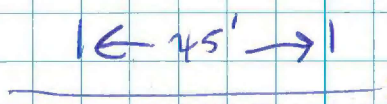
1403 Dispose remaining sample in Subunit #1

2

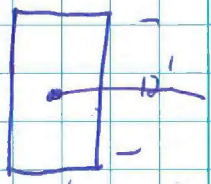
1417 Jake tears down DU1 ← ~~to~~ placed per spreadsheet
Matt continues to setup DU2

1424 Complete DU2 setup





1510 Measure impact Arc



not to scale

~~1300~~ 1520 load things into shed

1533 leave site, back to exchange

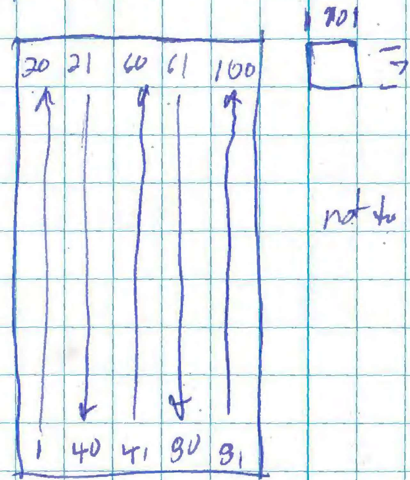
6/19/18 Matt Vads, Jake Kester

0837 Arrive onsite, Matt Vads
Begin prep to sample DU2
Notice site is considerably dryer than yesterday, all grid locations appear intact
0908 photograph 173 showing how duplicate samples were collected
0909 photograph 174 show DU2 sample location and extents of unit
0912 Check sample cooler, Plenty of ice, samples are adequately chilled
0918 Begin sampling DU2
photograph of weigh sub-samples, 175
0959 Complete sample collection, begin drying sample on stoves. Sample moist currently
1010 Jake arrives onsite, Starts placing pin flags in the DU3 per the spreadsheet at random #'s MV
1033 Remove sample from heat, allow to cool
1048 Jake begins sample collection from DU3
see next page for drawing.
1051 Begin sieving primary sample DU2
1106 photo of sieved material and rejects, 176
1108 Begin sieving duplicate sample DU2
1144 Complete sieving

MV

6/14/18

DU3



1122 check scale, recalibrate
divide primary DU 20 into 30 subplots
1126 photos 177 and 178 of sampling process
A 1129 collect sample ~~DU2~~ 100200-DU2
A 1147 ~~collect sample 100200-DU29, duplicate of DU2~~ MW → sample not submitted MW, see below
1153 Dispose of extra sample in grid #1
↑ primary, dup, and sieved extra
1156 Jake complete Bulk sample collection of DU3
1200 Call Stafford. Discuss duplicate sample.
Will discard sample from DU29. Recollect:
DU3 per workplan
1230 Begin dup DU3. Jake collects duplicate
8 in next of primary sample pt

Rite in the Rain

6/19/18

1302 Complete dry. Jake comple bulk sample collect at DU3 duplicate

1302 Steve DU3 primary and start dry'd duplicate no ballast fragments located during sieving

1316 photo 179 of DU3 during named sample

1320 reorganize pin flags in DU3 per random number spreadsheet

1323 Collect 100200-DU3 by Jake

1353 complete dry at DU3 duplicate. Jake to sieve and collect sample

1401 Collect 100200-DU3-44 from grid 44 at DU3. this was chosen by using the 25th digit of the random number generator set.

1507 Jake collect bulk replicate sample from DU3, Matt sets up grid #1 in DU4 for sampling

1517 Begin drying DU3 replicate

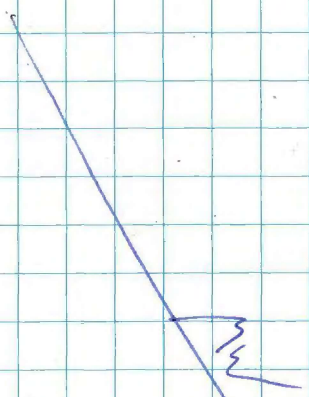
1554 Complete mapping out of DU4, see Seperate sheet.

1600 Jake has completed sieving and will collect sample shortly

1601 Collect 100200-DU3R

6/19/18

1606 dispose of remaining sample in grid 1
Take to take sample back to office ~~tomorrow~~
tonight to change out ice,
1608 partially demuddle DU3
1626 leave site



Rite in the Rain

Soil Sampling Form

Project Number: 100200				**Sampled By:** Matt Woods			
Sample ID: 100200-IA1-12-18				Sample Time: 1219		Sample Date: 6/20/18	
Duplicate ID: —				MS/MSD Yes (No)		Trip Blank Required: Yes (No)	
Sample Type				**Sample Location**			
(Grab)	Composite, number of parts ______			Surface Boring Test Pit		Sample Depth (~~ft~~ in bgs): 12-18	
Sample Description							
Gravel (3 – 0.08 in)	Sand (0.08 – 0.003 in)		Silt (< 0.003 in)	Clay (no grains visible)		Organic Soil	Peat
GW GP GM GC	SW SP SM SC		ML MH	CL CH		OL/OH	PT
Color: Brown	%Coarse:		%Fines: → sieved	Peat/Organic Soil Likely Present (Y/N): Y			
Moisture ((Dry), Moist, Wet/Saturated): Dried on stove				Stained: no		Odor: none	
Analyses	**Number of Bottles**	**Notes:**					
Total Pb	1 4oz	1 bullet recovered during sieving					
TCLP Pb	1 8oz						

Project Number: 100200				**Sampled By:** Jack Kesler			
Sample ID: 100200-DU4				Sample Time: 1300		Sample Date:	
Duplicate ID: —				MS/MSD Yes (No)		Trip Blank Required: Yes No	
Sample Type				**Sample Location**			
Grab	(Composite), number of parts 55			(Surface) Boring Test Pit		Sample Depth (ft bgs): 0-1	
Sample Description							
Gravel (3 – 0.08 in)	Sand (0.08 – 0.003 in)		Silt (< 0.003 in)	Clay (no grains visible)		Organic Soil	Peat
GW GP GM GC	SW SP SM SC		ML MH	CL CH		OL/OH	PT
Color: Brown	%Coarse:		%Fines: → sieve	Peat/Organic Soil Likely Present (Y/N): Y			
Moisture ((Dry), Moist, Wet/Saturated): Dried on stove				Stained: no		Odor: none	
Analyses	**Number of Bottles**	**Notes:**					
		1 bullet recover 110 g total submit ~~sample~~ decision unit					
		total Pb sample weight: 1.1kg					

Project Number:				**Sampled By:**			
Sample ID:				Sample Time:		Sample Date:	
Duplicate ID:				MS/MSD Yes No		Trip Blank Required: Yes No	
Sample Type				**Sample Location**			
Grab	Composite, number of parts ______			Surface Boring Test Pit		Sample Depth (ft bgs):	
Sample Description							
Gravel (3 – 0.08 in)	Sand (0.08 – 0.003 in)		Silt (< 0.003 in)	Clay (no grains visible)		Organic Soil	Peat
GW GP GM GC	SW SP SM SC		ML MH	CL CH		OL/OH	PT
Color:	%Coarse:		%Fines:	Peat/Organic Soil Likely Present (Y/N):			
Moisture (Dry, Moist, Wet/Saturated):				Stained:		Odor:	
Analyses	**Number of Bottles**	**Notes:**					

Soil Sampling Form

Project Number: 100200		**Sampled By:** Matt Ward	
Sample ID: 100200-IA1-0-6		Sample Time: 1104	Sample Date: ~~6/20/18~~ 6/20/18
Duplicate ID: —		MS/MSD Yes (No)	Trip Blank Required: Yes (No)
Sample Type		**Sample Location**	
(Grab)	Composite, number of parts _____	Surface (Boring) Test Pit	Sample Depth (ft bgs): 0-6 in bgs

Sample Description — 2 horizons

Gravel (3 – 0.08 in)	Sand (0.08 – 0.003 in)	Silt (< 0.003 in)	Clay (no grains visible)	Organic Soil	Peat
GW GP GM GC	SW SP SM SC	ML MH	CL CH	OL/OH	PT

Color: Brown	%~~Coarse~~:	%~~Fines~~: Sieved	Peat/Organic Soil Likely Present (Y/N): Y, slight
Moisture (Dry, Moist, Wet/Saturated): Dried on stove		Stained: ~~NSM~~ no	Odor: none

Analyses	Number of Bottles	Notes:
TCLP Pb	1 4oz	many bullets sieved out, appears small bits of lead remain in sieved portion, Est >20
Total Pb	1 Boz	

Project Number: 10020		**Sampled By:** Matt Wards	
Sample ID: 100200-IA1-6-12		Sample Time: 1119	Sample Date: 6/20/18
Duplicate ID: —		MS/MSD Yes (No)	Trip Blank Required: Yes (No)
Sample Type		**Sample Location**	
(Grab)	Composite, number of parts _____	Surface (Boring) Test Pit	Sample Depth (ft bgs): 6-12 in

Sample Description — 2 horizons

Gravel (3 – 0.08 in)	Sand (0.08 – 0.003 in)	Silt (< 0.003 in)	Clay (no grains visible)	Organic Soil	Peat
GW GP GM GC	SW SP SM SC	ML MH	CL CH	OL/OH	PT

Color: Brown	%~~Coarse~~:	%~~Fines~~: → Sieved	Peat/Organic Soil Likely Present (Y/N): Y, slight
Moisture (Dry, Moist, Wet/Saturated): Dried on stove		Stained: no	Odor: none

Analyses	Number of Bottles	Notes:
Total Pb	1 4oz	4 bullets sieved out, some smaller shard present
TCLP Pb	1 Boz	

Project Number: 100200		**Sampled By:** Matt Wards	
Sample ID: 100200-IA1-18-24		Sample Time: 1155	Sample Date: 6/20/18
Duplicate ID: —		MS/MSD Yes (No)	Trip Blank Required: Yes (No)
Sample Type		**Sample Location**	
(Grab)	Composite, number of parts _____	Surface (Boring) Test Pit	Sample Depth (ft bgs): 18-24 in

Sample Description

Gravel (3 – 0.08 in)	Sand (0.08 – 0.003 in)	Silt (< 0.003 in)	Clay (no grains visible)	Organic Soil	Peat
GW GP GM GC	SW SP SM SC	ML MH	CL CH	OL/OH	PT

Color: Light brown	%~~Coarse~~:	%~~Fines~~: → sieved	Peat/Organic Soil Likely Present (Y/N): N
Moisture (Dry, Moist, Wet/Saturated): Dry		Stained: no	Odor: none

Analyses	Number of Bottles	Notes:
Total Pb	1 4oz	prior to sieving mineral soil with ~~more~~ no larger gravel. No bullet shards or bullets observed in sample
TCLP Pb	1 x Boz	

Soil Sampling Form

Project Number: 100200			**Sampled By:** Matt Woods		
Sample ID: 100200-DU3-44			Sample Time: 1403 Sample Date:		
Duplicate ID: —			MS/MSD Yes (No) Trip Blank Required: Yes (No)		
Sample Type			**Sample Location**		
(Grab)	Composite, number of parts ____		(Surface) Boring Test Pit	Sample Depth (ft bgs): .1	
Sample Description					
Gravel (3 – 0.08 in)	Sand (0.08 – 0.003 in)	Silt (< 0.003 in)	Clay (no grains visible)	Organic Soil	Peat
GW GP GM GC	SW SP SM SC	(ML) MH	CL CH	OL/OH	PT
Color: Brown	%Coarse: 5	%Fines: 95	Peat/Organic Soil Likely Present (Y/N): slight		
Moisture (Dry, Moist, Wet/Saturated): moist		Stained: no	Odor: non		

Analyses	Number of Bottles	Notes:
ph	1 4oz jar	
phosphorus		
Sulfate		

Project Number: 100200			**Sampled By:** Jake Kesler		
Sample ID:			Sample Time: 1601 Sample Date:		
Duplicate ID:			MS/MSD Yes (No) Trip Blank Required: Yes (No)		
Sample Type			**Sample Location**		
Grab	Composite, number of parts ____		Surface Boring Test Pit	Sample Depth (ft bgs):	
Sample Description					
Gravel (3 – 0.08 in)	Sand (0.08 – 0.003 in)	Silt (< 0.003 in)	Clay (no grains visible)	Organic Soil	Peat
GW GP GM GC	SW SP SM SC	ML MH	CL CH	OL/OH	PT
Color:	%Coarse:	%Fines:	Peat/Organic Soil Likely Present (Y/N):		
Moisture (Dry, Moist, Wet/Saturated):		Stained:	Odor:		

Analyses	Number of Bottles	Notes:

MW 6/14/18

Project Number: 100200			**Sampled By:** Matt Wood		
Sample ID: 100200-IA2-12-18-MW			Sample Time: 1019 Sample Date: 6/20/18		
Duplicate ID: —			MS/MSD Yes (No) Trip Blank Required: Yes (No)		
Sample Type			**Sample Location**		
(Grab)	Composite, number of parts ____		Surface (Boring) Test Pit	Sample Depth (ft bgs): 12-18	
Sample Description					
Gravel (3 – 0.08 in)	Sand (0.08 – 0.003 in)	Silt (< 0.003 in)	Clay (no grains visible)	Organic Soil	Peat
GW GP GM GC	SW SP SM SC	(ML) MH	CL CH	OL/OH	PT
Color: Brown	%Coarse: 5	%Fines: 95	Peat/Organic Soil Likely Present (Y/N):		
Moisture (Dry, (Moist), Wet/Saturated):		Stained: no	Odor: none		

Analyses	Number of Bottles	Notes:
ph	1 4oz	
phosphorus		
Sulfate		

Soil Sampling Form

Project Number: 100200			**Sampled By:** Matt Wood		
Sample ID: 100200-DU1			Sample Time: 1352	Sample Date: 6/18/18	
Duplicate ID: —			MS/MSD Yes (No)	Trip Blank Required: Yes (No)	
Sample Type			**Sample Location**		0-.1
Grab	Composite, number of parts 50		(Surface) Boring Test Pit	Sample Depth (ft bgs): .1	
Sample Description					
Gravel (3 – 0.08 in)	Sand (0.08 – 0.003 in)	Silt (< 0.003 in)	Clay (no grains visible)	Organic Soil	Peat
GW GP GM GC	SW SP SM SC	ML MH	CL CH	OL/OH	PT
Color: Brown	%Coarse:	%Fines:	Peat/Organic Soil Likely Present (Y/N):		
Moisture (Dry, Moist, Wet/Saturated): Dry		Stained: no	Odor: none		

Analyses	Number of Bottles	Notes:
total Pb	1 4oz	no lead fragments observed in sample,
TCLP Pb	1 8oz	

Project Number: 100200			**Sampled By:** Matt Woods		
Sample ID: 100200-DU2			Sample Time: 1124	Sample Date: 6/19/18	
Duplicate ID: ~~100200-DU29, time of 1147~~ discarded			MS/MSD Yes (No)	Trip Blank Required: Yes (No)	
Sample Type			**Sample Location**		
Grab	Composite, number of parts 50		Surface Boring Test Pit	Sample Depth (ft bgs): 0-.1	
Sample Description					
Gravel (3 – 0.08 in)	Sand (0.08 – 0.003 in)	Silt (< 0.003 in)	Clay (no grains visible)	Organic Soil	Peat
GW GP GM GC	SW SP SM SC	ML MH	CL CH	OL/OH	PT
Color: Brown	%Coarse:	%Fines:	Peat/Organic Soil Likely Present (Y/N):		
Moisture (Dry, Moist, Wet/Saturated): Dry		Stained: no	Odor: none		

Analyses	Number of Bottles	Notes:
total Pb	1 4oz	No lead fragments observed in sampl
~~total~~ TCLP Pb	1 8oz	~~Total~~ sample weight for total lead: 1.1g ~~Duplicate weight at 1.2g~~ discarded

Project Number: 100200			**Sampled By:** Jake Kesler		
Sample ID: 100200-DU3			Sample Time: 1323	Sample Date: 6/19/18	
Duplicate ID: 100200-DU3R, sample time 1405			MS/MSD Yes, (No)	Trip Blank Required: Yes (No)	
Sample Type			**Sample Location**		
Grab	Composite, number of parts 50		(Surface) Boring Test Pit	Sample Depth (ft bgs): 0-.1	
Sample Description					
Gravel (3 – 0.08 in)	Sand (0.08 – 0.003 in)	Silt (< 0.003 in)	Clay (no grains visible)	Organic Soil	Peat
GW GP GM GC	SW SP SM SC	ML MH	CL CH	OL/OH	PT
Color: Brown	%Coarse:	%Fines:	Peat/Organic Soil Likely Present (Y/N):		
Moisture (Dry, Moist, Wet/Saturated): dry		Stained: no	Odor: none		

Analyses	Number of Bottles	Notes:
total Pb	1 4oz	Sample ~~taken~~ weight 1.1g, no bullet frags in sheared off
~~total~~ TCLP	1 8oz	

↑ Replicate 100200-DU3R. Sample weight 1.1g, no bullet frags observed, 50 pt composite

APPENDIX C

RESULTS OF ANALYTICAL TESTING
BY
SGS NORTH AMERICA, INC. OF ANCHORAGE, ALASKA
AND
ADEC LABORATORY DATA REVIEW CHECKLISTS

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks St. Suite 3
Anchorage, AK 99518
(907)433-3240

Report Number: **1183056**

Client Project: **HMCC Shooting Range**

Dear Matt Woods,

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

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

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

Sincerely,
SGS North America Inc.

_____

Jillian Vlahovich Date
Project Manager
Jillian.Vlahovich@sgs.com

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

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1183056**
Project Name/Site: **HMCC Shooting Range**
Project Contact: **Matt Woods**

Refer to sample receipt form for information on sample condition.

1183056013(1454949MS) (1454953) MS

6020A - Metals MS recovery for lead (47%) does not meet QC criteria. The post digestion spike was successful.

1183056013(1454949MSD) (1454954) MSD

6020A - Metals MSD recovery for lead (83%) does not meet QC criteria. The post digestion spike was successful.

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

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

Laboratory Qualifiers

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

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 DW Chemistry (Provisionally Certified as of 06/11/2018 for Mercury by EPA245.1,Beryllium and Copper by EPA200.8) & Microbiology & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

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

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

SGS North America Inc. 200 West Potter Drive, Anchorage, AK 99518
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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
100200-IA1-0-6	1183056001	06/20/2018	06/20/2018	Soil/Solid (dry weight)
100200-IA1-6-12	1183056002	06/20/2018	06/20/2018	Soil/Solid (dry weight)
100200-IA1-18-24	1183056003	06/20/2018	06/20/2018	Soil/Solid (dry weight)
100200-IA1-12-18	1183056004	06/20/2018	06/20/2018	Soil/Solid (dry weight)
100200-IA1-12-18-NV	1183056005	06/20/2018	06/20/2018	Soil/Solid (dry weight)
100200-DU2	1183056006	06/19/2018	06/20/2018	Soil/Solid (dry weight)
100200-DU3R	1183056007	06/19/2018	06/20/2018	Soil/Solid (dry weight)
100200-DU3-44	1183056008	06/19/2018	06/20/2018	Soil/Solid (dry weight)
100200-DU39	1183056009	06/19/2018	06/20/2018	Soil/Solid (dry weight)
100200-DU3	1183056010	06/19/2018	06/20/2018	Soil/Solid (dry weight)
100200-DU1	1183056011	06/18/2018	06/20/2018	Soil/Solid (dry weight)
100200-DU4	1183056012	06/20/2018	06/20/2018	Soil/Solid (dry weight)
100200-IA1-0-6	1183056013	06/20/2018	06/20/2018	Solid/Soil (Wet Weight)
100200-IA1-6-12	1183056014	06/20/2018	06/20/2018	Solid/Soil (Wet Weight)
100200-IA1-18-24	1183056015	06/20/2018	06/20/2018	Solid/Soil (Wet Weight)
100200-IA1-12-18	1183056016	06/20/2018	06/20/2018	Solid/Soil (Wet Weight)
100200-DU2	1183056017	06/19/2018	06/20/2018	Solid/Soil (Wet Weight)
100200-DU3R	1183056018	06/19/2018	06/20/2018	Solid/Soil (Wet Weight)
100200-DU39	1183056019	06/19/2018	06/20/2018	Solid/Soil (Wet Weight)
100200-DU3	1183056020	06/19/2018	06/20/2018	Solid/Soil (Wet Weight)
100200-DU1	1183056021	06/18/2018	06/20/2018	Solid/Soil (Wet Weight)
100200-DU4	1183056022	06/20/2018	06/20/2018	Solid/Soil (Wet Weight)

Method	Method Description
SW9056A	Ion Chromatographic Analysis Soils/Solid
SW6020A TCLP	Metals by ICP-MS
SW6020A	Metals by ICP-MS (S)
SM21 2540G	Percent Solids SM2540G
SW9045D	pH, Soil (S)

SGS North America Inc.
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Detectable Results Summary

Client Sample ID: **100200-IA1-0-6**
Lab Sample ID: 1183056001

	Parameter	Result	Units
Metals by ICP/MS	Lead	69000	mg/Kg

Client Sample ID: **100200-IA1-6-12**
Lab Sample ID: 1183056002

	Parameter	Result	Units
Metals by ICP/MS	Lead	2970	mg/Kg

Client Sample ID: **100200-IA1-18-24**
Lab Sample ID: 1183056003

	Parameter	Result	Units
Metals by ICP/MS	Lead	1190	mg/Kg

Client Sample ID: **100200-IA1-12-18**
Lab Sample ID: 1183056004

	Parameter	Result	Units
Metals by ICP/MS	Lead	185	mg/Kg

Client Sample ID: **100200-IA1-12-18-NV**
Lab Sample ID: 1183056005

	Parameter	Result	Units
Characterization	pH	5.90	pH units
Metals by ICP/MS	Phosphorus	742	mg/Kg
Waters Department	Sulfate	11.2	mg/Kg

Client Sample ID: **100200-DU2**
Lab Sample ID: 1183056006

	Parameter	Result	Units
Metals by ICP/MS	Lead	193	mg/Kg

Client Sample ID: **100200-DU3R**
Lab Sample ID: 1183056007

	Parameter	Result	Units
Metals by ICP/MS	Lead	1960	mg/Kg

Client Sample ID: **100200-DU3-44**
Lab Sample ID: 1183056008

	Parameter	Result	Units
Characterization	pH	6.00	pH units
Metals by ICP/MS	Phosphorus	635	mg/Kg
Waters Department	Sulfate	4.44	mg/Kg

Client Sample ID: **100200-DU39**
Lab Sample ID: 1183056009

	Parameter	Result	Units
Metals by ICP/MS	Lead	2420	mg/Kg

Client Sample ID: **100200-DU3**
Lab Sample ID: 1183056010

	Parameter	Result	Units
Metals by ICP/MS	Lead	1570	mg/Kg

Client Sample ID: **100200-DU1**
Lab Sample ID: 1183056011

	Parameter	Result	Units
Metals by ICP/MS	Lead	61.4	mg/Kg

Client Sample ID: **100200-DU4**
Lab Sample ID: 1183056012

	Parameter	Result	Units
Metals by ICP/MS	Lead	11900	mg/Kg

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Detectable Results Summary

Client Sample ID: **100200-IA1-0-6**
Lab Sample ID: 1183056013
TCLP Constituents Metals

Parameter	Result	Units
Lead	788	mg/L

Client Sample ID: **100200-IA1-6-12**
Lab Sample ID: 1183056014
TCLP Constituents Metals

Parameter	Result	Units
Lead	8.13	mg/L

Client Sample ID: **100200-IA1-18-24**
Lab Sample ID: 1183056015
TCLP Constituents Metals

Parameter	Result	Units
Lead	15.8	mg/L

Client Sample ID: **100200-IA1-12-18**
Lab Sample ID: 1183056016
TCLP Constituents Metals

Parameter	Result	Units
Lead	0.252	mg/L

Client Sample ID: **100200-DU2**
Lab Sample ID: 1183056017
TCLP Constituents Metals

Parameter	Result	Units
Lead	0.799	mg/L

Client Sample ID: **100200-DU3R**
Lab Sample ID: 1183056018
TCLP Constituents Metals

Parameter	Result	Units
Lead	26.7	mg/L

Client Sample ID: **100200-DU39**
Lab Sample ID: 1183056019
TCLP Constituents Metals

Parameter	Result	Units
Lead	15.9	mg/L

Client Sample ID: **100200-DU3**
Lab Sample ID: 1183056020
TCLP Constituents Metals

Parameter	Result	Units
Lead	17.7	mg/L

Client Sample ID: **100200-DU1**
Lab Sample ID: 1183056021
TCLP Constituents Metals

Parameter	Result	Units
Lead	0.556	mg/L

Client Sample ID: **100200-DU4**
Lab Sample ID: 1183056022
TCLP Constituents Metals

Parameter	Result	Units
Lead	27.6	mg/L

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Results of **100200-IA1-0-6**

Client Sample ID: **100200-IA1-0-6**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056001
Lab Project ID: 1183056

Collection Date: 06/20/18 11:09
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):93.6
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	69000		97.3	30.2	mg/Kg	5000		06/24/18 06:04

Batch Information

Analytical Batch: MMS10213
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 06/24/18 06:04
Container ID: 1183056001-A

Prep Batch: MXX31682
Prep Method: SW3050B
Prep Date/Time: 06/22/18 11:14
Prep Initial Wt./Vol.: 1.098 g
Prep Extract Vol: 50 mL

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Results of **100200-IA1-6-12**

Client Sample ID: **100200-IA1-6-12**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056002
Lab Project ID: 1183056

Collection Date: 06/20/18 11:19
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):92.2
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	2970		10.7	3.31	mg/Kg	500		06/24/18 06:09

Batch Information

Analytical Batch: MMS10213
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 06/24/18 06:09
Container ID: 1183056002-A

Prep Batch: MXX31682
Prep Method: SW3050B
Prep Date/Time: 06/22/18 11:14
Prep Initial Wt./Vol.: 1.015 g
Prep Extract Vol: 50 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-IA1-18-24**

Client Sample ID: **100200-IA1-18-24**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056003
Lab Project ID: 1183056

Collection Date: 06/20/18 11:55
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):99.5
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	1190		1.90	0.590	mg/Kg	100		06/24/18 06:14

Batch Information

Analytical Batch: MMS10213
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 06/24/18 06:14
Container ID: 1183056003-A

Prep Batch: MXX31682
Prep Method: SW3050B
Prep Date/Time: 06/22/18 11:14
Prep Initial Wt./Vol.: 1.057 g
Prep Extract Vol: 50 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-IA1-12-18**

Client Sample ID: **100200-IA1-12-18**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056004
Lab Project ID: 1183056

Collection Date: 06/20/18 12:19
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):89.7
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	185		1.09	0.337	mg/Kg	50		06/24/18 00:31

Batch Information

Analytical Batch: MMS10213
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 06/24/18 00:31
Container ID: 1183056004-A

Prep Batch: MXX31682
Prep Method: SW3050B
Prep Date/Time: 06/22/18 11:14
Prep Initial Wt./Vol.: 1.027 g
Prep Extract Vol: 50 mL

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Results of **100200-IA1-12-18-NV**

Client Sample ID: **100200-IA1-12-18-NV**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056005
Lab Project ID: 1183056

Collection Date: 06/20/18 10:19
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):71.2
Location:

Results by **Characterization**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
pH	5.90		0.00100	0.00100	pH units			06/22/18 17:00

Batch Information

Analytical Batch: TCLP9467
Analytical Method: SW9045D
Analyst: TFK
Analytical Date/Time: 06/22/18 17:00
Container ID: 1183056005-A

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-IA1-12-18-NV**

Client Sample ID: **100200-IA1-12-18-NV**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056005
Lab Project ID: 1183056

Collection Date: 06/20/18 10:19
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):71.2
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Phosphorus	742		129	40.1	mg/Kg	50		06/27/18 21:09

Batch Information

Analytical Batch: MMS10218
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 06/27/18 21:09
Container ID: 1183056005-A

Prep Batch: MXX31691
Prep Method: SW3050B
Prep Date/Time: 06/27/18 11:20
Prep Initial Wt./Vol.: 1.087 g
Prep Extract Vol: 50 mL

Results of **100200-IA1-12-18-NV**

Client Sample ID: **100200-IA1-12-18-NV**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056005
Lab Project ID: 1183056

Collection Date: 06/20/18 10:19
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):71.2
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfate	11.2		2.76	0.856	mg/Kg	1		06/22/18 23:57

Batch Information

Analytical Batch: WIC5786
Analytical Method: SW9056A
Analyst: AYC
Analytical Date/Time: 06/22/18 23:57
Container ID: 1183056005-A

Prep Batch: WXX12394
Prep Method: METHOD
Prep Date/Time: 06/22/18 18:11
Prep Initial Wt./Vol.: 4.0695 g
Prep Extract Vol: 40 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-DU2**

Client Sample ID: **100200-DU2**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056006
Lab Project ID: 1183056

Collection Date: 06/19/18 11:29
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):99.0
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	193		0.920	0.285	mg/Kg	50		06/24/18 00:36

Batch Information

Analytical Batch: MMS10213
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 06/24/18 00:36
Container ID: 1183056006-A

Prep Batch: MXX31682
Prep Method: SW3050B
Prep Date/Time: 06/22/18 11:14
Prep Initial Wt./Vol.: 1.098 g
Prep Extract Vol: 50 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-DU3R**

Client Sample ID: **100200-DU3R**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056007
Lab Project ID: 1183056

Collection Date: 06/19/18 16:01
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):100
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	1960		1.83	0.567	mg/Kg	100		06/24/18 06:18

Batch Information

Analytical Batch: MMS10213
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 06/24/18 06:18
Container ID: 1183056007-A

Prep Batch: MXX31682
Prep Method: SW3050B
Prep Date/Time: 06/22/18 11:14
Prep Initial Wt./Vol.: 1.094 g
Prep Extract Vol: 50 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-DU3-44**

Client Sample ID: **100200-DU3-44**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056008
Lab Project ID: 1183056

Collection Date: 06/19/18 14:03
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):85.5
Location:

Results by **Characterization**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
pH	6.00		0.00100	0.00100	pH units			06/22/18 17:00

Batch Information

Analytical Batch: TCLP9467
Analytical Method: SW9045D
Analyst: TFK
Analytical Date/Time: 06/22/18 17:00
Container ID: 1183056008-A

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-DU3-44**

Client Sample ID: **100200-DU3-44**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056008
Lab Project ID: 1183056

Collection Date: 06/19/18 14:03
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):85.5
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Phosphorus	635		110	34.1	mg/Kg	50		06/27/18 21:14

Batch Information

Analytical Batch: MMS10218
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 06/27/18 21:14
Container ID: 1183056008-A

Prep Batch: MXX31691
Prep Method: SW3050B
Prep Date/Time: 06/27/18 11:20
Prep Initial Wt./Vol.: 1.062 g
Prep Extract Vol: 50 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-DU3-44**

Client Sample ID: **100200-DU3-44**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056008
Lab Project ID: 1183056

Collection Date: 06/19/18 14:03
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):85.5
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfate	4.44		2.29	0.711	mg/Kg	1		06/23/18 00:53

Batch Information

Analytical Batch: WIC5786
Analytical Method: SW9056A
Analyst: AYC
Analytical Date/Time: 06/23/18 00:53
Container ID: 1183056008-A

Prep Batch: WXX12394
Prep Method: METHOD
Prep Date/Time: 06/22/18 18:11
Prep Initial Wt./Vol.: 4.078 g
Prep Extract Vol: 40 mL

Results of **100200-DU39**

Client Sample ID: **100200-DU39**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056009
Lab Project ID: 1183056

Collection Date: 06/19/18 14:05
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):99.3
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	2420		1.98	0.612	mg/Kg	100		06/24/18 06:23

Batch Information

Analytical Batch: MMS10213
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 06/24/18 06:23
Container ID: 1183056009-A

Prep Batch: MXX31682
Prep Method: SW3050B
Prep Date/Time: 06/22/18 11:14
Prep Initial Wt./Vol.: 1.02 g
Prep Extract Vol: 50 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-DU3**

Client Sample ID: **100200-DU3**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056010
Lab Project ID: 1183056

Collection Date: 06/19/18 13:23
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):98.3
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	1570		1.94	0.602	mg/Kg	100		06/24/18 06:28

Batch Information

Analytical Batch: MMS10213
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 06/24/18 06:28
Container ID: 1183056010-A

Prep Batch: MXX31682
Prep Method: SW3050B
Prep Date/Time: 06/22/18 11:14
Prep Initial Wt./Vol.: 1.048 g
Prep Extract Vol: 50 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-DU1**

Client Sample ID: **100200-DU1**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056011
Lab Project ID: 1183056

Collection Date: 06/18/18 13:52
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):98.3
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	61.4		0.932	0.289	mg/Kg	50		06/24/18 02:00

Batch Information

Analytical Batch: MMS10213
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 06/24/18 02:00
Container ID: 1183056011-A

Prep Batch: MXX31682
Prep Method: SW3050B
Prep Date/Time: 06/22/18 11:14
Prep Initial Wt./Vol.: 1.091 g
Prep Extract Vol: 50 mL

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Results of **100200-DU4**

Client Sample ID: **100200-DU4**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056012
Lab Project ID: 1183056

Collection Date: 06/20/18 13:00
Received Date: 06/20/18 16:00
Matrix: Soil/Solid (dry weight)
Solids (%):97.1
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	11900		10.1	3.13	mg/Kg	500		06/24/18 06:47

Batch Information

Analytical Batch: MMS10213
Analytical Method: SW6020A
Analyst: ACF
Analytical Date/Time: 06/24/18 06:47
Container ID: 1183056012-A

Prep Batch: MXX31682
Prep Method: SW3050B
Prep Date/Time: 06/22/18 11:14
Prep Initial Wt./Vol.: 1.021 g
Prep Extract Vol: 50 mL

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Results of **100200-IA1-0-6**

Client Sample ID: **100200-IA1-0-6**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056013
Lab Project ID: 1183056

Collection Date: 06/20/18 11:09
Received Date: 06/20/18 16:00
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	788	*	0.400	0.124	mg/L	200	(<5)	06/25/18 16:19

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 06/25/18 16:19
Container ID: 1183056013-A

Prep Batch: MXT5643
Prep Method: SW3010A
Prep Date/Time: 06/25/18 08:00
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-IA1-6-12**

Client Sample ID: **100200-IA1-6-12**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056014
Lab Project ID: 1183056

Collection Date: 06/20/18 11:19
Received Date: 06/20/18 16:00
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	8.13	*	0.0500	0.0155	mg/L	25	(<5)	06/25/18 14:36

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 06/25/18 14:36
Container ID: 1183056014-A

Prep Batch: MXT5643
Prep Method: SW3010A
Prep Date/Time: 06/25/18 08:00
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-IA1-18-24**

Client Sample ID: **100200-IA1-18-24**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056015
Lab Project ID: 1183056

Collection Date: 06/20/18 11:55
Received Date: 06/20/18 16:00
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	15.8	*	0.0500	0.0155	mg/L	25	(<5)	06/25/18 14:54

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 06/25/18 14:54
Container ID: 1183056015-A

Prep Batch: MXT5643
Prep Method: SW3010A
Prep Date/Time: 06/25/18 08:00
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-IA1-12-18**

Client Sample ID: **100200-IA1-12-18**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056016
Lab Project ID: 1183056

Collection Date: 06/20/18 12:19
Received Date: 06/20/18 16:00
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	0.252		0.0500	0.0155	mg/L	25	(<5)	06/25/18 14:59

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 06/25/18 14:59
Container ID: 1183056016-A

Prep Batch: MXT5643
Prep Method: SW3010A
Prep Date/Time: 06/25/18 08:00
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-DU2**

Client Sample ID: **100200-DU2**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056017
Lab Project ID: 1183056

Collection Date: 06/19/18 11:29
Received Date: 06/20/18 16:00
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	0.799		0.0500	0.0155	mg/L	25	(<5)	06/25/18 15:04

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 06/25/18 15:04
Container ID: 1183056017-A

Prep Batch: MXT5643
Prep Method: SW3010A
Prep Date/Time: 06/25/18 08:00
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

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Results of **100200-DU3R**

Client Sample ID: **100200-DU3R**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056018
Lab Project ID: 1183056

Collection Date: 06/19/18 16:01
Received Date: 06/20/18 16:00
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	26.7	*	0.0500	0.0155	mg/L	25	(<5)	06/25/18 15:08

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 06/25/18 15:08
Container ID: 1183056018-A

Prep Batch: MXT5643
Prep Method: SW3010A
Prep Date/Time: 06/25/18 08:00
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-DU39**

Client Sample ID: **100200-DU39**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056019
Lab Project ID: 1183056

Collection Date: 06/19/18 14:05
Received Date: 06/20/18 16:00
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	15.9	*	0.0500	0.0155	mg/L	25	(<5)	06/25/18 15:13

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 06/25/18 15:13
Container ID: 1183056019-A

Prep Batch: MXT5643
Prep Method: SW3010A
Prep Date/Time: 06/25/18 08:00
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-DU3**

Client Sample ID: **100200-DU3**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056020
Lab Project ID: 1183056

Collection Date: 06/19/18 13:23
Received Date: 06/20/18 16:00
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	17.7	*	0.0500	0.0155	mg/L	25	(<5)	06/25/18 15:18

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 06/25/18 15:18
Container ID: 1183056020-A

Prep Batch: MXT5643
Prep Method: SW3010A
Prep Date/Time: 06/25/18 08:00
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-DU1**

Client Sample ID: **100200-DU1**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056021
Lab Project ID: 1183056

Collection Date: 06/18/18 13:52
Received Date: 06/20/18 16:00
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	0.556		0.0500	0.0155	mg/L	25	(<5)	06/25/18 15:22

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 06/25/18 15:22
Container ID: 1183056021-A

Prep Batch: MXT5643
Prep Method: SW3010A
Prep Date/Time: 06/25/18 08:00
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Results of **100200-DU4**

Client Sample ID: **100200-DU4**
Client Project ID: **HMCC Shooting Range**
Lab Sample ID: 1183056022
Lab Project ID: 1183056

Collection Date: 06/20/18 13:00
Received Date: 06/20/18 16:00
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	27.6	*	0.0500	0.0155	mg/L	25	(<5)	06/25/18 15:27

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 06/25/18 15:27
Container ID: 1183056022-A

Prep Batch: MXT5643
Prep Method: SW3010A
Prep Date/Time: 06/25/18 08:00
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 06/28/2018 2:09:07PM

J flagging is activated

Method Blank

Blank ID: LB1 for HBN 1781347 [TCLP/9461
Blank Lab ID: 1454237

Matrix: Solid/Soil (Wet Weight)

QC for Samples:
1183056013, 1183056014, 1183056015, 1183056016, 1183056017, 1183056018, 1183056019, 1183056020, 1183056021, 1183056022

Results by **SW6020A TCLP**

Parameter	Results	LOQ/CL	DL	Units
Lead	0.0250U	0.0500	0.0155	mg/L

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexion P5
Analyst: DSH
Analytical Date/Time: 6/25/2018 1:58:35PM

Prep Batch: MXT5643
Prep Method: SW3010A
Prep Date/Time: 6/25/2018 8:00:39AM
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Method Blank

Blank ID: MB for HBN 1781495 [MXT/5643]
Blank Lab ID: 1454947

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1183056013, 1183056014, 1183056015, 1183056016, 1183056017, 1183056018, 1183056019, 1183056020, 1183056021, 1183056022

Results by **SW6020A TCLP**

Parameter	Results	LOQ/CL	DL	Units
Lead	0.00250U	0.00500	0.00155	mg/L

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexion P5
Analyst: DSH
Analytical Date/Time: 6/25/2018 2:07:57PM

Prep Batch: MXT5643
Prep Method: SW3010A
Prep Date/Time: 6/25/2018 8:00:39AM
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1183056 [MXT5643]
Blank Spike Lab ID: 1454948
Date Analyzed: 06/25/2018 14:12

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183056013, 1183056014, 1183056015, 1183056016, 1183056017, 1183056018, 1183056019, 1183056020, 1183056021, 1183056022

Results by **SW6020A TCLP**

Blank Spike (mg/L)

Parameter	Spike	Result	Rec (%)	CL
Lead	1	1.03	103	(88-115)

Batch Information

Analytical Batch: **MMS10215**
Analytical Method: **SW6020A TCLP**
Instrument: **Perkin Elmer Nexion P5**
Analyst: **DSH**

Prep Batch: **MXT5643**
Prep Method: **SW3010A**
Prep Date/Time: **06/25/2018 08:00**
Spike Init Wt./Vol.: 1 mg/L Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1454949
MS Sample ID: 1454953 MS
MSD Sample ID: 1454954 MSD

Analysis Date: 06/25/2018 16:19
Analysis Date: 06/25/2018 16:23
Analysis Date: 06/25/2018 16:28
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1183056013, 1183056014, 1183056015, 1183056016, 1183056017, 1183056018, 1183056019, 1183056020, 1183056021, 1183056022

Results by **SW6020A TCLP**

		Matrix Spike (mg/L)				Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)		Spike	Result	Rec (%)		CL	RPD (%)	RPD CL
Lead	788	10.0	793	47	*	10.0	797	83	*	88-115	0.46	(< 20)

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 6/25/2018 4:23:52PM

Prep Batch: MXT5643
Prep Method: Waters Digest for Metals by ICP-MS(TCLP)
Prep Date/Time: 6/25/2018 8:00:39AM
Prep Initial Wt./Vol.: 2.50mL
Prep Extract Vol: 25.00mL

Print Date: 06/28/2018 2:09:12PM

Original Sample ID: 1454949
MS Sample ID: 1454955 BNT
MSD Sample ID:

Analysis Date: 06/25/2018 16:19
Analysis Date: 06/25/2018 16:33
Analysis Date:
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1183056013, 1183056014, 1183056015, 1183056016, 1183056017, 1183056018, 1183056019, 1183056020, 1183056021, 1183056022

Results by **SW6020A TCLP**

		Matrix Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Lead	788	500	1280	99				80-120		

Batch Information

Analytical Batch: MMS10215
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 6/25/2018 4:33:14PM

Prep Batch: MXT5643
Prep Method: Waters Digest for Metals by ICP-MS(TCLP)
Prep Date/Time: 6/25/2018 8:00:39AM
Prep Initial Wt./Vol.: 2.50mL
Prep Extract Vol: 25.00mL

Print Date: 06/28/2018 2:09:12PM

Method Blank

Blank ID: MB for HBN 1781376 [MXX/31682]
Blank Lab ID: 1454361

Matrix: Soil/Solid (dry weight)

QC for Samples:
1183056001, 1183056002, 1183056003, 1183056004, 1183056006, 1183056007, 1183056009, 1183056010, 1183056011, 1183056012

Results by **SW6020A**

Parameter	Results	LOQ/CL	DL	Units
Lead	0.100U	0.200	0.0620	mg/Kg

Batch Information

Analytical Batch: MMS10213
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexion P5
Analyst: ACF
Analytical Date/Time: 6/24/2018 5:07:50AM

Prep Batch: MXX31682
Prep Method: SW3050B
Prep Date/Time: 6/22/2018 11:14:10AM
Prep Initial Wt./Vol.: 1 g
Prep Extract Vol: 50 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1183056 [MXX31682]
Blank Spike Lab ID: 1454362
Date Analyzed: 06/24/2018 05:12

Matrix: Soil/Solid (dry weight)

QC for Samples: 1183056001, 1183056002, 1183056003, 1183056004, 1183056006, 1183056007, 1183056009, 1183056010, 1183056011, 1183056012

Results by **SW6020A**

Blank Spike (mg/Kg)

Parameter	Spike	Result	Rec (%)	CL
Lead	50	49.8	100	(84-118)

Batch Information

Analytical Batch: **MMS10213**
Analytical Method: **SW6020A**
Instrument: **Perkin Elmer Nexion P5**
Analyst: **ACF**

Prep Batch: **MXX31682**
Prep Method: **SW3050B**
Prep Date/Time: **06/22/2018 11:14**
Spike Init Wt./Vol.: 50 mg/Kg Extract Vol: 50 mL
Dupe Init Wt./Vol.: Extract Vol:

Print Date: 06/28/2018 2:09:16PM

Matrix Spike Summary

Original Sample ID: 1454363
MS Sample ID: 1454365 MS
MSD Sample ID: 1454366 MSD

Analysis Date: 06/24/2018 5:17
Analysis Date: 06/24/2018 5:21
Analysis Date: 06/24/2018 5:26
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1183056001, 1183056002, 1183056003, 1183056004, 1183056006, 1183056007, 1183056009, 1183056010, 1183056011, 1183056012

Results by **SW6020A**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Lead	3.41	48.2	49.8	96	48.1	49.8	96	84-118	0.18	(< 20)

Batch Information

Analytical Batch: MMS10213
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: ACF
Analytical Date/Time: 6/24/2018 5:21:57AM

Prep Batch: MXX31682
Prep Method: Soils/Solids Digest for Metals by ICP-MS
Prep Date/Time: 6/22/2018 11:14:10AM
Prep Initial Wt./Vol.: 1.04g
Prep Extract Vol: 50.00mL

Print Date: 06/28/2018 2:09:18PM

Method Blank

Blank ID: MB for HBN 1781364 [SPT/10511]
Blank Lab ID: 1454323

Matrix: Soil/Solid (dry weight)

QC for Samples:
1183056011, 1183056012

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT10511
Analytical Method: SM21 2540G
Instrument:
Analyst: E.M
Analytical Date/Time: 6/21/2018 5:33:00PM

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Duplicate Sample Summary

Original Sample ID: 1183052001
Duplicate Sample ID: 1454325
QC for Samples:

Analysis Date: 06/21/2018 17:33
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	92.4	92.7	%	0.29	(< 15)

Batch Information

Analytical Batch: SPT10511
Analytical Method: SM21 2540G
Instrument:
Analyst: E.M

Print Date: 06/28/2018 2:09:25PM

Duplicate Sample Summary

Original Sample ID: 1183052014
Duplicate Sample ID: 1454326
QC for Samples:
1183056011

Analysis Date: 06/21/2018 17:33
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	88.1	89.9	%	2.00	(< 15)

Batch Information

Analytical Batch: SPT10511
Analytical Method: SM21 2540G
Instrument:
Analyst: E.M

Print Date: 06/28/2018 2:09:25PM

Duplicate Sample Summary

Original Sample ID: 1183056011
Duplicate Sample ID: 1454327
QC for Samples:
1183056011, 1183056012

Analysis Date: 06/21/2018 17:33
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	98.3	98.3	%	0.05	(< 15)

Batch Information

Analytical Batch: SPT10511
Analytical Method: SM21 2540G
Instrument:
Analyst: E.M

Print Date: 06/28/2018 2:09:25PM

Method Blank

Blank ID: MB for HBN 1781439 [SPT/10513]
Blank Lab ID: 1454701

Matrix: Soil/Solid (dry weight)

QC for Samples:
1183056001, 1183056002, 1183056003, 1183056004, 1183056005, 1183056006, 1183056007, 1183056008, 1183056009, 1183056010

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT10513
Analytical Method: SM21 2540G
Instrument:
Analyst: FGL
Analytical Date/Time: 6/22/2018 5:50:00PM

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Duplicate Sample Summary

Original Sample ID: 1183090001
Duplicate Sample ID: 1454702

Analysis Date: 06/22/2018 17:50
Matrix: Soil/Solid (dry weight)

QC for Samples:

1183056001, 1183056002, 1183056003, 1183056004, 1183056005, 1183056006, 1183056007, 1183056008, 1183056009, 1183056010

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	77.9	77.3	%	0.70	(< 15)

Batch Information

Analytical Batch: SPT10513
Analytical Method: SM21 2540G
Instrument:
Analyst: FGL

Print Date: 06/28/2018 2:09:29PM

Duplicate Sample Summary

Original Sample ID: 1183056008
Duplicate Sample ID: 1454657

Analysis Date: 06/22/2018 17:00
Matrix: Soil/Solid (dry weight)

QC for Samples:

1183056005, 1183056008

Results by **SW9045D**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
pH	6.00	6.00	pH units	0.00	(< 5)

Batch Information

Analytical Batch: TCLP9467
Analytical Method: SW9045D
Instrument: pH Meter Hanna 5221-01
Analyst: TFK

Print Date: 06/28/2018 2:09:33PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1183056 [TCLP9467]
Blank Spike Lab ID: 1454654
Date Analyzed: 06/22/2018 17:00

Matrix: Soil/Solid (dry weight)

QC for Samples: 1183056005, 1183056008

Results by **SW9045D**

Blank Spike (pH units)

Parameter	Spike	Result	Rec (%)	CL
pH	7	7.03	100	(99-101)

Batch Information

Analytical Batch: **TCLP9467**
Analytical Method: **SW9045D**
Instrument: **pH Meter Hanna 5221-01**
Analyst: **TFK**

Print Date: 06/28/2018 2:09:35PM

Method Blank

Blank ID: MB for HBN 1781515 [WXX/12394]
Blank Lab ID: 1455070

Matrix: Soil/Solid (dry weight)

QC for Samples:
1183056005, 1183056008

Results by **SW9056A**

Parameter	Results	LOQ/CL	DL	Units
Sulfate	1.00U	2.00	0.620	mg/Kg

Batch Information

Analytical Batch: WIC5786
Analytical Method: SW9056A
Instrument: 930 Metrohm compact IC flex
Analyst: AYC
Analytical Date/Time: 6/22/2018 11:19:04PM

Prep Batch: WXX12394
Prep Method: METHOD
Prep Date/Time: 6/22/2018 6:11:00PM
Prep Initial Wt./Vol.: 4 g
Prep Extract Vol: 40 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1183056 [WXX12394]
Blank Spike Lab ID: 1455071
Date Analyzed: 06/22/2018 23:38

Matrix: Soil/Solid (dry weight)

QC for Samples: 1183056005, 1183056008

Results by **SW9056A**

Blank Spike (mg/Kg)

Parameter	Spike	Result	Rec (%)	CL
Sulfate	50	50.2	100	(87-115)

Batch Information

Analytical Batch: **WIC5786**
Analytical Method: **SW9056A**
Instrument: **930 Metrohm compact IC flex**
Analyst: **AYC**

Prep Batch: **WXX12394**
Prep Method: **METHOD**
Prep Date/Time: **06/22/2018 18:11**
Spike Init Wt./Vol.: 50 mg/Kg Extract Vol: 40 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1183056005
MS Sample ID: 1455072 MS
MSD Sample ID: 1455073 MSD

Analysis Date: 06/22/2018 23:57
Analysis Date: 06/23/2018 0:15
Analysis Date: 06/23/2018 0:34
Matrix: Soil/Solid (dry weight)

QC for Samples: 1183056005, 1183056008

Results by **SW9056A**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Sulfate	11.2	69.5	78.7	97	69.4	77.5	96	87-115	1.40	(< 15)

Batch Information

Analytical Batch: WIC5786
Analytical Method: SW9056A
Instrument: 930 Metrohm compact IC flex
Analyst: AYC
Analytical Date/Time: 6/23/2018 12:15:56AM

Prep Batch: WXX12394
Prep Method: SW9056 Extraction Soil/Solids
Prep Date/Time: 6/22/2018 6:11:00PM
Prep Initial Wt./Vol.: 4.04g
Prep Extract Vol: 40.00mL

Print Date: 06/28/2018 2:09:43PM

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CHAIN OF CUSTODY RECORD

1183056

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

Section 1

CLIENT: HMCC

CONTACT: PHONE NO:

PROJECT NAME: HMCC shooting range — PROJECT/ PWSID/ PERMIT#:

REPORTS TO: Stafford G, Matt Woods — E-MAIL: mww@shanwil.com

INVOICE TO: Shannon and Wilson — QUOTE #: P.O. #: 100200

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: Total Pb	Preservative: TCLP Pb	Preservative: pH	Preservative: phosphorus	Preservative: sulfate	REMARKS/ LOC ID
1	100200-IA1-0-6	6/20/18	1109	Soil	2	G	X	X				
2	100200-IA1-6-12	"	1119	Soil	2	G	X	X				
3	100200-IA1-18-24	"	1155	Soil	2	G	X	X				name 100200-IA1-18-24
4	100200-IA1-12-18	↓	1219	Soil	2	G	X	X				
5	100200-IA1-12-18-MV	6/20/18	1019	Soil	1	G			X	X	X	
6	100200-DU2	6/19/18	1129	Soil	2	C	X	X				1g total Pb
7	100200-DU3R	6/19/18	1601	Soil	2	C	X	X				1g total Pb
8	100200-DU3-44	6/19/18	1403	Soil	1	G			X	X	X	
9	100200-DU39	6/19/18	1405	Soil	2	C	X	X				1g total Pb
10	100200-DU3	6/19/18	1323	Soil	2	C	X	X				1g total Pb

Section 5

	Date	Time	
Relinquished By: (1)	6/20/18	1545	Received By:
Relinquished By: (2)			Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	06/20/18	16:00	Received For Laboratory By: SD

Section 4

DOD Project? Yes (No)

Cooler ID:

Data Deliverable Requirements: Level II

Requested Turnaround Time and/or Special Instructions: Standard TAT

Temp Blank °C: 3.7 D30 or Ambient [ ] (See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) (INTACT) BROKEN ABSENT (See attached Sample Receipt Form)

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

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SGS North America Inc.
CHAIN OF CUSTODY RECORD

1183056

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

Section 1

CLIENT: HMCC

CONTACT: PHONE NO:

PROJECT NAME: HMCC Shooting Range PROJECT/ PWSID/ PERMIT#:

REPORTS TO: Stafford G. Matt Vavra E-MAIL: mjw@shanwil.com

INVOICE TO: Shannon & Wilson QUOTE #: P.O. #: 100200

Section 3

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incre-mental Soils	Preservative: Total Pb	Preservative: TCLP Pb	REMARKS/ LOC ID
(11)	100200-DU1	6/18/18	1352	Soil	2	C	X	X	1g total Pb
(12)	100200-DU4	6/20/18	13:00	Soil	2	C	X	X	1g total Pb

Section 4

DOD Project? Yes (No)

Cooler ID:

Data Deliverable Requirements: level II

Requested Turnaround Time and/or Special Instructions: Standard TAT

Section 5

	Date	Time	
Relinquished By: (1)	6/20/18	1545	Received By:
Relinquished By: (2)			Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	6/20/18	16:00	Received For Laboratory By: SD

Temp Blank °C: _____ or Ambient [ ] (See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT (See attached Sample Receipt Form)

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[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

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Characterization of TCLP Samples for LIMS Login

Date Characterized: 6/20/18 **Analyst:** NSW

Sample Container ID:	Matrix	%	Is sufficient volume/mass available?	Notes:
1A-12A	Xylene miscible (Top layer * = matrix 3 **)		**Yes** / No	If multiple jars were received, were they consistent? **Yes** / No / NA
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / **NA**
	Solid (Bottom layer = matrix 7 or 2 if % solids required)	100 %		Sample description/other observations: dark, rocky soil
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			Sample description/other observations:
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			Sample description/other observations:
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			Sample description/other observations:
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			Sample description/other observations:

Remember: *** = Chlorinated oils will be heavier than water and present as the bottom later.***
***** = Oils must be filterable to be logged in as matrix 3. Nonfilterable oils must be logged in as matrix 7.***
****** = Refer to F078 'Characterization of TCLP Samples for LIMS' to determine if there's sufficent volume/mass.***

e-Sample Receipt Form

SGS Workorder #: **1183056**

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		N/A Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	YES	1F, 1B
COC accompanied samples?	YES	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	YES	Cooler ID: 1 @ 3.7 °C Therm. ID: D30
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	YES	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	YES	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	NO	Phosphorus by SW 6020 per client-JKV.
		N/A ***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	NO	Samples 6, 7, 9, 10-12 have 1g soil for total Pb.
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	N/A	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	

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

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1183056001-A	No Preservative Required	OK			
1183056002-A	No Preservative Required	OK			
1183056003-A	No Preservative Required	OK			
1183056004-A	No Preservative Required	OK			
1183056005-A	No Preservative Required	OK			
1183056006-A	No Preservative Required	OK			
1183056006-B	No Preservative Required	OK			
1183056007-A	No Preservative Required	OK			
1183056007-B	No Preservative Required	OK			
1183056008-A	No Preservative Required	OK			
1183056009-A	No Preservative Required	OK			
1183056009-B	No Preservative Required	OK			
1183056010-A	No Preservative Required	OK			
1183056010-B	No Preservative Required	OK			
1183056011-A	No Preservative Required	OK			
1183056011-B	No Preservative Required	OK			
1183056012-A	No Preservative Required	OK			
1183056012-B	No Preservative Required	OK			
1183056013-A	No Preservative Required	OK			
1183056014-A	No Preservative Required	OK			
1183056015-A	No Preservative Required	OK			
1183056016-A	No Preservative Required	OK			
1183056017-A	No Preservative Required	OK			
1183056018-A	No Preservative Required	OK			
1183056019-A	No Preservative Required	OK			
1183056020-A	No Preservative Required	OK			
1183056021-A	No Preservative Required	OK			
1183056022-A	No Preservative Required	OK			

Container Condition Glossary

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

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

LABORATORY DATA REVIEW CHECKLIST

CS Report Name: HMCC Shooting Range Characterization
Eagle River, Alaska

Date: October 2018

Laboratory Report Date: 06/29/18

Consultant Firm: Shannon & Wilson, Inc.

Completed by: Stafford Glashan
Title: Senior Engineer III
Laboratory Name: SGS North America Inc.
Laboratory Report Number: 1188056
ADEC File Number: *NA*

(**NOTE**: ***NA*** = not applicable; Text in *italics* added by Shannon & Wilson, Inc.)

1. Laboratory

a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses? **Yes / No / NA** (please explain)
Comments:

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS-approved?
Yes / No / NA (please explain)
Comments:

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?
Yes / No / NA (please explain)
Comments**:**

b. Correct analyses requested? **Yes / No / NA** (please explain)
Comments**:**

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
Yes / No / NA (please explain)
Comments: *The temperature blank was 3.7° C.*

b. Sample preservation acceptable - acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)? **Yes / No / NA** (please explain)
Comments:

c. Sample condition documented - broken, leaking (Methanol), zero headspace (VOC vials)? **Yes / No / NA** (please explain)
Comments: *No discrepancies were noted.*

d. If there were any discrepancies, were they documented? – For example, incorrect sample containers/preservation, sample temperature outside acceptance range, insufficient or missing samples, etc.? **Yes / No / NA** (please explain)
Comments: *No discrepancies documented.*

e. Data quality or usability affected? **Yes / No / NA**
Comments: *See above.*

4. Case Narrative

a. Present and understandable? **Yes / No / NA** (please explain)
Comments:

b. Discrepancies, errors or QC failures identified by the lab? **Yes / No / NA** (please explain)
Comments:
MS/MSD
- *Lead recovery does not meet QC criteria. The post digestion spike was successful.*

c. Were corrective actions documented? **Yes / No / NA** (please explain)
Comments:

d. What is the effect on data quality/usability, according to the case narrative?
Comments: *None stated.*

5. Sample Results

a. Correct analyses performed/reported as requested on COC? **Yes / No / NA** (please explain)
Comments:

b. All applicable holding times met? **Yes / No / NA** (please explain)
Comments:

c. All soils reported on a dry weight basis? **Yes / No / NA** (please explain)
Comments:

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project? **Yes / No / NA** (please explain)
Comments:

e. Data quality or usability affected? **NA** Please explain.

Comments:

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis, and 20 samples?
Yes / No / NA (please explain)
Comments:

ii. All method blank results less than LOQ? **Yes / No / NA** (please explain)
Comments:

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

- .

iv. Do the affected sample(s) have data flags? **Yes/ No / NA** (please explain)
Comments:

If so, are the data flags clearly defined? **Yes / No / NA**
Comments:

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

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

i. Organics - One LCS/LCSD reported per matrix, analysis, and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846) **Yes / No / NA** (please explain)
Comments:

ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples? **Yes / No / NA** (please explain)
Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages) **Yes / No / NA** (please explain)
Comments:.

iv. Precision – All relative percent differences (RPDs) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%, VOCs 20%; all other analyses see the laboratory QC pages) **Yes / No / NA** (please explain)
Comments:

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

vi. Do the affected samples(s) have data flags? If so, are the data flags clearly defined?
Yes / No / NA (please explain)
Comments:

vii. Data quality or usability affected? Please explain. ***NA***
Comments:

c. Surrogates - Organics Only

i. Are surrogate recoveries reported for organic analyses, field, QC and laboratory samples? **Yes / No / NA** (please explain)
Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages) **Yes / No / NA** (please explain)
Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined? **Yes / No / NA** (please explain)
Comments:

iv. Data quality or usability affected? Please explain. **Yes / No / NA**
Comments:

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

i. One trip blank reported per matrix, analysis, and cooler? (If not, enter explanation below.) **Yes / No / NA** (please explain)
Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? **(**If not, a comment stating why must be entered below.) **Yes / No / NA** (please explain)
Comments:

iii. All results less than LOQ? **Yes / No / NA** (please explain)
Comments:

iv. If above LOQ, what samples are affected?
Comments**:**

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

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
Yes / No / NA (please explain)
Comments: *Characterization/ISM sampling.*

ii. Submitted blind to the lab? **Yes / No / NA** (please explain)
Comments:

iii. Precision – All relative percent differences (RPDs) less than specified DQOs?
(Recommended: 30% for water, 50% for soil) **Yes / No / NA** (please explain)
Comments:

iv. Data quality or usability affected? Please explain.
Comments:

f. Decontamination or Equipment Blank (if not applicable)
Yes / No / NA (please explain)
Comments: *Soil samples were collected with clean, dedicated steel sampling spoons.*

i. All results less than LOQ? **Yes / No / NA** (please explain)
Comments:

ii. If above LOQ, what samples are affected? ***NA***
Comments:

iii. Data quality or usability affected? Please explain. ***NA***
Comments:

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

a. Defined and appropriate? **Yes / No / NA** (please explain)
Comments: *SGS defines laboratory-specific qualifiers on page 4 of their report.*

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks St., Ste 3
Anchorage, AK 99518
(907)433-3214

Report Number: **1184053**

Client Project: **100200 HMCC**

Dear Stafford Glashan,

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

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

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

Sincerely,
SGS North America Inc.

_____

Jillian Vlahovich Date
Project Manager
Jillian.Vlahovich@sgs.com

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

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1184053**
Project Name/Site: **100200 HMCC**
Project Contact: **Stafford Glashan**

Refer to sample receipt form for information on sample condition.

100200-IA2-X (1184053005) PS

6020A - Metals analyte lead is detected in the LB above the LOQ. The associated sample concentration is 10 times greater than the concentration in the LB.

LB1 for HBN 1783814 [TCLP/9571 (1465240) LB1

6020A - Metals analyte lead is detected in the LB above the LOQ.

1184053005(1465542MS) (1465544) MS

6020A - Metals MS recovery for lead does not meet QC criteria. The post digestion spike was successful.

1184053005(1465542MSD) (1465545) MSD

6020A - Metals MSD recovery for lead does not meet QC criteria. The post digestion spike was successful.

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

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

Laboratory Qualifiers

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

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 DW Chemistry (Provisionally Certified as of 06/11/2018 for Mercury by EPA245.1,Beryllium and Copper by EPA200.8) & Microbiology & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

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

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

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
100200-D03-4X	1184053001	07/30/2018	07/30/2018	Solid/Soil (Wet Weight)
100200-D03-10X	1184053002	07/30/2018	07/30/2018	Solid/Soil (Wet Weight)
100200-D04-4X	1184053003	07/30/2018	07/30/2018	Solid/Soil (Wet Weight)
100200-D04-10X	1184053004	07/30/2018	07/30/2018	Solid/Soil (Wet Weight)
100200-IA2-X	1184053005	07/30/2018	07/30/2018	Solid/Soil (Wet Weight)

Method	Method Description
SW6020A TCLP	Metals by ICP-MS

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Detectable Results Summary

Client Sample ID: **100200-D03-4X**
Lab Sample ID: 1184053001
TCLP Constituents Metals

Parameter	Result	Units
Lead	25.2	mg/L

Client Sample ID: **100200-D03-10X**
Lab Sample ID: 1184053002
TCLP Constituents Metals

Parameter	Result	Units
Lead	29.3	mg/L

Client Sample ID: **100200-D04-4X**
Lab Sample ID: 1184053003
TCLP Constituents Metals

Parameter	Result	Units
Lead	75.6	mg/L

Client Sample ID: **100200-D04-10X**
Lab Sample ID: 1184053004
TCLP Constituents Metals

Parameter	Result	Units
Lead	29.5	mg/L

Client Sample ID: **100200-IA2-X**
Lab Sample ID: 1184053005
TCLP Constituents Metals

Parameter	Result	Units
Lead	656	mg/L

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Results of **100200-D03-4X**

Client Sample ID: **100200-D03-4X**
Client Project ID: **100200 HMCC**
Lab Sample ID: 1184053001
Lab Project ID: 1184053

Collection Date: 07/30/18 10:40
Received Date: 07/30/18 12:36
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	25.2	*	0.0500	0.0155	mg/L	25	(<5)	08/09/18 18:55

Batch Information

Analytical Batch: MMS10273
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 08/09/18 18:55
Container ID: 1184053001-A

Prep Batch: MXT5683
Prep Method: SW3010A
Prep Date/Time: 08/07/18 11:20
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 08/14/2018 11:31:46AM

J flagging is activated

Results of **100200-D03-10X**

Client Sample ID: **100200-D03-10X**
Client Project ID: **100200 HMCC**
Lab Sample ID: 1184053002
Lab Project ID: 1184053

Collection Date: 07/30/18 10:45
Received Date: 07/30/18 12:36
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	29.3	*	0.0500	0.0155	mg/L	25	(<5)	08/09/18 18:59

Batch Information

Analytical Batch: MMS10273
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 08/09/18 18:59
Container ID: 1184053002-A

Prep Batch: MXT5683
Prep Method: SW3010A
Prep Date/Time: 08/07/18 11:20
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 08/14/2018 11:31:46AM

J flagging is activated

Results of **100200-D04-4X**

Client Sample ID: **100200-D04-4X**
Client Project ID: **100200 HMCC**
Lab Sample ID: 1184053003
Lab Project ID: 1184053

Collection Date: 07/30/18 10:50
Received Date: 07/30/18 12:36
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	75.6	*	0.0500	0.0155	mg/L	25	(<5)	08/09/18 19:18

Batch Information

Analytical Batch: MMS10273
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 08/09/18 19:18
Container ID: 1184053003-A

Prep Batch: MXT5683
Prep Method: SW3010A
Prep Date/Time: 08/07/18 11:20
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 08/14/2018 11:31:46AM

J flagging is activated

Results of **100200-D04-10X**

Client Sample ID: **100200-D04-10X**
Client Project ID: **100200 HMCC**
Lab Sample ID: 1184053004
Lab Project ID: 1184053

Collection Date: 07/30/18 10:55
Received Date: 07/30/18 12:36
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	29.5	*	0.0500	0.0155	mg/L	25	(<5)	08/09/18 19:23

Batch Information

Analytical Batch: MMS10273
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 08/09/18 19:23
Container ID: 1184053004-A

Prep Batch: MXT5683
Prep Method: SW3010A
Prep Date/Time: 08/07/18 11:20
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 08/14/2018 11:31:46AM

J flagging is activated

Results of **100200-IA2-X**

Client Sample ID: **100200-IA2-X**
Client Project ID: **100200 HMCC**
Lab Sample ID: 1184053005
Lab Project ID: 1184053

Collection Date: 07/30/18 11:10
Received Date: 07/30/18 12:36
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	656	*	0.400	0.124	mg/L	200	(<5)	08/09/18 04:49

Batch Information

Analytical Batch: MMS10272
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 08/09/18 04:49
Container ID: 1184053005-A

Prep Batch: MXT5684
Prep Method: SW3010A
Prep Date/Time: 08/08/18 11:55
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 08/14/2018 11:31:46AM

J flagging is activated

Method Blank

Blank ID: LB1 for HBN 1783735 [TCLP/9568
Blank Lab ID: 1464924

Matrix: Solid/Soil (Wet Weight)

QC for Samples:
1184053001, 1184053002, 1184053003, 1184053004

Results by **SW6020A TCLP**

Parameter	Results	LOQ/CL	DL	Units
Lead	0.0250U	0.0500	0.0155	mg/L

Batch Information

Analytical Batch: MMS10273
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexion P5
Analyst: DSH
Analytical Date/Time: 8/9/2018 1:48:16PM

Prep Batch: MXT5683
Prep Method: SW3010A
Prep Date/Time: 8/7/2018 11:20:05AM
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

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Method Blank

Blank ID: MB for HBN 1783800 [MXT/5683]
Blank Lab ID: 1465194

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1184053001, 1184053002, 1184053003, 1184053004

Results by **SW6020A TCLP**

Parameter	Results	LOQ/CL	DL	Units
Lead	0.00250U	0.00500	0.00155	mg/L

Batch Information

Analytical Batch: MMS10273
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexion P5
Analyst: DSH
Analytical Date/Time: 8/9/2018 5:26:02PM

Prep Batch: MXT5683
Prep Method: SW3010A
Prep Date/Time: 8/7/2018 11:20:05AM
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

SGS North America Inc.
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Blank Spike Summary

Blank Spike ID: LCS for HBN 1184053 [MXT5683]
Blank Spike Lab ID: 1465195
Date Analyzed: 08/09/2018 17:30

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1184053001, 1184053002, 1184053003, 1184053004

Results by **SW6020A TCLP**

Blank Spike (mg/L)

Parameter	Spike	Result	Rec (%)	CL
Lead	1	1.04	104	(88-115)

Batch Information

Analytical Batch: **MMS10273**
Analytical Method: **SW6020A TCLP**
Instrument: **Perkin Elmer Nexion P5**
Analyst: **DSH**

Prep Batch: **MXT5683**
Prep Method: **SW3010A**
Prep Date/Time: **08/07/2018 11:20**
Spike Init Wt./Vol.: 1 mg/L Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

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200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Matrix Spike Summary

Original Sample ID: 1465196
MS Sample ID: 1465198 MS
MSD Sample ID: 1465199 MSD

Analysis Date: 08/09/2018 17:35
Analysis Date: 08/09/2018 17:40
Analysis Date: 08/09/2018 17:44
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1184053001, 1184053002, 1184053003, 1184053004

Results by **SW6020A TCLP**

		Matrix Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Lead	0.0500	10.0	10.1	100	10.0	10.1	101	88-115	0.63	(< 20)

Batch Information

Analytical Batch: MMS10273
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexion P5
Analyst: DSH
Analytical Date/Time: 8/9/2018 5:40:07PM

Prep Batch: MXT5683
Prep Method: Waters Digest for Metals by ICP-MS(TCLP)
Prep Date/Time: 8/7/2018 11:20:05AM
Prep Initial Wt./Vol.: 2.50mL
Prep Extract Vol: 25.00mL

Print Date: 08/14/2018 11:31:50AM

Method Blank

Blank ID: LB1 for HBN 1783814 [TCLP/9571
Blank Lab ID: 1465240

Matrix: Solid/Soil (Wet Weight)

QC for Samples:
1184053005

Results by **SW6020A TCLP**

Parameter	Results	LOQ/CL	DL	Units
Lead	0.113*	0.0500	0.0155	mg/L

Batch Information

Analytical Batch: MMS10273
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexion P5
Analyst: DSH
Analytical Date/Time: 8/9/2018 1:57:39PM

Prep Batch: MXT5684
Prep Method: SW3010A
Prep Date/Time: 8/8/2018 11:55:30AM
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 08/14/2018 11:31:51AM

Method Blank

Blank ID: MB for HBN 1783891 [MXT/5684]
Blank Lab ID: 1465540

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1184053005

Results by **SW6020A TCLP**

Parameter	Results	LOQ/CL	DL	Units
Lead	0.00250U	0.00500	0.00155	mg/L

Batch Information

Analytical Batch: MMS10273
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer NexIon P5
Analyst: DSH
Analytical Date/Time: 8/9/2018 1:52:58PM

Prep Batch: MXT5684
Prep Method: SW3010A
Prep Date/Time: 8/8/2018 11:55:30AM
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1184053 [MXT5684]
Blank Spike Lab ID: 1465541
Date Analyzed: 08/08/2018 19:23

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1184053005

Results by **SW6020A TCLP**

Blank Spike (mg/L)

Parameter	Spike	Result	Rec (%)	CL
Lead	1	0.976	98	(88-115)

Batch Information

Analytical Batch: **MMS10272**
Analytical Method: **SW6020A TCLP**
Instrument: **Perkin Elmer Nexion P5**
Analyst: **DSH**

Prep Batch: **MXT5684**
Prep Method: **SW3010A**
Prep Date/Time: **08/08/2018 11:55**
Spike Init Wt./Vol.: 1 mg/L Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1465542
MS Sample ID: 1465544 MS
MSD Sample ID: 1465545 MSD

Analysis Date: 08/09/2018 4:49
Analysis Date: 08/09/2018 4:54
Analysis Date: 08/09/2018 4:59
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1184053005

Results by **SW6020A TCLP**

		Matrix Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Lead	656	10.0	669	137 *	10.0	657	11 *	88-115	1.90	(< 20)

Batch Information

Analytical Batch: MMS10272
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer NexIon P5
Analyst: DSH
Analytical Date/Time: 8/9/2018 4:54:27AM

Prep Batch: MXT5684
Prep Method: Waters Digest for Metals by ICP-MS(TCLP)
Prep Date/Time: 8/8/2018 11:55:30AM
Prep Initial Wt./Vol.: 2.50mL
Prep Extract Vol: 25.00mL

Print Date: 08/14/2018 11:31:54AM

Original Sample ID: 1465542
MS Sample ID: 1465543 BNT
MSD Sample ID:

QC for Samples: 1184053005

Analysis Date: 08/09/2018 4:49
Analysis Date: 08/09/2018 5:03
Analysis Date:
Matrix: Solid/Soil (Wet Weight)

Results by **SW6020A TCLP**

		Matrix Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Lead	656	500	1170	103				80-120		

Batch Information

Analytical Batch: MMS10272
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 8/9/2018 5:03:50AM

Prep Batch: MXT5684
Prep Method: Waters Digest for Metals by ICP-MS(TCLP)
Prep Date/Time: 8/8/2018 11:55:30AM
Prep Initial Wt./Vol.: 2.50mL
Prep Extract Vol: 25.00mL

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1184053

REVIEWED S.D

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory SGS

Attn: Jillian

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

3990 Collins Way, Suite 100
Lake Oswego, OR 97035
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

~~1321 Bannock Street, Suite 200~~
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	ALP Lead EPA 1311/6020	Total Number of Containers	Remarks/Matrix
100200-DU3-4X	① A	1040	7/30/18		X	X	1	Soil
DU3-10X	② A	1045						
DU4-4X	③ A	1050						
DU4-10X	④ A	1055						
IA2-X	⑤ A	1110						Soil/phosphate

Project Information		Sample Receipt	
Project Number: 100200		Total Number of Containers	
Project Name: HNCC		COC Seals/Intact? Y/N/NA	NA HD
Contact: SJG		Received Good Cond./Cold	Y
Ongoing Project? Yes ☒ No ☐		Delivery Method: HD	
Sampler: SJG		(attach shipping bill, if any)	

Instructions
Requested Turnaround Time: Standard
Special Instructions:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1440	Signature: Time:	Signature: Time:
Printed Name: Stafford Glasby Date: 7/30/18	Printed Name: Date:	Printed Name: Date:
Company: S&W	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time: 12:36
Printed Name: Date:	Printed Name: Date:	Printed Name: Jillian Vlahovich Date: 7/30/18
Company:	Company:	Company: SGS

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

200124

F-19-91/UR

TB 5.3°C D45

No. 35416

SGS North America Inc.

200 W. Potter Dr., Anchorage, AK 99518 (ph) 907-562-2343, (fax) 907-561-5301

3180 Peger Rd. Ste. 190, Fairbanks, AK 99709 (ph) 907-474-8656

Sample Kit Request

☑ **Client pickup Date:** 7/18/2018 **Time:** 15:30

Be sure to ask if client will ship by ground (DOT) or air carrier (IATA)

Does a Profile exist in LIMS? **If not, please send a request for new profile build.**

Client Name: Shannon & Wilson

Ordered By: Stafford **Phone #:**

Email: SJG@shanwil.com

Project Name: Highland Mt. **Project/Permit#:**

Quote #: **Profile #:**

Delivery Address:

☐ **Deliver to client:**

☐ **Ship by/Air Carrier:**

Airbill Number:

Date to ship by:

Notes:

Kit request taken by: CGH **Date:** July 18, 2018

Kit prepared by: ↓ **Date:** ↓

Kit *(including lid tightness for pres'd bottles)* checked by: **Date:**

Kit packed & shipped by: **Date:**

Filename: SKIT_Shannon & Wilson_Highland Mt._2018-07-18 *Required Items

No. Samples	Matrix	Analysis	Container Size & Type		Pres.			Hold Time	# QC Bottles	Total Bottles
8	soil	TCLP Lead	1 x 4-oz	amber glass				6M		8

☐ Pack for Shipping via ***ground*** (DOT)

☐ Pack for Shipping via ***air carrier*** (IATA)

☑ Temperature Blank (***circle one:*** 120-ml OR 500-ml)

☐ Soil VOA Trip Blank - Lot#:

☐ Water VOA Trip Blank - Lot#:

☐ 524 VOA Trip Blank - Lot#:

☐ Low Level Mercury Trip Blank- Lot#:

☑ Coolers

☑ Gel Ice

☑ Bubble Wrap

☑ Labels

☑ Custody Seals

☐ SGS COCs - ***Circle req'd format:*** ☐ Blank COC ☐ DW COC ☐ COC initiated by PM (attached)

☐ Send additional instructions/documents ***(Note to PM:*** *Be sure to attach copy of requested form.)*

☐ Total # includes bottles for % Solids

☐ Track all Lot#? (Required for DOD)

☐ Foreign Soil

Other Notes/Reminders for Kit Prep:

Attention Client/Sampler:

1. Do not rinse container; be aware of any acid preservative in container.
2. Fill container, but do not overfill (except volatile waters).
3. Label the container with your sample ID as well as the date/time of collection.
4. Fill out the Chain of Custody.
5. Add frozen gel packs or ice to your cooler & pack to prevent breakage.

Charges may be invoiced for bottles which are unused or improperly used.

If you have any questions concerning this sample kit, please contact your Project Manager for assistance. *Thank you.*

***This will email a copy of this form for confirmation to the client email and save the form to the network. This should not be**

SGS

1184053

Characterization of TCLP Samples f

Date Characterized: 7/30/18 Analyst: NLC

Sample Container ID:	Matrix	%	Is sufficient volume/mass available?	Notes:
0-5' A	Xylene miscible (Top layer * = matrix 3 **)	0%	Yes / No (circled: No)	If multiple jars were received, were they consistent? Yes / No / NA (circled: NA)
	Water miscible (Middle layer = matrix 6)	0%		If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA (circled: NA)
	Solid (Bottom layer = matrix 7 or 2 if % solids required)	100%		Sample description/other observations: Soil
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			Sample description/other observations:
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			Sample description/other observations:
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			Sample description/other observations:
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			Sample description/other observations:

Remember: ****= Chlorinated oils will be heavier than water and present as the bottom later.***
***** = Oils must be filterable to be logged in as matrix 3. Nonfilterable oils must be logged in as matrix 7.***
****** = Refer to F078 'Characterization of TCLP Samples for LIMS' to determine if there's sufficent volume/mass.***

e-Sample Receipt Form

SGS Workorder #: **1184053**

1184053

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		YES Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	ABSENT
COC accompanied samples?	YES	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	YES	Cooler ID: 1 @ 5.3 °C Therm. ID: D45
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	YES	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)? **Note: If times differ <1hr, record details & login per COC.	YES	
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	YES	
	N/A	***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	YES	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	N/A	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	

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

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1184053001-A	No Preservative Required	OK			
1184053002-A	No Preservative Required	OK			
1184053003-A	No Preservative Required	OK			
1184053004-A	No Preservative Required	OK			
1184053005-A	No Preservative Required	OK			

Container Condition Glossary

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

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

LABORATORY DATA REVIEW CHECKLIST

CS Report Name: HMCC Shooting Range Characterization
Eagle River, Alaska

Date: October 2018

Laboratory Report Date: 08/14/18

Consultant Firm: Shannon & Wilson, Inc.

Completed by: Stafford Glashan
Title: Senior Engineer III
Laboratory Name: SGS North America Inc.
Laboratory Report Number: 1184053
ADEC File Number: *NA*

(**NOTE**: ***NA*** = not applicable; Text in *italics* added by Shannon & Wilson, Inc.)

1. Laboratory

a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses? **Yes / No / NA** (please explain)
Comments:

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS-approved?
Yes / No / NA (please explain)
Comments:

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?
Yes / No / NA (please explain)
Comments**:**

b. Correct analyses requested? **Yes / No / NA** (please explain)
Comments**:**

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
Yes / No / NA (please explain)
Comments: *The temperature blank was 5.3° C.*

b. Sample preservation acceptable - acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)? **Yes / No / NA** (please explain)
Comments:

c. Sample condition documented - broken, leaking (Methanol), zero headspace (VOC vials)? **Yes / No / NA** (please explain)
Comments: *No discrepancies were noted.*

d. If there were any discrepancies, were they documented? – For example, incorrect sample containers/preservation, sample temperature outside acceptance range, insufficient or missing samples, etc.? **Yes / No / NA** (please explain)
Comments: *No discrepancies documented.*

e. Data quality or usability affected? **Yes / No / NA**
Comments: *See above.*

4. Case Narrative

a. Present and understandable? **Yes / No / NA** (please explain)
Comments:

b. Discrepancies, errors or QC failures identified by the lab? **Yes / No / NA** (please explain)
Comments:

MS/MSD

- *Lead recovery does not meet QC criteria. The post digestion spike was successful.*

LB1

- *Lead detected in lab blank associated with 100200-IA2-X.*

c. Were corrective actions documented? **Yes / No / NA** (please explain)
Comments:

d. What is the effect on data quality/usability, according to the case narrative?
Comments: *None as blank concentration is 10x less than sample result.*

5. Sample Results

a. Correct analyses performed/reported as requested on COC? **Yes / No / NA** (please explain)
Comments:

b. All applicable holding times met? **Yes / No / NA** (please explain)
Comments:

c. All soils reported on a dry weight basis? **Yes / No / NA** (please explain)
Comments:

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project? **Yes / No / NA** (please explain)

Comments:

e. Data quality or usability affected? **NA** Please explain.
Comments:

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis, and 20 samples?
Yes / No / NA (please explain)
Comments:

ii. All method blank results less than LOQ? **Yes / No / NA** (please explain)
Comments:

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

iv. Do the affected sample(s) have data flags? **Yes/ No / NA** (please explain)
Comments:

If so, are the data flags clearly defined? **Yes / No / NA**
Comments:

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

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

i. Organics - One LCS/LCSD reported per matrix, analysis, and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846) **Yes / No / NA** (please explain)
Comments:

ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples? **Yes / No / NA** (please explain)
Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages) **Yes / No / NA** (please explain)
Comments:.

iv. Precision – All relative percent differences (RPDs) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%, VOCs 20%; all other analyses see the laboratory QC pages) **Yes / No / NA**

(please explain)
Comments:

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

vi. Do the affected samples(s) have data flags? If so, are the data flags clearly defined?
Yes / No / NA (please explain)
Comments:

vii. Data quality or usability affected? Please explain. ***NA***
Comments:

c. Surrogates - Organics Only

i. Are surrogate recoveries reported for organic analyses, field, QC and laboratory samples? **Yes / No / NA** (please explain)
Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages) **Yes / No / NA** (please explain)
Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined? **Yes / No / NA** (please explain)
Comments:

iv. Data quality or usability affected? Please explain. **Yes / No / NA**
Comments:

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

i. One trip blank reported per matrix, analysis, and cooler? (If not, enter explanation below.) **Yes / No / NA** (please explain)
Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? **(**If not, a comment stating why must be entered below.) **Yes / No / NA** (please explain)
Comments:

iii. All results less than LOQ? **Yes / No / NA** (please explain)
Comments:

iv. If above LOQ, what samples are affected?
Comments**:**

v. Data quality or usability affected? Please explain.

Comments:

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
Yes / No / NA (please explain)
Comments: *Characterization/ISM sampling.*

ii. Submitted blind to the lab? **Yes / No / NA** (please explain)
Comments:

iii. Precision – All relative percent differences (RPDs) less than specified DQOs?
(Recommended: 30% for water, 50% for soil) **Yes / No / NA** (please explain)
Comments:

iv. Data quality or usability affected? Please explain.
Comments:

f. Decontamination or Equipment Blank (if not applicable)
Yes / No / NA (please explain)
Comments: *Soil samples were collected with clean, dedicated steel sampling spoons.*

i. All results less than LOQ? **Yes / No / NA** (please explain)
Comments:

ii. If above LOQ, what samples are affected? ***NA***
Comments:

iii. Data quality or usability affected? Please explain. ***NA***
Comments:

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

a. Defined and appropriate? **Yes / No / NA** (please explain)
Comments: *SGS defines laboratory-specific qualifiers on page 4 of their report.*

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks St., Ste 3
Anchorage, AK 99518
(907)433-3214

Report Number: **1184610**

Client Project: **100200 HMCC**

Dear Stafford Glashan,

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

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

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

Sincerely,
SGS North America Inc.

_____

Jillian Vlahovich Date
Project Manager
Jillian.Vlahovich@sgs.com

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1184610**
Project Name/Site: **100200 HMCC**
Project Contact: **Stafford Glashan**

Refer to sample receipt form for information on sample condition.

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

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

Laboratory Qualifiers

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

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SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

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

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

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t 907.562.2343 f 907.561.5301 www.us.sgs.com

Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
100200-DU3-10X2	1184610001	08/20/2018	08/20/2018	Solid/Soil (Wet Weight)
100200-DU4-10X2	1184610002	08/20/2018	08/20/2018	Solid/Soil (Wet Weight)
100200-IA2-X2	1184610003	08/20/2018	08/20/2018	Solid/Soil (Wet Weight)

Method	Method Description
SW6020A TCLP	Metals by ICP-MS

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Detectable Results Summary

Client Sample ID: **100200-DU3-10X2**
Lab Sample ID: 1184610001
TCLP Constituents Metals

Parameter	Result	Units
Lead	22.1	mg/L

Client Sample ID: **100200-DU4-10X2**
Lab Sample ID: 1184610002
TCLP Constituents Metals

Parameter	Result	Units
Lead	85.8	mg/L

Client Sample ID: **100200-IA2-X2**
Lab Sample ID: 1184610003
TCLP Constituents Metals

Parameter	Result	Units
Lead	455	mg/L

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Results of **100200-DU3-10X2**

Client Sample ID: **100200-DU3-10X2**
Client Project ID: **100200 HMCC**
Lab Sample ID: 1184610001
Lab Project ID: 1184610

Collection Date: 08/20/18 12:15
Received Date: 08/20/18 13:20
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	22.1	*	0.0500	0.0155	mg/L	25	(<5)	08/27/18 15:21

Batch Information

Analytical Batch: MMS10293
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 08/27/18 15:21
Container ID: 1184610001-A

Prep Batch: MXT5694
Prep Method: SW3010A
Prep Date/Time: 08/22/18 12:00
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 08/31/2018 3:24:28PM

J flagging is activated

Results of **100200-DU4-10X2**

Client Sample ID: **100200-DU4-10X2**
Client Project ID: **100200 HMCC**
Lab Sample ID: 1184610002
Lab Project ID: 1184610

Collection Date: 08/20/18 12:20
Received Date: 08/20/18 13:20
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	85.8	*	0.0500	0.0155	mg/L	25	(<5)	08/27/18 15:39

Batch Information

Analytical Batch: MMS10293
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 08/27/18 15:39
Container ID: 1184610002-A

Prep Batch: MXT5694
Prep Method: SW3010A
Prep Date/Time: 08/22/18 12:00
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Print Date: 08/31/2018 3:24:28PM

J flagging is activated

Results of **100200-IA2-X2**

Client Sample ID: **100200-IA2-X2**
Client Project ID: **100200 HMCC**
Lab Sample ID: 1184610003
Lab Project ID: 1184610

Collection Date: 08/20/18 12:25
Received Date: 08/20/18 13:20
Matrix: Solid/Soil (Wet Weight)
Solids (%):
Location:

Results by **TCLP Constituents Metals**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Lead	455	*	0.400	0.124	mg/L	200	(<5)	08/27/18 20:09

Batch Information

Analytical Batch: MMS10293
Analytical Method: SW6020A TCLP
Analyst: DSH
Analytical Date/Time: 08/27/18 20:09
Container ID: 1184610003-A

Prep Batch: MXT5694
Prep Method: SW3010A
Prep Date/Time: 08/22/18 12:00
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

Method Blank

Blank ID: LB1 for HBN 1784662 [TCLP/9607
Blank Lab ID: 1469099

Matrix: Solid/Soil (Wet Weight)

QC for Samples:
1184610001, 1184610002, 1184610003

Results by **SW6020A TCLP**

Parameter	Results	LOQ/CL	DL	Units
Lead	0.0196J	0.0500	0.0155	mg/L

Batch Information

Analytical Batch: MMS10293
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexion P5
Analyst: DSH
Analytical Date/Time: 8/27/2018 2:39:05PM

Prep Batch: MXT5694
Prep Method: SW3010A
Prep Date/Time: 8/22/2018 12:00:00PM
Prep Initial Wt./Vol.: 2.5 mL
Prep Extract Vol: 25 mL

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Method Blank

Blank ID: MB for HBN 1784753 [MXT/5694]
Blank Lab ID: 1469457

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1184610001, 1184610002, 1184610003

Results by **SW6020A TCLP**

Parameter	Results	LOQ/CL	DL	Units
Lead	0.00250U	0.00500	0.00155	mg/L

Batch Information

Analytical Batch: MMS10293
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexion P5
Analyst: DSH
Analytical Date/Time: 8/27/2018 2:43:47PM

Prep Batch: MXT5694
Prep Method: SW3010A
Prep Date/Time: 8/22/2018 12:00:00PM
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1184610 [MXT5694]
Blank Spike Lab ID: 1469458
Date Analyzed: 08/27/2018 14:48

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1184610001, 1184610002, 1184610003

Results by **SW6020A TCLP**

Blank Spike (mg/L)

Parameter	Spike	Result	Rec (%)	CL
Lead	1	1.09	109	(88-115)

Batch Information

Analytical Batch: **MMS10293**
Analytical Method: **SW6020A TCLP**
Instrument: **Perkin Elmer Nexion P5**
Analyst: **DSH**

Prep Batch: **MXT5694**
Prep Method: **SW3010A**
Prep Date/Time: **08/22/2018 12:00**
Spike Init Wt./Vol.: 1 mg/L Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1469459
MS Sample ID: 1469461 MS
MSD Sample ID: 1469462 MSD

Analysis Date: 08/27/2018 14:53
Analysis Date: 08/27/2018 14:57
Analysis Date: 08/27/2018 15:02
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1184610001, 1184610002, 1184610003

Results by **SW6020A TCLP**

		Matrix Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Lead	0.0265J	10.0	10.8	108	10.0	10.7	107	88-115	0.67	(< 20)

Batch Information

Analytical Batch: MMS10293
Analytical Method: SW6020A TCLP
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 8/27/2018 2:57:52PM

Prep Batch: MXT5694
Prep Method: Waters Digest for Metals by ICP-MS(TCLP)
Prep Date/Time: 8/22/2018 12:00:00PM
Prep Initial Wt./Vol.: 2.50mL
Prep Extract Vol: 25.00mL

Print Date: 08/31/2018 3:24:31PM

REVIEWED

1184610

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory SGS

Attn: Jillian

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

400 N. 34th Street, Suite 100
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(206) 632-8020

2355 Hill Road
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5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	EPA 311/6020 TCLP Lead	Total Number of Containers	Remarks/Matrix
100200-DU3-10x2	①A	1215	8/20/18		X	X	1	Soil
DU4-10x2	②A	1220	↓		↓	↓	↓	↓
↓ IA2-x2	③A	1225	↓		↓	↓	↓	↓

Project Information		Sample Receipt	
Project Number:	100200	Total Number of Containers	
Project Name:	HMCC	COC Seals/Intact? Y/N/NA	
Contact:	SSC	Received Good Cond./Cold	
Ongoing Project? Yes ☒ No ☐		Delivery Method:	
Sampler:	SSC	(attach shipping bill, if any)	

Instructions	
Requested Turnaround Time:	Standard
Special Instructions:	

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1320	Signature: Time:	Signature: Time:
Printed Name: Stafford Gkushi Date: 8/15/18	Printed Name: Date:	Printed Name: Date:
Company: S&W	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time: 13:20
Printed Name: Date:	Printed Name: Date:	Printed Name: Kyle Tolkinen Date: 8/20/18
Company:	Company:	Company: SGS

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

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F-19-91/UR

TEMP: 9.3 D35

No. 35428

1184610

SGS North America Inc.

200 W. Potter Dr., Anchorage, AK 99518 (ph) 907-562-2343, (fax) 907-561-5301

3180 Peger Rd. Ste. 190, Fairbanks, AK 99709 (ph) 907-474-8656

☑ est

Client pickup Date: 8/20/2018 **Time:** 10:00

Be sure to ask if client will ship by ground (DOT) or air carrier (IATA)

Does a Profile exist in LIMS? If not, please send a request for new profile build.

Client Name: Shannon & Wilson

Ordered By: Stafford Glashan **Phone #:**

Email: SJG@shanwil.com

Project Name: TCLP Lead **Project/Permit#:**

Quote #: **Profile #:**

Delivery Address:

☐ **Deliver to client:**

☐ **Ship by/Air Carrier:**

Airbill Number:

Date to ship by:

Notes:

Kit request taken by: JKV **Date:** August 17, 2018

Kit prepared by: **Date:**

Kit *(including lid tightness for pres'd bottles)* checked by: JKV **Date:** 8/20/18

Kit packed & shipped by: **Date:**

Filename: SKIT_Shannon & Wilson _TCLP Lead_2018-08-17 *Required Items

No. Samples	Matrix	Analysis	Container Size & Type		Pres.	Bottle Lot #	Preservative Lot #	Hold Time	# QC Bottles	Total Bottles
3	soil	TCLP Lead	1 x 8-oz	amber glass	none			180 days		3

☐ Pack for Shipping via ***ground*** (DOT)

☐ Pack for Shipping via ***air carrier*** (IATA)

☑ Temperature Blank (***circle one:*** 120-ml OR 500-ml)

☐ Soil VOA Trip Blank - Lot#:

☐ Water VOA Trip Blank - Lot#:

☐ 524 VOA Trip Blank - Lot#:

☐ Low Level Mercury Trip Blank- Lot#:

☑ Coolers

☑ Gel Ice

☑ Bubble Wrap

☑ Labels

☐ Custody Seals

☑ SGS COCs - ***Circle req'd format:*** ☑ Blank COC ☐ DW COC ☐ COC initiated by PM (attached)

☐ Send additional instructions/documents *(**Note to PM:** Be sure to attach copy of requested form.)*

☐ Total # includes bottles for % Solids

☐ Track all Lot#? (Required for DOD)

☐ Foreign Soil

Other Notes/Reminders for Kit Prep:

Attention Client/Sampler:

1. Do not rinse container; be aware of any acid preservative in container.
2. Fill container, but do not overfill (except volatile waters).
3. Label the container with your sample ID as well as the date/time of collection.
4. Fill out the Chain of Custody.
5. Add frozen gel packs or ice to your cooler & pack to prevent breakage.

Charges may be invoiced for bottles which are unused or improperly used.
If you have any questions concerning this sample kit, please contact your Project Manager for assistance. *Thank you.*

***This will email a copy of this form for confirmation to the client email and save the form to the network. This should not be**

14 of 17

SGS

SGS North Ame
200 W. Potter Drive
phone (907) 562-23

1184610

Characterization of TCLP Samples for LIMS Logi

Date Characterized: 8/20 Analyst: S.D

Sample Container ID:	Matrix	%	Is sufficient volume/mass available?	Notes:
①A-③A	Xylene miscible (Top layer * = matrix 3 **)		(Yes) / No	If multiple jars were received, were they consistent? Yes / No / (NA)
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / (NA)
	(Solid) (Bottom layer = matrix 7 or 2 if % solids required)	100%		Sample description/other observations: Soil
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			Sample description/other observations:
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			Sample description/other observations:
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			Sample description/other observations:
	Xylene miscible (Top layer * = matrix 3 **)		Yes / No	If multiple jars were received, were they consistent? Yes / No / NA
	Water miscible (Middle layer = matrix 6)			If biphasic, was there **only** one layer with sufficient sample ***? Yes / No / NA
	Solid (Bottom layer = matrix 7 or 2 if % solids required)			Sample description/other observations:

Remember: **** = Chlorinated oils will be heavier than water and present as the bottom later.***
***** = Oils must be filterable to be logged in as matrix 3. Nonfilterable oils must be logged in as matrix 7.***
****** = Refer to F078 'Characterization of TCLP Samples for LIMS' to determine if there's sufficent volume/mass.***

e-Sample Receipt Form

SGS Workorder #: **1184610**

1 1 8 4 6 1 0

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements	yes	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	n/a	hand delivered
COC accompanied samples?	yes	
n/a **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	yes	Cooler ID: 1 @ 9.3 °C Therm. ID: D35
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
If >6°C, were samples collected <8 hours ago?	yes	
If <0°C, were sample containers ice free?	n/a	
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)? **Note: If times differ <1hr, record details & login per COC.	yes	
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	yes	
	n/a	***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	n/a	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	n/a	
Were all soil VOAs field extracted with MeOH+BFB?	n/a	

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

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1184610001-A	No Preservative Required	OK			
1184610002-A	No Preservative Required	OK			
1184610003-A	No Preservative Required	OK			

Container Condition Glossary

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

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

LABORATORY DATA REVIEW CHECKLIST

CS Report Name: HMCC Shooting Range Characterization
Eagle River, Alaska

Date: October 2018

Laboratory Report Date: 08/31/18

Consultant Firm: Shannon & Wilson, Inc.

Completed by: Stafford Glashan
Title: Senior Engineer III
Laboratory Name: SGS North America Inc.
Laboratory Report Number: 1184610
ADEC File Number: *NA*

(**NOTE**: ***NA*** = not applicable; Text in *italics* added by Shannon & Wilson, Inc.)

1. Laboratory

a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses? **Yes / No / NA** (please explain)
Comments:

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS-approved?
Yes / No / NA (please explain)
Comments:

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?
Yes / No / NA (please explain)
Comments**:**

b. Correct analyses requested? **Yes / No / NA** (please explain)
Comments**:**

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
Yes / No / NA (please explain)
Comments: *The temperature blank was 9.3° C. Samples were on ice and submitted within an hour of collection.*

b. Sample preservation acceptable - acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)? **Yes / No / NA** (please explain)
Comments:

c. Sample condition documented - broken, leaking (Methanol), zero headspace (VOC vials)? **Yes / No / NA** (please explain)
Comments: *No discrepancies were noted.*

d. If there were any discrepancies, were they documented? – For example, incorrect sample containers/preservation, sample temperature outside acceptance range, insufficient or missing samples, etc.? **Yes / No / NA** (please explain)
Comments: *No discrepancies documented.*

e. Data quality or usability affected? **Yes / No / NA**
Comments: *See above.*

4. Case Narrative

a. Present and understandable? **Yes / No / NA** (please explain)
Comments:

b. Discrepancies, errors or QC failures identified by the lab? **Yes / No / NA** (please explain)
Comments:

c. Were corrective actions documented? **Yes / No / NA** (please explain)
Comments:

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

5. Sample Results

a. Correct analyses performed/reported as requested on COC? **Yes / No / NA** (please explain)
Comments:

b. All applicable holding times met? **Yes / No / NA** (please explain)
Comments:

c. All soils reported on a dry weight basis? **Yes / No / NA** (please explain)
Comments:

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project? **Yes / No / NA** (please explain)
Comments:

e. Data quality or usability affected? **NA** Please explain.
Comments:

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis, and 20 samples?
Yes / No / NA (please explain)
Comments:

ii. All method blank results less than LOQ? **Yes / No / NA** (please explain)
Comments:

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

iv. Do the affected sample(s) have data flags? **Yes/ No / NA** (please explain)
Comments:

If so, are the data flags clearly defined? **Yes / No / NA**
Comments:

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

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

i. Organics - One LCS/LCSD reported per matrix, analysis, and 20 samples?
(LCS/LCSD required per AK methods, LCS required per SW846) **Yes / No / NA**
(please explain)
Comments:

ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples? **Yes / No / NA** (please explain)
Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages) **Yes / No / NA** (please explain)
Comments:.

iv. Precision – All relative percent differences (RPDs) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%, VOCs 20%; all other analyses see the laboratory QC pages) **Yes / No / NA** (please explain)
Comments:

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

Comments:

vi. Do the affected samples(s) have data flags? If so, are the data flags clearly defined? **Yes / No / NA** (please explain)
Comments:

vii. Data quality or usability affected? Please explain. ***NA***
Comments:

c. Surrogates - Organics Only

i. Are surrogate recoveries reported for organic analyses, field, QC and laboratory samples? **Yes / No / NA** (please explain)
Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages) **Yes / No / NA** (please explain)
Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined? **Yes / No / NA** (please explain)
Comments:

iv. Data quality or usability affected? Please explain. **Yes / No / NA**
Comments:

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

i. One trip blank reported per matrix, analysis, and cooler? (If not, enter explanation below.) **Yes / No / NA** (please explain)
Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? **(**If not, a comment stating why must be entered below.) **Yes / No / NA** (please explain)
Comments:

iii. All results less than LOQ? **Yes / No / NA** (please explain)
Comments:

iv. If above LOQ, what samples are affected?
Comments**:**

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

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
Yes / No / NA (please explain)
Comments: *Characterization/ISM sampling.*

ii. Submitted blind to the lab? **Yes / No / NA** (please explain)
Comments:

iii. Precision – All relative percent differences (RPDs) less than specified DQOs?
(Recommended: 30% for water, 50% for soil) **Yes / No / NA** (please explain)
Comments:

iv. Data quality or usability affected? Please explain.
Comments:

f. Decontamination or Equipment Blank (if not applicable)
Yes / No / NA (please explain)
Comments: *Soil samples were collected with clean, dedicated steel sampling spoons.*

i. All results less than LOQ? **Yes / No / NA** (please explain)
Comments:

ii. If above LOQ, what samples are affected? *NA*
Comments:

iii. Data quality or usability affected? Please explain. *NA*
Comments:

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

a. Defined and appropriate? **Yes / No / NA** (please explain)
Comments: *SGS defines laboratory-specific qualifiers on page 4 of their report.*

APPENDIX D

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

IMPORTANT INFORMATION ABOUT YOUR ENVIRONMENTAL SITE ASSESSMENT/EVALUATION REPORT

ENVIRONMENTAL SITE ASSESSMENTS/EVALUATIONS ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

This report was prepared to meet the needs you specified with respect to your specific site and your risk management preferences. Unless indicated otherwise, we prepared your report expressly for you and for the purposes you indicated. No one other than you should use this report for any purpose without first conferring with us. No one is authorized to use this report for any purpose other than that originally contemplated without our prior written consent.

The findings and conclusions documented in this site assessment/evaluation have been prepared for specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in this area. The conclusions presented are based on interpretation of information currently available to us and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

OUR REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

Our environmental site assessment is based on several factors and may include (but not be limited to): reviewing public documents to chronicle site ownership for the past 30, 40, or more years; investigating the site's regulatory history to learn about permits granted or citations issued; determining prior uses of the site and those adjacent to it; reviewing available topographic and real estate maps, historical aerial photos, geologic information, and hydrologic data; reviewing readily available published information about surface and subsurface conditions; reviewing federal and state lists of known and potentially contaminated sites; evaluating the potential for naturally occurring hazards; and interviewing public officials, owners/operators, and/or adjacent owners with respect to local concerns and environmental conditions.

Except as noted within the text of the report, no sampling or quantitative laboratory testing was performed by us as part of this site assessment. Where such analyses were conducted by an outside laboratory, Shannon & Wilson relied upon the data provided and did not conduct an independent evaluation regarding the reliability of the data.

CONDITIONS CAN CHANGE.

Site conditions, both surface and subsurface, may be affected as a result of natural processes or human influence. An environmental site assessment/evaluation is based on conditions that existed at the time of the evaluation. Because so many aspects of a historical review rely on third party information, most consultants will refuse to certify (warrant) that a site is free of contaminants, as it is impossible to know with absolute certainty if such a condition exists. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas that showed no signs of contamination at the time they were studied.

Unless your consultant indicates otherwise, your report should not be construed to represent geotechnical subsurface conditions at or adjacent to the site and does not provide sufficient information for construction-related activities. Your report also should not be used following floods, earthquakes, or other acts of nature; if the size or configuration of the site is altered; if the location of the site is modified; or if there is a change of ownership and/or use of the property.

INCIDENTAL DAMAGE MAY OCCUR DURING SAMPLING ACTIVITIES.

Incidental damage to a facility may occur during sampling activities. Asbestos and lead-based paint sampling often require destructive sampling of pipe insulation, floor tile, walls, doors, ceiling tile, roofing, and other building materials. Shannon & Wilson does not provide for paint repair. Limited repair of asbestos sample locations are provided. However, Shannon & Wilson neither warranties repairs made by our field personnel, nor are we held liable for injuries or damages as a result of those repairs. If you desire a specific form of repair, such as those provided by a licensed roofing contractor, you need to request the specific repair at the time of the proposal. The owner is responsible for repair methods that are not specified in the proposal.

READ RESPONSIBILITY CLAUSES CAREFULLY.

Environmental site assessments/evaluations are less exact than other design disciplines because they are based extensively on judgment and opinion, and there may not have been any (or very limited) investigation of actual subsurface conditions. Wholly unwarranted claims have been lodged against consultants. To limit this exposure, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses may appear in this report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

Consultants cannot accept responsibility for problems that may develop if they are not consulted after factors considered in their reports have changed, or conditions at the site have changed. Therefore, it is incumbent upon you to notify your consultant of any factors that may have changed prior to submission of the final assessment/evaluation.

An assessment/evaluation of a site helps reduce your risk, but does not eliminate it. Even the most rigorous professional assessment may fail to identify all existing conditions.

ONE OF THE OBLIGATIONS OF YOUR CONSULTANT IS TO PROTECT THE SAFETY, HEALTH, PROPERTY, AND WELFARE OF THE PUBLIC.

If our environmental site assessment/evaluation discloses the existence of conditions that may endanger the safety, health, property, or welfare of the public, we may be obligated under rules of professional conduct, statutory law, or common law to notify you and others of these conditions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

APPENDIX C: DOCUMENTATION

Appendix C

Documentation

CONTENTS

Soil Sampling Form

Project Number:			**Sampled By:**		
Sample ID:			Sample Time:	Sample Date:	
Duplicate ID:			MS/MSD Yes No Trip Blank Required: Yes No		
Sample Type			**Sample Location**		
Grab	Composite, num. of parts ______		Surface Boring Test Pit	Sample Depth (ft bgs):	
Sample Description					
Gravel (3-0.06 in)	Sand (0.08-0.003 in)	Silt (<0.003 in)	Clay (no grains visible)	Organic Soil	Peat
GW GP GM GC	SW SP SM SC	ML MH	CL CH	OL/OH	PT
Color:	%Course:	%Fines:	Peat/Organics Soil Likely Present (Y/N):		
Moisture (Dry, Moist, Wet/Saturated):			Stained:	Odor:	
Analyses	**Number of Bottles**	**Notes:**			

Project Number:			**Sampled By:**		
Sample ID:			Sample Time:	Sample Date:	
Duplicate ID:			MS/MSD Yes No Trip Blank Required: Yes No		
Sample Type			**Sample Location**		
Grab	Composite, num. of parts ______		Surface Boring Test Pit	Sample Depth (ft bgs):	
Sample Description					
Gravel (3-0.06 in)	Sand (0.08-0.003 in)	Silt (<0.003 in)	Clay (no grains visible)	Organic Soil	Peat
GW GP GM GC	SW SP SM SC	ML MH	CL CH	OL/OH	PT
Color:	%Course:	%Fines:	Peat/Organics Soil Likely Present (Y/N):		
Moisture (Dry, Moist, Wet/Saturated):			Stained:	Odor:	
Analyses	**Number of Bottles**	**Notes:**			

Project Number:			**Sampled By:**		
Sample ID:			Sample Time:	Sample Date:	
Duplicate ID:			MS/MSD Yes No Trip Blank Required: Yes No		
Sample Type			**Sample Location**		
Grab	Composite, num. of parts ______		Surface Boring Test Pit	Sample Depth (ft bgs):	
Sample Description					
Gravel (3-0.06 in)	Sand (0.08-0.003 in)	Silt (<0.003 in)	Clay (no grains visible)	Organic Soil	Peat
GW GP GM GC	SW SP SM SC	ML MH	CL CH	OL/OH	PT
Color:	%Course:	%Fines:	Peat/Organics Soil Likely Present (Y/N):		
Moisture (Dry, Moist, Wet/Saturated):			Stained:	Odor:	
Analyses	**Number of Bottles**	**Notes:**			

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

5430 Fairbanks St, Ste 3
Anchorage, AK 99518
(907) 561-2120
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Page _____ of _____

Laboratory _____

Attn: _____

Analytical Methods (include preservative if used)

Turn Around Time:	**Quote No:**	**J-Flags:** ☐ Yes ☐ No
☐ Normal ☐ Rush	**MSA Number:**	
Please Specify		

Sample Identity	Lab No.	Time	Date Sampled								Total Number of Containers	Remarks/Matrix

Project Information	
Number:	
Name:	
Contact:	
Ongoing Project? Yes ☐ No ☐	
Sampler:	

Sample Receipt	
Total No. of Containers:	
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	
Delivery Method:	

Reliquished By: 1.	**Reliquished By: 2.**	**Reliquished By: 3.**
Signature: Time:_____	Signature: Time:_____	Signature: Time:_____
Printed Name: Date:_____	Printed Name: Date:_____	Printed Name: Date:_____
Company:	Company:	Company:

Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time:_____	Signature: Time:_____	Signature: Time:_____
Printed Name: Date:_____	Printed Name: Date:_____	Printed Name: Date:_____
Company:	Company:	Company:

Notes:

No._____

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites and Prevention Preparedness and Response Programs

Contaminated Media Transport and Treatment or Disposal Approval Form

HAZARD ID # or SPILL ID #	NAME OF CONTAMINATED SITE OR SPILL

CONTAMINATED SITE OR SPILL LOCATION – ADDRESS OR OTHER APPROPRIATE DESCRIPTION

CURRENT PHYSICAL LOCATION OF MEDIA	SOURCE OF THE CONTAMINATION (DAY TANK, FIRE TRAINING PIT, LUST, ETC.)

CONTAMINANTS OF CONCERN	ESTIMATED VOLUME	DATE(S) GENERATED

POST TREATMENT ANALYSIS REQUIRED *(such as GRO, DRO, RRO, VOCs, metals, PFAS, and/or Chlorinated Solvents)*

COMMENTS OR OTHER IMPORTANT INFORMATION

TREATMENT FACILITY, LANDFILL, AND/OR FINAL DESTINATION OF MEDIA	PHYSICAL ADDRESS/PHONE NUMBER
RESPONSIBLE PARTY	**ADDRESS/PHONE NUMBER**
WASTE MANAGEMENT CO. / ORGANIZER	**ADDRESS/PHONE NUMBER**

***Note, disposal of polluted soil in a landfill requires prior approval from the landfill operator and ADEC Solid Waste Program.**

Name of the Person Requesting Approval (printed) _____ Title/Association _____

Signature _____ Date _____ Phone Number _____

----------DEC USE ONLY----------

Based on the information provided, ADEC approves transport of the above mentioned material. The Responsible Party or their consultant must submit to the DEC Project Manager a copy of weight receipts of the loads transported and a post treatment analytical report, if disposed of at an approved treatment facility. The contaminated soil shall be transported as a covered load in compliance with 18 AAC 60.015.

DEC Project Manager Name (printed) _____ Project Manager Title _____

Signature _____ Date _____ Phone Number _____

Instructions to Complete
Contaminated Media Transport and Treatment or Disposal Approval Form

The Alaska Department of Environmental Conservation (DEC) must approve the movement or disposal of contaminated soil and water from a site in accordance with 18 Alaska Administrative Code (AAC) 75.325(i), 18 AAC 75.370(b), and 18 AAC 78.274(b). The *Contaminated Media Transport and Treatment or Disposal Approval Form* should be used to document this approval. Soil treatment facilities regulated under 18 AAC 75.365 are required by their Operations Plans to only accept contaminated soil for which an approval form has been signed by a DEC project manager.

Site information can be found on the Contaminated Site Database (www.alaska.gov/Applications/SPAR/PublicMVC/CSP/Search/) or the Spills Database (http://dec.alaska.gov/Applications/SPAR/PublicMVC/PERP/SpillSearch).

Instructions to Complete:

1. **Hazard ID or Spill ID #:** For a contaminated site, the Hazard ID can be found on the Contaminated Sites Database. For a spill, the Spill ID can be found in the subject line of letters from DEC or the Spills Database. If the waste originates from multiple sites, all Hazard IDs or Spill IDs must be listed.

2. **Name of Contaminated Site or Spill:** For a contaminated site, the official site name can be found on the Contaminated Sites Database. For a spill, the official name of the spill is found in the subject line of letters from DEC or the Spills Database.

3. **Contaminated Site or Spill Location – Address or Other Appropriate Description:** This address or description captures the origin of the contaminated media or the location of the spill. For a contaminated site, the address or other appropriate description can be found on the Contaminated Sites Database. For a spill, this can be found on the Spill Report or the Spills Database.

4. **Current Physical Location of the Media:** Provide the physical location where the contaminated media (soil, water, etc.) is currently stored. This location may be the same as location provided in the "Contaminated Site or Spill Location", or it could be a hazardous waste facility or other location/staging area agreed upon in the DEC-approved work plan.

5. **Source of Contamination (Day Tank, Fire Training Pit, LUST, etc.):** List all sources which contributed to the contamination in the media being transported. Sources can include previous releases that have comingled. If the source is unknown, state "Unknown".

6. **Contaminants of Concern (CoCs):** List all contaminants detected above the most stringent Method 2 Tables B1 and B2 soil cleanup levels in 18 AAC 75.341(c) and (d), the Table C groundwater cleanup levels in 18 AAC 75.345, and other applicable action levels (e.g., TCLP results). Attach the laboratory data package for the contaminated media that is being disposed of and, if applicable, a data summary table or narrative to this form. Data gathered during site characterization activities may be sufficient to determine the CoCs. There are situations in which generator knowledge of the contaminant source may be accepted by a treatment or disposal facility in lieu of analytical sample results, such as, diesel-impacted media from a heating oil tank. If you are using generator knowledge in lieu of analytical sample results, include a statement which documents this knowledge in the Comments section.

7. **Estimated Volume:** Include the total volume of contaminated media to be transported; for instance, "Nine 55-gallon drums" or '"25 cubic yards of soil."

8. **Date(s) Generated:** Provide the date the media was generated (e.g., excavated, pumped out of the ground, etc.). If the media was generated over multiple days, list the range of dates.

9. **Post Treatment Analysis Required (such as GRO, DRO, RRO, VOCs, PAHs, metals, PFAS, chlorinated solvents, etc.):** Provide the list of all contaminants that exceed the most stringent Method 2 cleanup levels. For DEC-approved soil treatment facilities in Alaska, specific post treatment analyses will be determined by the facility based upon the contaminants and requirements of their Operations Plan. If the media are being transported to a landfill or permitted liquid waste facility without off-site treatment, include "Not Applicable".

10. **Comments or Other Important Information:** Provide any other information which needs to be conveyed.
    a. If generator knowledge of the CoCs is being used in lieu of sample analytical results, an explanation needs to be provided in this field.
    b. If the material is going to be placed in a landfill in Alaska, include a statement that the landfill has agreed to accept the material and provide the contact information for the landfill point of contact. If the material is going to be placed in a Class 2 or 3 landfill, attach the DEC Solid Waste Program's approval letter to this form.
    c. If the media is going to an intermediate location or facility prior to its final destination, describe the complete transportation route with intermediate locations in this field.

11. **Treatment Facility, Landfill, and/or Final Destination of Media:** Include the name of the facility, landfill, or the final destination of the media. A list of DEC-approved Alaskan soil treatment facilities is available at www.dec.alaska.gov/spar/csp/offsite-remediation/. If multiple treatment facilities will be used, use separate forms to document what media will go to which facility. For material that will go to a waste transfer facility prior to disposal at another facility, the final destination should be listed.
    a. **Physical Address/Phone Number:** Provide the physical location and telephone number of the facility, landfill, or the final destination of the media.

12. **Responsible Party:** Provide the name of the party responsible for the contaminated site or spill.
    a. **Address/Phone Number:** Provide the mailing address and telephone number of the responsible party.

13. **Waste Management Co./Organizer:** Provide the name of company or person shipping and/or organizing the shipment of the media.
    a. **Address/Phone Number:** Provide the mailing address and telephone number of the waste management company or organizer.

Submit this completed form along with all necessary attachments to the assigned DEC project manager for approval, or contact the Contaminated Sites Program at (907) 269-7558 or the Prevention, Preparedness and Response Program at (907) 269-7557.

APPENDIX D: ISM REFERENCE DOCUMENT

Appendix D

Incremental Sampling Methodology Reference Document

SUBMITTED TO:
Shannon & Wilson, Inc.
2355 Hill Road
Fairbanks, AK 99709

RD-B37

VERSION 1.2

Incremental Sampling Methodology

REFERENCE DOCUMENT

SHANNON & WILSON

March 15, 2023

Shannon & Wilson No: RD-B37

PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Submitted To: Shannon & Wilson, Inc.
2355 Hill Road
Fairbanks, AK 99709

Subject: RD-B37 VERSION 1.2, INCREMENTAL SAMPLING METHODOLOGY, REFERENCE DOCUMENT

This document is intended for internal use by Shannon & Wilson, Inc. employees. The material contained in this reference document is based on the Interstate Technology and Regulatory Council (ITRC) 2012 guidance document entitled *Incremental Sampling Methodology*, which was revised in January 2020.

CONTENTS

CONTENTS

Exhibits

ACRONYMS

95% UCL	95% Upper Confidence Limit
ADEC	Alaska Department of Environmental Conservation
COPC	contaminant of potential concern
DL	detection limit
DU	decision unit
GPS	Global Positioning System
ISM	incremental sampling methodology
ITRC	Interstate Technology Regulatory Council
LOQ	limit of quantitation
MDL	method detection limit
MI	ISM
PAH	polynuclear aromatic hydrocarbon
PID	photo ionization detector
PM	project manager
PPE	personal protective equipment
RD	reference document
RL	reporting limit
RSD	relative standard deviation
SD	standard deviation
SDS	safety data sheet
SSHP	site safety and health plan
UST	underground storage tank

1 RATIONALE AND SAMPLING THEORY

Incremental Sampling Methodology (ISM) is performed to address the fundamental error inherent in discrete sampling practices. Because soil is typically a non-homogenous matrix and contaminant plumes tend to follow preferential pathways rather than being evenly distributed, there is likely to be variability in analytical soil results which misrepresent the true contaminant concentrations. From a statistical viewpoint, discrete soil results can be meaningless unless the target analytes are uniformly distributed within the soil matrix. ISM sampling addresses this variability by using a systematic random sampling process to create a composite sample for which the mean contaminant concentrations are representative of the entire area in question; hence forth known as a decision unit (DU). ISM sampling is procedurally identical to Multi-Increment™ sampling as described in the previously published Alaska Department of Environmental Conservation (ADEC) guidance.

Historically the goal of environmental soil sampling has been to determine the highest concentration of a target contaminant onsite, for risk assessment purposes. This mode of thinking is applicable to homogenous matrices but is fundamentally flawed when dealing with a matrix as variable as soil. When viewed at the particulate level, soil is an aggregate of minerals, organic matter, water, and possibly contaminants of potential concern (COPCs). Some of these COPCs may exist as independent particles, such as with lead and other heavy metals. The quantity of soil extracted for analysis in an analytical laboratory is usually on the order of a few grams, meaning that the presence or absence of these particles can severely bias the results. Depending on the soil particles selected for extraction, the potential concentration of contaminants could be close to 100%, even if those contaminants constitute only a small fraction of the soil matrix. Additionally, a second analysis of the same initial sample volume could yield a drastically different result. A better method of determining risk of exposure for a non-homogenous matrix is to ascertain the mean concentration of a given contaminant within a defined area of similar composition.

ISM sampling seeks to determine the mean concentration of COPCs within a DU, by subdividing the DU into equal-sized units aligned in a grid configuration and collecting a random subsample of equal volume from each grid unit. These individual subsamples are then composited, sieved, and subsampled again to generate a single representative sample for the entire DU. Replicate samples may be collected from the same DU via the same method, to assess the amount of agreement between the results. The precision between these results is used to determine the overall representativeness of the sample. This process results in the derivation of a statistically defensible mean analyte concentration within the sampled area.

2 SCOPE AND APPLICABILITY

This procedure is followed when collecting ISM soil samples within defined and approved DUs on environmental project sites. ISM samples are collected when it is necessary to determine the nature and mean concentrations of COPCs present within the entire DU.

Sample collection frequency and location/depth are determined via a systematic random sampling process that must be detailed in an approved Work Plan, Proposal, Scope of Services, or other project-specific management documents. However, the following guidance documents are typically used to inform the collection procedure for ISM soil samples:

- ADEC Field Sampling Guidance, dated August 2019
- ITRC Incremental Sampling Methodology, dated February 2012

ISM soil sampling, according to this reference document (RD), is applicable to surface and subsurface soil sampling, excavations, UST removal, stockpile or waste characterization sampling, or any other related task where DU boundaries can be clearly defined.

3 RESPONSIBILITY

The Project Manager (PM) is responsible for ensuring that ISM sampling methodology meets ADEC requirements and is carried out in an unbiased and statistically defensible manner. The PM must also determine that the designated DUs are appropriately defined and based on the best available information. The PM will document that ISM samples are collected in accordance with this RD and any site-specific or project-specific planning documents.

It is the responsibility of the field technician to request the appropriate laboratory containers, coordinate with the analytical laboratory, and collect the samples in general accordance with this RD.

4 REQUIRED MATERIALS/EQUIPMENT

The materials required for this RD include the following:

- Laboratory-supplied jars appropriate for each analysis requested
- Vials of methanol and/or other sample preservatives, as applicable
- Trip blank, as applicable

- Temperature blank
- Shannon & Wilson sample labels
- Soil sample extraction tools yielding a defined volume, such as Terra Core™ samplers
- Tool box with tape measure, hand trowel, rock hammer, and other tools as applicable
- Pin flags or stakes
- Decontamination setup: typically (1) water with Alconox detergent, (2) rinse water, and (3) deionized (DI) water but modified as needed per project requirements
- Project-specific field forms
- Chain-of-Custody forms
- Personal protective equipment (PPE) such as nitrile gloves and safety glasses
- Paper towels, oil and/or water sorbent pads as needed
- Sample packing, as required: bubble wrap, sorbents, plastic bags, etc.
- Sample cooler, with frozen ice-substitute

5 DU DESIGNATION

A project site may consist of one or more DUs, which are determined based on historical information and/or field investigation. The boundaries of a DU must be defined based on knowledge of site-specific conditions such as soil composition, site use, potential exposure pathways, proximity to known releases, and/or field-screening results. As a rule, a DU footprint should not exceed 10,000 square feet. When sampling soil stockpiles, 250 cubic yards should be treated as the upper limit for a single DU; with more DUs designated as needed for large stockpiles. An important factor to consider is that a DU has three dimensions, and it may be necessary to define several vertically stacked DUs if contaminant concentrations are thought to be variable with depth. A DU must encapsulate an area for which the intended use, expected contaminant concentrations, and soil properties are similar. For example, the immediate contaminant release site must be a unique DU, while the surrounding areas should be broken up into separate DUs based on site conditions and project goals.

5.1 Historical Site Information

Before designating a DU, the environmental professional should compile all available information on the site. Information such as spill reports, interviews with personnel present during the release, property zoning information, and site plans/schematics can all provide insight into where contamination is likely to be present.

5.2 Field-Screening

Field-screening may be employed as a means of identifying possible DUs. Spill delineation based on PID results can be used to define the boundaries of the release area DU. Similarly, high PID readings in an area isolated from the primary release may imply a secondary source of contamination, which must be treated as a separate DU.

5.3 DU Delineation and Approval

When the environmental professional has determined how they would like to divide the site into DUs, they must seek approval from the PM and relevant regulatory agencies. Upon approval of the proposed DUs, the environmental professional must collect accurate boundary measurements by either recording GPS coordinates at the DU corners or measuring the distance from those corners to permanent structures.

6 SAMPLING PROCEDURE

The process of collecting the samples is not dissimilar from discrete sampling, with the primary difference being the frequency of sample locations and the quantity of soil collected. In broad strokes, the process involves dividing the decision unit into a grid, sampling each grid cell, compositing the subsamples, and repeating the process for replicate samples as necessary. Procedural details are provided in the following subsections.

6.1 DU Sampling Grid Creation

Before sampling can commence, the DU must be subdivided into a grid of equally sized cells. The number of these cells is variable, but ADEC guidance states that 30 grid cells should be considered a minimum for a representative sample. The total area encapsulated by each grid cell is at the discretion of the environmental professional, but should provide sufficient resolution to capture the spatial variability of the DU. The following formula may be used to estimate the dimensions of each grid cell:

Equation 1: Grid cell dimension estimation

Equation	Variable and Definition	
$X = \sqrt{\frac{A}{N}}$	X	Length and width dimensions of the resulting grid cell
	A	Total area of the DU
	N	Total number of desired grid cells

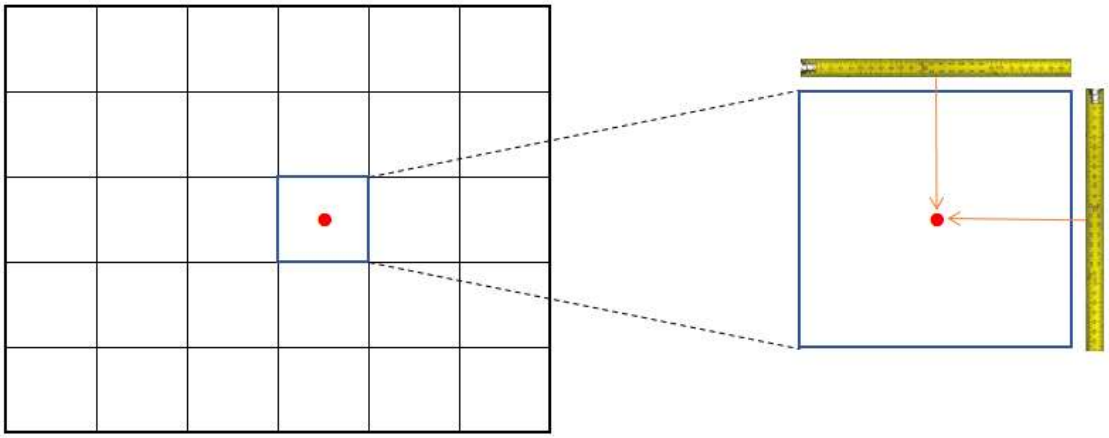
Once a sampling grid has been established, it should be physically represented in the field to promote accurate sampling. This can be accomplished in many ways including pin flags, marker stakes, twine, barrier tape, and/or spray paint.

Exhibit 1: Example sampling grid

6.2 Systematic Random Sampling

When performing the actual sampling, the environmental professional must systematically collect a quantity of soil of roughly equivalent volume from each grid cell within the DU. The location of these sample points within the grid cells must be determined randomly. The recommended method by which to accomplish this is to lay a tape measure along the X and Y axis of a grid cell. A die or random number generator can then be used to ascertain a random value which corresponds to increments on the tape measure.

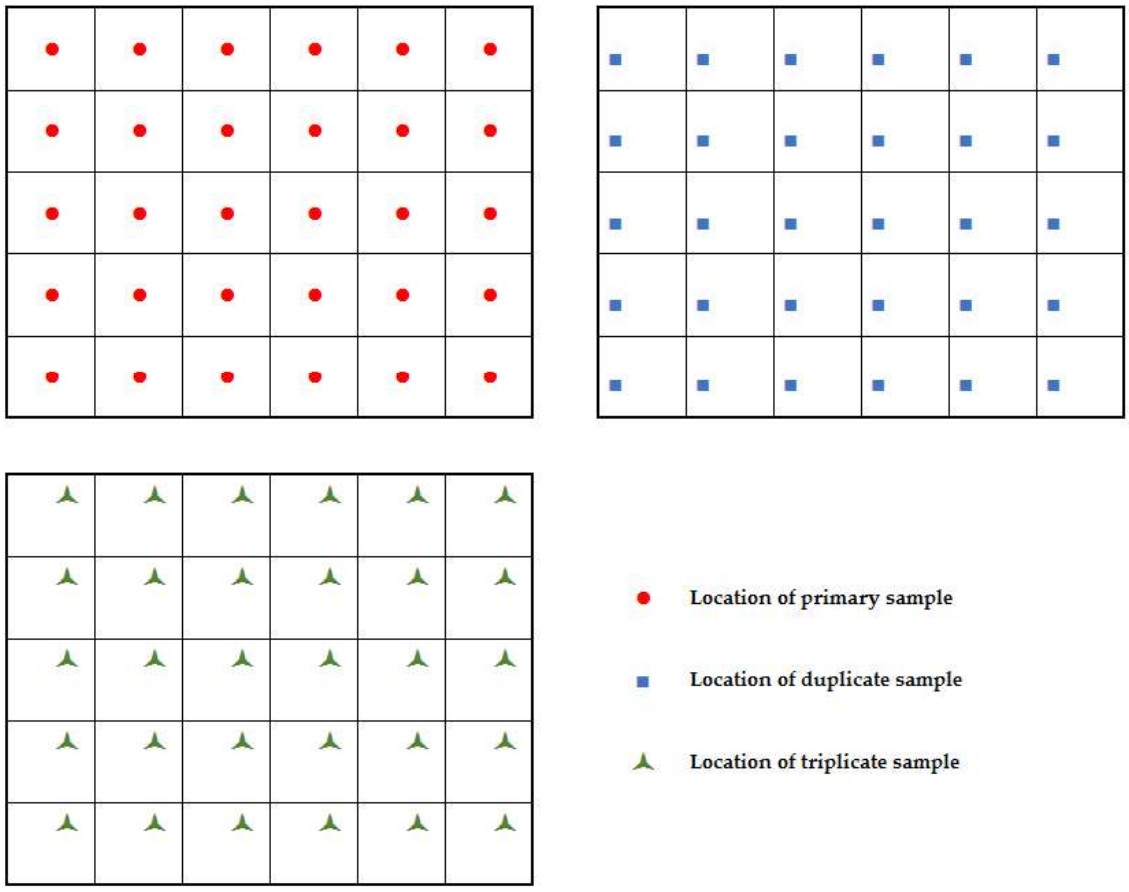
Exhibit 2: Random sample location determination



The sample location within the grid cell must be determined randomly. A die or random number generator is recommended for determining the X, Y, and Z coordinates of the sample location.

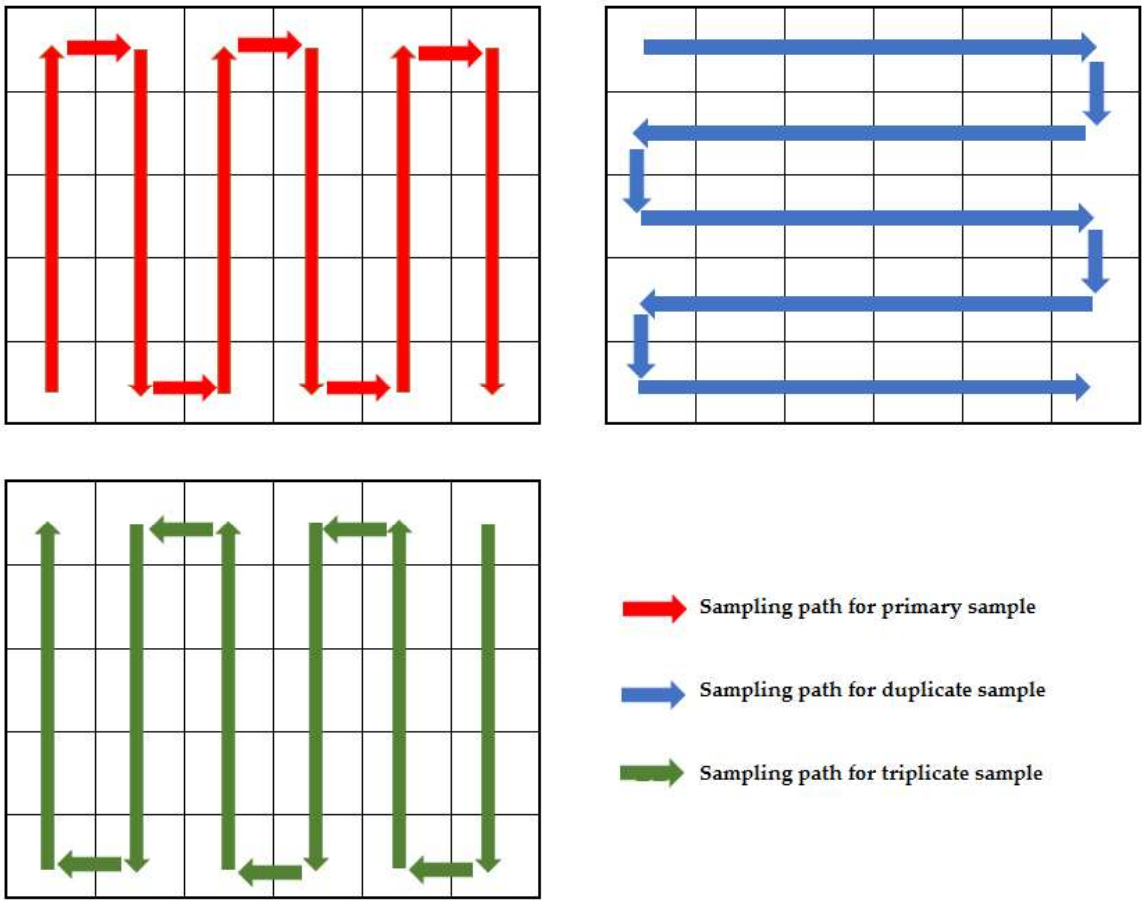
Once the random sample location has been determined within the grid cell, that same location is used when sampling all remaining grid cells within the DU. This process may be repeated for replicate samples, such that a new random sampling location is determined for each (Exhibit 3).

Exhibit 3: Random sampling locations for replicate samples



The systematic order in which the grid cells are sampled should be different for each of the replicate samples (Exhibit 4). While all grid cells within the DU will be sampled during each process, changing the order in which they are sampled reduces procedural bias.

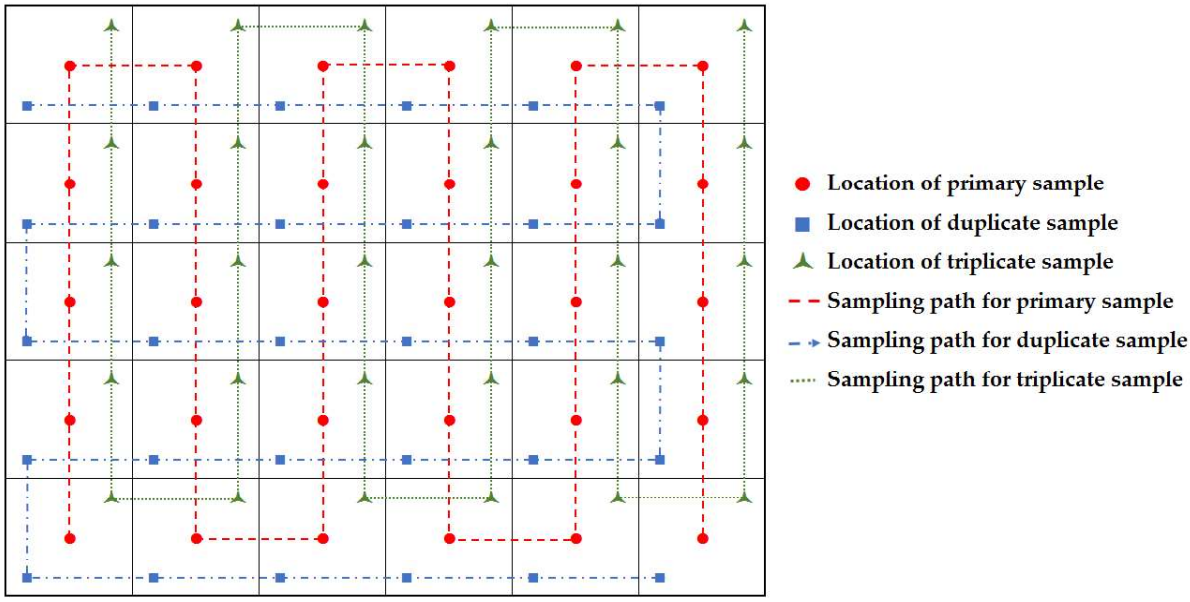
Exhibit 4: Systematic approach to sampling grid cells



The soil extracted from each grid cell should be composited with the soil from all other grid cells for that replicate sample. The end result should be a single unique container for each replicate sample.

By collecting soil from unique locations within the grid cells for each of the replicate samples, the total amount of DU surface area coverage is enhanced (Exhibit 5).

Exhibit 5: DU coverage after triplicate samples are collected



The frequency of replicate sample collection is determined by the number of DUs being sampled, and through consultation with the ADEC.

6.2.1 Replicate Samples

Duplicate and triplicate samples are collected to verify the representativeness of the ISM sample. The representativeness is assessed by calculating a relative standard deviation (RSD) and 95% upper confidence limit (95% UCL) for the detected analytes. For this reason, the DU from which replicate samples are collected must be chosen based on where contaminants are most likely to be encountered; as non-detect results cannot be used for RSD calculations. A ISM sample taken from a site consisting of a single DU must always be collected in triplicate. For sites consisting of multiple DUs, replicate samples must be collected at a minimum rate of 10%. ADEC may require a higher rate of replicate sample collection; however, this will be determined during the work plan approval process.

6.3 Sample Collection

When collecting subsamples from each grid cell, it is important to collect roughly the same quantity from each cell. Because the analytical results will represent the mean contaminant concentrations for the entire DU, each grid cell must be represented equally in the composite sample. Collecting more soil from one or more grid cells will bias the results, giving more weight to those afore mentioned cells.

To ensure that an equal volume of soil is collected from each grid cell, the environmental professional should use a standardized tool, such as a Terra Core Sampler™ or other small-volume soil core sampler (Exhibit 6).

Exhibit 6: Example soil sampling tools

The subsamples should then be deposited in a clean bucket, large sealable bag, or otherwise sterile container for transport. However the samples are containerized, there should be one unique and clearly labeled sample mass for each of the replicate samples. An exception to this rule is when volatile analyses are requested.

6.3.1 Volatile Sample Collection

If volatile analyses are being requested, a secondary volume of soil must be collected from each sample point and immediately preserved in the field. The laboratory must supply pre-weighed containers of sufficient capacity, such that at least five grams of soil from each grid cell can be contained and preserved with the proper amount of preservative (usually methanol). The soil extracted by the coring tool should be ejected directly into the laboratory supplied container. That container must either already contain the preservative, or the preservative must be immediately added. The sample container must remain open no longer than is necessary to add the extracted soil and, if needed, the preservative. The laboratory may elect to provide several smaller containers for the volatile sample volume in lieu of a single larger one. It is acceptable to divide the volatile sample amongst several containers because it is incumbent on the laboratory to randomly subsample the containers and composite the subsampled aliquot.

7 EQUIPMENT DECONTAMINATION

Because the goal of ISM sampling is to arrive at a mean contaminant concentration that is representative of the entire DU, it is not necessary to decontaminate sampling equipment

between grid cells of the same DU for the same sample. However, sampling equipment should be decontaminated prior to collecting replicate samples within the DU. Reusable sampling equipment must always be decontaminated prior to use in sampling additional DUs.

7.1 Decontamination Procedure

Equipment decontamination procedures are detailed in RD-B13. Typically, reusable equipment for ISM sampling includes hand tools such as a small-volume soil core sampler. Decontamination of these hand tools involves:

- Scrubbing the tool with a water/detergent solution;
- Washing the tool in a tap-water bath; and
- Rinsing the tool with DI water.

Depending on the type and severity of the release, it may be necessary to decontaminate PPE when moving between DUs. Personnel decontamination procedures, if necessary, will be determined on a site-specific basis and must be detailed in an approved work plan.

8 FIELD DOCUMENTATION

Shannon & Wilson personnel will document relevant field information such as field-screening results, site observations, and sample collection details using standard field forms or the field notebook. The field technician will generate a site diagram which will include at a minimum:

- swing ties from DU corners to permanent features or
- DU corners marked with GPS points;
- field measurements of DU boundary dimensions;
- DU grid cell dimensions;
- Method of random sample point determination and associated coordinates;
- notes or diagrams of sampling paths for the replicate samples;
- The date and time of sample collection;
- descriptions of photographs taken at the site.

Shannon & Wilson maintains custody of the samples until submitting them to the analytical laboratory. The field technician will complete a Chain-of-Custody form at the time each cooler is packed for submittal to the laboratory. Environmental Sample Handling is discussed under a separate RD.

8.1 Field Documentation Review

The Project Manager will review the Sample Collection Log or other field forms pertaining to the activities under their supervision. The elements of this review will include technical content, consistency, and compliance with the project plans and RDs.

8.2 Field Documentation Archive

At the completion of the project, original field notes including information pertaining to soil sample collection and chain-of-custody records will be stored on a red backing in the hard copy of the project file. Project file lifetime is established according to standard Shannon & Wilson file-retention procedures.

9 SAMPLE PROCESSING AND SUBSAMPLING

After the ISM sample has been collected in the field, it must be processed, subsampled, and submitted to the analytical laboratory within the applicable method holding time(s). The sample processing involves drying the sample, sieving out the coarse material, and preparing the sieved soil for subsampling. Subsampling involves randomly sampling the fine material sieved from the field sample to submit to the analytical laboratory. The Shannon & Wilson soils lab is equipped to perform these services. However, many analytical laboratories (including SGS North America) are also able to perform these services for an additional fee.

9.1 Sample Processing

Only fine-grained soil can be used for analysis at the laboratory. In order to subsample the fine material, the soils lab performing the sample processing must sieve the entire bulk sample with a #10 (2mm) sieve into a clean container. However, samples collected in the field are often moist or wet. In these instances, the sample must first be dried before it can be sieved. Drying of the sample, if necessary, must be done via passive air-drying at ambient room temperature; as baking the sample will invalidate the results.

To dry the sample, the entire sample mass must be spread on a tray at a roughly uniform thickness of 1/2 to 1 inch. The soil may need to be turned at regular intervals to expedite the drying process. Sample drying may require several days, so it is imperative that processing begin as soon as is feasible after collection in the field. To preserve sample integrity, drying times should not exceed three days. It is important to remember that this process only pertains to non-volatile analyses (excluding pesticides and PAHs); a volatile sample must never be dried or sieved.

9.2 Subsampling

Subsampling is performed on the fine material sieved from the bulk sample via the following steps:

- Spread the fine-grained soil on a clean steel tray at a uniform depth of roughly 1/2 inch;
- Divide the tray area into 30 to 50 equally-sized subsections using a clean spatula or other edged tool.
- Using a tablespoon or other defined measuring tool, scoop approximately 1 gram (1/2 tablespoon) from each subsection and place the scoops into a single sample jar;
- Repeat the process to collect a second sample volume to submit to the laboratory for percent moisture analysis.
- The sample mass submitted to the laboratory must contain at least 30 grams (1 ounce) of soil, or more as needed per analysis.

10 SAMPLE REPRESENTATIVENESS AND REPORTING

Replicate samples are collected so that an RSD and 95% UCL may be calculated upon receipt of the analytical results. The RSD, represented as a percentage, is used to determine the amount of agreement between replicate results. The RSD is calculated via the following formula:

Equation 2: Relative standard deviation

Equation	Variable and Definition	
$RSD(\%) = \frac{SD}{\mu} \times 100$	RSD	Relative standard deviation
	SD	Standard deviation
	μ	Arithmetic mean of sample results for a target analyte

Where standard deviation (SD) is defined as:

Equation 3: Standard Deviation

Equation	Variable and Definition	
$SD = \sqrt{\frac{\sum \lvert x - \mu \rvert^2}{N-1}}$	SD	Standard deviation
	x	Result for a target analyte for which the SD is to be calculated
	μ	Arithmetic mean of the data set for the target analyte
	N	Number of results in the data set for the target analyte

And the arithmetic mean is defined as:

Equation 4: Arithmetic mean

Equation	Variable and Definition	
$\mu = \frac{1}{N}\sum_{i=1}^{N} x_i$	μ	Arithmetic mean of the data set for the target analyte
	N	Number of results in the data set for the target analyte
	x	Result for a target analyte for which the mean is to be calculated

ADEC requires that the RSD be 30% or less before the data can be considered sufficiently precise. If the RSD is greater than 30%, ADEC considers the representativeness of the sample to be questionable. The RSD may be elevated when the detected analyte concentrations are near or below the limit of quantitation (LOQ) or relevant reporting limits (RLs). In these situations, the data must be evaluated on a case-by-case basis.

The 95% UCL is a value derived from the results of the three replicate samples for each target analyte. This value represents a statistically derived concentration for a target analyte for which there is a 95% probability that the true mean analyte concentration does not exceed within the given DU. The 95% UCL for each analyte should be compared to the applicable regulatory limits during reporting. The method by which the 95% UCL is derived is based on whether the concentrations of target analytes are assumed to be normally distributed or skewed within the soil mass. This assumption can be made by calculating the coefficient of variance (CV). The CV is calculated via the following formula (Equation 5):

Equation 5: Coefficient of Variance

Equation	Variable and Definition	
$CV = \frac{SD}{\mu}$	CV	Coefficient of variance
	SD	Standard deviation
	μ	Arithmetic mean of sample results for a target analyte

Typically, if the CV for a given analyte is found to be between 0 and 1.5, then that analyte is assumed to be normally distributed within the sample. Conversely, if the CV is between 1.5 and 3.0, the distribution of that analyte within the sample can be assumed to be skewed. A CV >3.0 would imply a heavily skewed distribution.

For an analyte exhibiting a normal distribution, the 95% UCL should be calculated using the one-sided Student's-t factor. This is accomplished via the following formula (Equation 6):

Equation 6: 95% Upper Confidence Limit Using Student's t-factor

Equation	Variable and Definition	
$95\%\ UCL = \mu + \frac{(t \times SD)}{\sqrt{N}}$	μ	Arithmetic mean of the data set for the target analyte
	N	Number of results in the data set for the target analyte
	t	95% one-sided t-distribution factor (e.g. for N=3, t=2.92)
	SD	Standard deviation

For an analyte exhibiting a skewed distribution, the 95% UCL should be calculated using the Chebyshev's theorem. This is accomplished via the following formula (Equation 7):

Equation 7: 95% Upper Confidence Limit using Chebyshev's Theorem

Equation	Variable and Definition	
$95\%\ UCL = \mu + \sqrt{(1/\alpha) - 1} \times \frac{SD}{\sqrt{N}}$	μ	Arithmetic mean of the data set for the target analyte
	N	Number of results in the data set for the target analyte
	1 - α	Decision confidence level (*α = 5% or 0.05*)
	SD	Standard deviation

Assuming a Type 1 error tolerance of 5%, the expression $\sqrt{\left(\frac{1}{\alpha}\right) - 1}$ simplifies down to the constant 4.36 for computational purposes.

By either method, replicate data sets that contain one or two non-detect results will substitute the laboratory's most sensitive detection limit (normally the method detection limit [MDL] or detection limit [DL]) for the non-detect result during RSD and 95% UCL calculations.

11 HEALTH AND SAFETY

A Site Safety & Health Plan (SSHP) and/or Job Safety Analysis worksheet (JSA) will be prepared for each project and will discuss safety issues involved with environmental sampling procedures. Any staff working on the project site must read and abide by the SSHP and sign the SSHP acknowledgement form.

Personnel using this procedure will utilize PPE in accordance with these plans. ISM sample collection typically requires a minimum of Level D PPE, including nitrile gloves and safety glasses, to be worn while working.

Safety Data Sheets (SDSs) will be provided for any chemicals that will be used on the project or that are known possible exposure risks for the site. For example, ISM soil sample collection for determination of volatile compounds requires a methanol preservative.

Personnel using this procedure must be trained on the information contained in the SDSs, engineering controls, and any required PPE. Additional information is included in the SSHP.

12 TRAINING AND PREREQUISITES

ISM soil sampling must be completed by a State of Alaska Qualified Sampler per 18 AAC 75.333[c] and 18 AAC 78.088[b], or a supervised individual in training to become a Qualified Sampler. Per ADEC, a Qualified Sampler "has a four-year undergraduate or a graduate degree from a nationally or internationally accredited postsecondary institution in environmental science or another related scientific field and has at least one year of professional experience in contaminated site characterization and cleanup activities under the direct supervision of a qualified environmental professional completed after the degree described in this subparagraph was obtained."

Before performing this procedure independently, field staff will also be trained in ISM sample collection by an experienced staff member. Training will entail reading this RD and at least one day of supervised, on-the-job instruction.

13 QUALITY ASSURANCE / QUALITY CONTROL

Field quality assurance (QA) and quality control (QC) practices are designed to verify the quality of the work and the overall representativeness of the sample results. By taking steps to proactively address common sources of error and by following relevant QA procedures, we can be confident that the data we provide meets our professional standard and those of relevant regulatory agencies.

13.1 Mitigation of Potential Problems

- Use a standardized tool when collecting subsamples to ensure that an equivalent amount of soil is collected from each cell.
- To prevent cross-contamination between samples and/or DUs, follow decontamination procedures and use disposable supplies.

- Since non-volatile samples will need to be dried, sieved, and subsampled, be sure to submit the sample for processing as soon as possible to avoid method holding time exceedances.
- To minimize transposing errors in sample names, label sample containers prior to sample collection with at least the sample ID, date, and time.
- Complete a Sample Collection Log, COC form, labeled site sketch, and/or other record of sample collection information while in the field.
- Photograph important site features and sample locations using perspective photographs and make notes in the field notebook describing those photographs.

13.2 Applicable Quality Assurance Manual Procedures

- QP 05 Preparation of Field Activity Reports
- QP 11 Sample Control and Retention
- QP 13 Document Control and Retention

13.3 Other References

The following guidance documents are typically used to guide the collection of ISM soil samples:

- ADEC Field Sampling Guidance, dated January 2022
- ITRC Incremental Sampling Methodology, dated February 2012

The following RDs provide further information for activities mentioned herein:

- RD-A11 Field Notes & Documentation
- RD-A31 Basic Site Map
- RD-B11 Environmental Sample Handling
- RD-B13 Equipment Decontamination
- RD-B14 IDW Management

14 DOCUMENT HISTORY AND VERSION CONTROL

Version	Date	Reason/Description of Change(s)	Author	Reviews
0.1	5/11/18	New	APW	
1.0	10/18/19			MSL
1.0	10/18/19	Final Approved		CBD
1.1	5/18/21	Added contingency for non-normally distributed data	APW	
1.2	3/15/23	Updated dates of references	DHF	