FINAL
Limited Site Assessment and Hazardous Building Materials Survey Former Arctic Village Power Plant Arctic Village, Alaska

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Submitted To:
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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ACM	Asbestos-containing material
ADEC	Alaska Department of Environmental Conservation
AK	Alaska Method
ASTs	Aboveground storage tanks
bgs	Below ground surface
CFR	Code of Federal Regulation
CSM	Conceptual Site Model
DBAC	Brownfield Assessment and Cleanup
DQOs	Data quality objectives
DRO	Diesel range organics
EHS-Alaska	EHS-Alaska, Inc.
EPA	Environmental Protection Agency
GPS	Global Positioning System
GRO	Gasoline range organics
HBM	Hazardous building materials
HID	High intensity discharge
LCS/LCSD	Laboratory control sample/laboratory control sample duplicate
mg/kg	Milligrams per kilogram
MS/MSD	Matrix spike/matrix spike duplicate
PCBs	Polychlorinated Biphenyls
PID	Photoionization detector
ppm	Parts per million
RCRA	Resource Recovery and Conservation Act
ROM	Rough order of magnitude
RRO	Residual range organics
SGS	SGS North America, Inc.
USGS	U.S. Geological Survey
URS	URS Corporation
VOCs	Volatile organic compounds
XRF	X-ray fluorescence

LIMITED SITE ASSESSMENT AND HAZARDOUS BUILDING MATERIALS SURVEY FORMER ARCTIC VILLAGE POWER PLANT ARCTIC VILLAGE, ALASKA

1.0 INTRODUCTION

This report presents the results of our limited site assessment and hazardous building materials (HBM) survey conducted at the Former Arctic Village Power Plant, Arctic Village, Alaska. The site is listed on the Alaska Department of Environmental Conservation (ADEC) contaminated site database as File No. 700.38.002.

The project was conducted under Shannon & Wilson's ADEC Hazardous Substance Assessment and Cleanup Term Contract 18-8036-03. Authorization to proceed was received from ADEC on August 31, 2015 with Notice to Proceed No. 18-8036-03-034. The project was conducted in general accordance with our September 4, 2015 work plan which was approved by Ms. Janice Wiegers of the ADEC, in the form of an email dated September 10, 2015.

2.0 BACKGROUND

The property is located west of Main Street and south of Airport Street in Arctic Village, Alaska. According to the U.S. Geological Survey (USGS) Arctic A-3 quadrangle, the site is located within Section 24, Township 15 South, Range 28 East, Umiat Meridian, Alaska. A vicinity map showing Arctic Village and the surrounding area is included as Figure 1. Figure 2 is a site plan depicting general site features of the property.

The property is owned by the Native Village of Venetie Tribal Government and is occupied by an abandoned building. The structure was constructed on pilings in 1976 for use as a washeteria. The structure was later utilized as an electrical power generation plant, maintenance shop, and storage area. Three 6,000-gallon aboveground storage tanks (ASTs) were formerly located north of the structure. Three electrical generators and a 120-gallon day tank were located inside the structure.

The ADEC visited the site in 1994 and documented soil staining in the vicinity of the ASTs and miscellaneous drums. They also observed fuel saturated soil beneath the structure and broken batteries.

URS Corporation (URS) documented several recognized environmental conditions associated with the property and surrounding properties in a *Phase I Environmental Site Assessment,*

Former Public Health Service Building, Arctic Village, Alaska report dated September 11, 2007. Past releases of oil, diesel fuel, anti-freeze, chlorine, and fluoride were documented at the site, including a release of approximately 4,000 to 5,000 gallons of diesel fuel inside the structure. In addition, a diesel fuel seep was reportedly documented southwest of the property. An out-of-use electrical transformer surrounded by staining was also reported in the building during the 2007 site visit. URS recommended completing a Phase II site investigation of the property.

The Native Village of Venetie Tribal Government requested assistance from the ADEC through its Brownfield Assessment and Cleanup (DBAC) Program in 2015 to assess contamination associated with historical use of the facility with a goal of demolishing the abandoned former power plant building and converting the property to a community greenspace and gathering area. The project purpose is to conduct a property assessment and make recommendations for assessment and cleanup of the subject property.

3.0 FIELD ACTIVITIES

On September 22, 2015 Shannon & Wilson conducted a limited site assessment that included advancing hand borings and collecting soil samples. The limited site assessment was conducted by an ADEC-qualified environmental professional, as defined by 18 Alaska Administrative Code (AAC) 75.333. SGS North America, Inc. (SGS) of Anchorage, Alaska provided analytical testing of the soil samples under subcontract to Shannon & Wilson.

Soil sample locations, screening results, and soil descriptions are summarized in Table 1. Field notes taken during the site activities are included in Appendix A. Global position system (GPS) coordinates of the soil sample locations are included on Figure 2. However, swing-tie measurements, presented in Appendix A, are considered to be more accurate than the GPS coordinates due to the GPS' reported accuracy of 12 to 30 feet. Photographs of the sampling activities are included in Appendix B.

3.1 Scope Modifications

The following changes to the scope presented in the work plan was implemented due to conditions encountered in the field:

- The work plan stated that 10 surface soil analytical samples would be collected (seven from outside the building and three from beneath the building). Due to frozen soil conditions, only six analytical samples were collected. The ADEC was notified of this change during our field activities.

- The work plan included scope for three hand borings to a maximum of 8 feet bgs or until permafrost was encountered. Due to frozen surface soil conditions, the hand borings were advanced to a maximum of 1.5 feet below ground surface (bgs).

3.2 Soil Sampling

To delineate the lateral extent of surface soil contamination, 20 field screening samples (Samples SS1 through SS20) were collected from areas exhibiting evidence of contamination (i.e. visible staining, fuel odors), the locations of the former ASTs, and beneath the on-site structure. Samples SS1 through SS14 were collected from outside the footprint of the building and Samples SS15 through SS20 were collected from beneath the building.

The samples were collected using a 3-inch diameter steel bucket auger and/or shovels. Field screening samples were collected with a clean stainless steel spoon from undisturbed soil. The sampling equipment, hand auger, and hand tools were decontaminated between each sample location. Due to frozen soil conditions, the soil samples were collected from between approximately 0.5 to 1.5 feet bgs. The approximate soil sample locations are shown on Figure 2.

The soil samples were visually evaluated for soil type and "screened" for volatile organic compounds (VOCs) using a photoionization detector (PID). The PID was calibrated before screening activities with 100 parts per million (ppm) isobutylene standard gas. Headspace samples were collected in re-sealable plastic bags by filling them with freshly exposed soil to one-half of their volumes and then sealing the top. The headspace samples were warmed to a common temperature of approximately 40º Fahrenheit prior to screening. Screening was accomplished by inserting the PID sampling probe into the air space above the soil in the bag. The field PID readings were obtained within one hour of the time of sample collection. The results of the field screening and descriptions are included in Table 1.

Six analytical soil samples were collected from locations with the highest PID readings. The analytical soil samples tested for volatile constituents were collected using methanol preservation. In accordance with the method, at least 25 grams of soil were quickly placed into a laboratory supplied 4 ounce jar that had been pre-weighed. Afterward, 25 milliliters of reagent grade methanol was added to submerge the soil. The methanol extracts the hydrocarbons from the soil at the time of sampling, thereby reducing the possible loss of volatile constituents prior to sample analysis. The samples were transferred to the appropriate laboratory-supplied jars using decontaminated stainless steel spoons, and transferred to the laboratory in a cooler with ice packs using chain-of-custody procedures. The analytical sample locations were documented with swing tie measurements taken from permanent site features and GPS coordinates. Sample collection data and visual soil descriptions are included in Table 1.

Upon the completion of sampling, all excavated material was backfilled into the respective sample location, with excess material spread on the ground surface near the backfilled holes. Water used to decontaminate the hand auger and shovel was discharged to the ground surface at the site.

4.0 LABORATORY ANALYSIS

Based on the field screening results, a total of six soil samples were collected and submitted to SGS for laboratory analysis. The samples were analyzed for gasoline range organics (GRO) by Alaska Method (AK) 101, diesel range organics (DRO) by AK 102, residual range organics (RRO) analysis by AK 103, VOCs by Environmental Protection Agency (EPA) Method 8260B, and Resource Recovery and Conservation Act (RCRA) metals by EPA Method 6020A. In addition, Samples SS11 and SS16 were analyzed for polychlorinated biphenyls (PCBs) by EPA Method 8082A.

5.0 SUBSURFACE CONDITIONS

From the ground surface to approximately 1.5 foot bgs, the site consisted of frozen silty sands. Groundwater was not encountered during this limited site assessment.

6.0 DISCUSSION OF RESULTS

The analytical results were compared to the ADEC cleanup levels contained in the November 6, 2016, 18 AAC 75 regulations. According to the ADEC, sites located north of latitude 68º North are considered within the "Arctic Zone". The GRO, DRO, and RRO soil cleanup levels are based on the ADEC Method One levels listed in 18 AAC.75.341, Table A2. The cleanup levels for the remaining tested analytes are based on the ADEC Method Two cleanup levels listed in 18 AAC 75.341, Table B1, for the "Arctic Zone". The applicable cleanup levels are provided in Table 2 with the associated sample results.

6.1 Soil Samples

DRO and RRO were detected in three (Samples SS11, SS16, and SS17) of the six soil samples at concentrations exceeding the ADEC Method One cleanup levels of 250 mg/kg and 2,000 mg/kg, respectively. The samples contained a maximum of 12,400 mg/kg DRO (Sample SS17) and 9,120 mg/kg RRO (Sample SS11). GRO was not detected in the project samples. PCBs were not detected in Samples SS11 and SS16. Four VOCs (toluene, xylenes, naphthalene, and/or trichlorofluoromethane) were detected in five project samples at concentrations less than the

ADEC Arctic Zone cleanup levels. RCRA metals were detected in each of the samples at concentrations less than the ADEC Arctic Zone cleanup levels.

6.2 Quality Assurance/Quality Control

The project laboratory follows on-going quality control procedures to evaluate conformance to applicable ADEC data quality objectives (DQOs). Internal laboratory controls to address data quality for this project include surrogate spikes, method blanks, matrix spike/matrix spike duplicates (MS/MSD), and laboratory control sample/laboratory control sample duplicates (LCS/LCSD) to determine recovery rates, precision, accuracy, and matrix bias. If a DQO was not met, the project laboratory provides a brief narrative identifying the problem in the Case Narrative of their Laboratory Report (See Appendix C).

A laboratory-prepared trip blank sample accompanied the project sample jars from the laboratory to the site during sampling activities and back again to SGS. The soil trip blank did not contain detectable concentrations of GRO or VOCs. These results suggest that the project soil samples were not cross-contaminated during sampling, shipping, or analysis of the samples. However, an estimated concentration of GRO was detected in the method blank. It is likely that the estimated concentrations of GRO in the project samples were a result of the sample analysis process. Therefore, the affected samples were reported as non-detect and flagged "B" on Table 2.

Shannon & Wilson conducted a limited data assessment to review the laboratory's compliance with precision, accuracy, sensitivity, and completeness to the data quality objectives. Shannon & Wilson reviewed the SGS data deliverables and completed the ADEC's Laboratory Data Review Checklist, which is included in Appendix C. In our opinion, no non-conformances that would adversely impact data usability for the objectives of this project were noted.

7.0 HAZARDOUS BUILDING MATERIALS SURVEY

EHS-Alaska, Inc. (EHS-Alaska) conducted a HBM survey of the former power plant on September 22, 2015. The interior and exterior of the structure were visually inspected to identify HBM. EHS-Alaska's findings are reported in their October 15, 2015 report titled *Hazardous Materials Assessment, Arctic Village Former Power Plant, Arctic Village, Alaska,* included as Appendix D.

7.1 Asbestos-Containing Materials

Thirty two samples were collected from the former power plant. The samples were analyzed using polarized light microscopy by EPA Method 600/M4-82-020. Thirteen of the 32 samples

were found to contain asbestos (defined as having over 1 percent asbestos content) and included the following materials:

- Joint compound;
- Green hard duct mastic; and,
- Black tar patch.

A comprehensive list of asbestos-containing material (ACM) identified in the September 2015 HBM survey, along with additional materials that were/are assumed to contain asbestos, is included in the Appendix D report.

According to EHS-Alaska, ACM in the building, including duct sealants and roof patching tars, are not considered friable in present condition, but may become friable if damaged. The joint compound on the gypsum board walls and ceilings contained asbestos and is considered friable in its current condition. The EPA requires that a trained asbestos worker remove all ACM that would be disturbed by the proposed demolition. Additionally, the owner (or owner's contractor) may need to develop a pre-demolition work plan.

Settled and concealed dusts were examined by EHS-Alaska's field inspector but analytical sampling of the dust was not conducted. Based on visual inspection and experience from similar buildings, the inspector opined that the settled and concealed dusts likely contain less than 1 percent asbestos and are not ACM.

7.2 Lead-Containing Materials

EHS-Alaska collected 20 discrete samples which were tested in-place using a NITON x-ray fluorescence (XRF) lead paint analyzer. Although, not included in the project scope, EHS-Alaska also analyzed two painted surfaces on a pump house located at Lillie Lake, about 4,000 feet southwest of the property. Reportedly, water was formerly pumped from the lake to the former power plant. A lead analysis summary and sampling locations are provided in Appendix C and D of the EHS-Alaska report. The highest lead concentrations were identified on the pump house building. The remaining samples collected from the former power plant were at concentrations less than 1.0 milligram per square centimeter (mg/cm^2) (the amount of lead required to classify paint as lead based).

Metallic lead items identified in the building included lead solder at copper piping joints and roof flashings, and batteries for various equipment. These lead-containing materials should be recycled or disposed of as hazardous waste.

Although broken batteries were previously observed at the site, batteries were not documented during the September 22, 2015 site assessment activities.

7.3 PCB- and Mercury-Containing Materials

EHS-Alaska conducted a limited visual inspection of light fixture ballasts and identified fluorescent light fixtures with PCB-containing ballasts. Not all fixtures were accessible, therefore, EHS-Alaska recommends inspecting all ballasts during removal. If they are not marked "No PCBs," either the manufacturer should be contacted to determine the presence of PCBs or it should be assumed the ballasts contain PCBs. PCB-containing materials must be handled and disposed in accordance with regulation 40 Code of Federal Regulations (CFR) Part 761 by personnel trained and certified as outlined in 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response [HAZWOPER]) and 8 AAC 61.

EHS-Alaska collected two bulk samples from the concrete floor adjacent to a transformer. According the Table 4A within the HBM survey report, PCBs were not detected in the bulk samples. A sketch of the locations of the bulk samples are included as Appendix D of the HBM survey report.

The only mercury-containing materials identified by the EHS-Alaska survey are fluorescent lamps and high intensity discharge (HID) lights. EHS-Alaska recommends all mercury-containing items removed from the building be disposed of as hazardous waste or recycled.

7.4 Other Hazardous Materials

EHS-Alaska identified refrigerators outside the building that may contain ozone depleting refrigerants. Ozone depleting substances are regulated by the EPA and must be removed by certified technicians, as defined by 40 CFR 82.152, prior to equipment disposal. Certification requires passing an EPA-approved test to earn a Section 608 Technician Certification through an EPA-approved certifying organization.

The wood floor surrounding the generators appeared soaked with fuel. Based on the quantity of debris present within the former power plant building, we could not accurately evaluate the extent of fuel saturated building materials. According to the ADEC Solid Waste Program, fuel soaked building materials can likely be placed in a permitted monofill, as long as the material is not overly fuel saturated. Burning the material in a smart-ash burner is a potential disposal option for overly fuel saturated building materials, which do not contain ACM or other hazardous building materials.

7.5 Fungal Growth

EHS-Alaska's field inspector performed a visual examination of the building for suspected fungal growth. Fungal growth was observed throughout the mechanical room, laundry room, and bathroom area. Water was entering the ceiling area above the mechanical room due to missing roof vents. Due to the black discoloration of most of the walls and ceilings due to what appears to be soot from the diesel generator, it was difficult for EHS-Alaska's field representative to visually verify the presence of suspect fungal growth throughout a large portion of the building.

7.6 Summary

The EHS-Alaska report comments on the regulatory constraints, provides estimated hazardous materials quantities, and presents recommendations for removal. In summary, the 2015 sampling effort documented ACM, lead-containing materials, mercury in fluorescent lamps, PCBs in light ballasts, suspect fungal growth, and refrigerants in various locations in the former power plant.

8.0 CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) was prepared to identify known and potential exposure pathways associated with petroleum hydrocarbons at the site. The CSM was developed using the ADEC's guidance CSM Scoping Form. The ADEC forms are included in Appendix E, with discussions of the potential exposure pathways provided below. The narrative includes descriptions of the site-specific considerations that increase or decrease the viability of each pathway at this site.

The highest documented DRO concentration (12,400 mg/kg) is only 100 mg/kg less than the most stringent ADEC Method Two cleanup level. For purposes of this CSM, we assume that DRO exceeding the ADEC Method Two Arctic Zone cleanup levels for ingestion and inhalation (12,500 mg/kg) is present at the site, although this was not verified in the 2015 samples. The rationale for this assumption is based on the large volume of the reported spills at the site, and data gaps/limitations of the 2015 sampling that suggest these samples may not be fully representative of the entire site.

8.1 Soil – Direct Contact

The incidental ingestion exposure route is considered complete due to the presence of DRO concentrations in soil between 0 and 15 feet bgs that potentially exceed the ADEC cleanup level.

The incidental ingestion exposure pathway is potentially complete for current residents, site visitors, and trespassers, and future commercial and construction workers.

8.2 Groundwater

Because contaminants are not expected to migrate to the groundwater due to the presence of permafrost, ingestion of groundwater is not considered an exposure pathway of concern at this site.

8.3 Air

Volatile contaminants have the potential to impact receptors through outdoor and indoor air inhalation. DRO is assumed to be present at concentrations above the ADEC Human Health cleanup level, which is the cumulative exposure pathway through dermal contact, ingestion, and inhalation of volatile and particulate compounds. The presence of volatile contaminant concentrations (DRO) in soil within the top 15 feet bgs creates a potentially complete outdoor air exposure pathway for current residents, site visitors, and trespassers, and future commercial and construction workers.

Although DRO-impacted soil has been identified at the site, Appendix D in the ADEC's October 2010 *Policy Guidance on Developing Conceptual Site Models* notes that the ADEC does not require evaluation of DRO for the indoor inhalation pathway. If structures are constructed within 30 feet of the documented petroleum contamination, other petroleum constituents (e.g. benzene, toluene, ethylbenzene, and xylenes [BTEX]; VOCs; and polynuclear aromatic hydrocarbons [PAHs]) may require evaluation for the indoor inhalation pathway.

8.4 Surface Water

Reportedly, surface water with a visible sheen has been observed at the site during snowmelt. Therefore, migration to surface water is considered a potentially complete exposure pathway for the subject site.

8.5 Other

Other impacted media, including sediment and biota, were not identified at the site.

8.6 CSM Summary

Currently complete or potentially complete exposure pathways, including direct contact with soil, surface water, and inhalation of indoor and outdoor air, have been identified at the site. It is

also recognized that changes in the site use or other site conditions may affect the viability of potential exposure pathways. In particular, the CSM will need to be re-evaluated and revised as necessary if demolition occurs at the site and/or a change in land use occurs.

9.0 DATA GAPS

The following is a list of data gaps identified for the site. Resolution of these data gaps may affect the conclusions and recommendations presented in this report and will likely be necessary to prepare a detailed cost estimate for site cleanup.

- Hand borings could not be advanced deeper than 1.5 feet bgs, with the majority of the sample locations being advanced to a maximum of 0.7 foot bgs. Therefore, it is unknown if higher contaminant concentrations are present at greater depths.
- The highest documented DRO concentration (12,400 mg/kg) is only 100 mg/kg less than the applicable ADEC Method Two Arctic Zone cleanup levels for ingestion and inhalation. Although unverified, there is a potential that DRO exceeding the ADEC Method Two Arctic Zone cleanup levels for ingestion and inhalation is present at the site.
- Reportedly, additional areas of surface soil staining is present at the site. Snow cover prevented the direct observation of much of the site and higher contaminant concentrations may be located at unobserved stained areas.
- Based on the limited sampling conducted, there is uncertainty regarding the representativeness of the soil sample results.
- Reportedly, surface water with a visible sheen has been observed at the site during snowmelt. The source of the potential sheening is currently unknown.

10.0 CONCLUSIONS/RECOMMENDATIONS

The project included a limited site assessment and HBM survey. The limited site assessment included advancing 20 surface soil hand borings at the site. Analytical soil samples were collected from six locations. Soil samples exceeding the ADEC Method One cleanup levels for DRO and RRO were documented at the site. The samples contained a maximum of 12,400 mg/kg DRO, which is 100 mg/kg less than the applicable ADEC Method Two Arctic Zone cleanup levels for ingestion and inhalation. Based on the documented concentrations of DRO and the limited sampling which was conducted during the limited site assessment, it is also assumed that soil exceeding the ADEC Arctic Zone cleanup level for DRO is present at the site.

Hazardous building materials identified in the on-site structure, included ACM, lead-containing materials, PCB- and mercury-containing materials, ozone-depleting refrigerants, and fungal growth. These materials will require special handling and disposal practices during the planned building demolition activities. The estimated quantities of hazardous building materials is present in Table 3.

10.1 Recommended Remedial/Characterization Actions

The recommended actions outlined below are based on the assumption that the desired re-use for the site is a community greenspace and gathering/potlach area. Other options may exist, and our opinions may require revision if additional characterization indicates the presence of additional areas of impacted soil or additional contaminants are documented.

10.1.1 Hazardous Building Materials

The building is currently unsecure and trespassers have vandalized the structure. As an interim measure to mitigate the risk associated with HBM we recommend implementing the following engineering controls until the building is property demolished and disposed offsite.

- Secure all building openings accessible without a ladder.
- Apply institutional controls to maintain site barriers (i.e. fencing) and notify potential site trespassers of known environmental conditions (i.e. signs). Conduct site inspections to verify condition of institutional controls.

It is our understanding that the Native Village of Venetie Tribal Government would like to demolish and remove the former power plant building from the site. Demolition and disposal of buildings containing hazardous building materials are controlled under a variety of Federal and State regulations and guidelines. Based on a letter dated September 12, 2016 from Ms. Trisha Bower of the ADEC Solid Waste Program, it is likely that the demolition debris, including ACM, can be placed in a permitted monofill. The letter is included in Appendix F. It is estimated that the asbestos volume is less than 250 cubic yards; therefore, Ms. Bower suggests preparing a One-Time Disposal of Asbestos Waste permit application and constructing a monofill to receive the demolition debris. This option is dependent upon the availability of local land suitable for the construction of a monofill and EPA/ADEC concurrence. A potentially less cost effective alternative is to segregate the ACM for transport off site and disposal at a permitted facility. Either disposal method will require the following:

- Preparation of a written safety plan, which may require an air monitoring program.

- Coordinate demolition and disposal activities with ADEC and/or EPA. Including notifying EPA 10 days prior to demolishing asbestos containing building materials.
- Use qualified personnel to handle HBMs.
- Lighting ballasts should be inspected, and those containing PCBs will need to be removed prior to demolition and be properly disposed of in accordance with local, state, and federal regulations.
- Prior to removal and disposal of fluorescent light bulbs and HID lamps from the building. The fluorescent light bulbs and HID lamps will require proper disposal as a universal waste or recycling. It is noted that the local Indian General Assistance Program representative typically assists with the disposal of fluorescent light bulbs and HID lamps in Arctic Village.
- If flaking or peeling paint is encountered, the loose paint must be removed by a certified worker.

10.1.2 Soil Management

Soil exceeding the applicable ADEC Method One cleanup levels is present at the site and potentially extends offsite. Therefore, following removal of the structure, soil cleanup activities may be warranted. Prior to preparing a soil cleanup plan we recommend conducting additional soil characterization to verify the extent of soil contamination exceeding the applicable ADEC Arctic Zone cleanup levels. Recommended tasks include:

- Prepare a site characterization work plan for ADEC review.
- Advance test pits with a backhoe or hand tools and collect analytical soil samples in an effort to delineate the horizontal and vertical extent of soil contamination.

Following the additional site characterization activities we also recommend evaluating potential remedial options and preparing a corrective action plan, as warranted. Remedial options include in-situ treatment using natural attenuation and/or active remediation, and removal and treatment. It our experience with similar sites, the most cost effective treatment method is frequently excavation and landfarming of contaminated soil. Soil impacted with diesel fuel can sometimes be effectively treated with natural attenuation/biodegradation which can take several years. Landfarming is relatively inexpensive, and consists of spreading the soil to a depth of one to two feet, and periodically tilling the soil. The limitation of landfarming is that the contaminated soil remains in the community, diligent maintenance and tilling is required, and

the process may take several years (or longer). More frequent tilling and/or adding nutrients has the potential to reduce treatment time. Soil removed from the site will also likely need to be replaced with imported fill to meet reuse objectives in a timely manner.

11.0 CLOSURE/LIMITATIONS

This report was prepared for the exclusive use of our client and their representatives. The findings we have presented within this report are based on the limited sampling and analyses we conducted for this project. As a result, the analyses and sampling performed can only provide you with our professional judgment as to the environmental characteristics of this site, and in no way guarantee 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 due to natural forces or human activity can occur on the site. 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 attachment in Appendix G, "Important Information About Your Geotechnical/Environmental Report," to assist you 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 except upon your authorization or as required by law.

We appreciate this opportunity to be of service and your confidence in our firm. If you have questions or comments concerning this report, please call Dan P. McMahon or the undersigned at (907) 561-2120.

SHANNON & WILSON, INC.

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TABLE 1
SAMPLE LOCATIONS AND DESCRIPTIONS

Sample Number	Date	Sample Location (See Figure 2)	Depth (feet bgs)	Headspace (ppm) ^	Sample Description
Soil Samples					
* SS1	9/22/2015	Southwest of former power plant	0.5-0.7	0.3	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
* SS2	9/22/2015	Location of former ASTs, north of former power plant	0.5-0.7	0.4	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS3	9/22/2015	Location of former ASTs, north of former power plant	0.5-0.7	0.2	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS4	9/22/2015	North of former power plant	0.5-0.7	0.2	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS5	9/22/2015	North of former power plant	0.5-0.7	0.0	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS6	9/22/2015	East of former power plant	0.5-0.7	0.2	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
* SS7	9/22/2015	Southeast of former power plant	1.3-1.5	0.4	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS8	9/22/2015	South of former power plant	0.5-0.7	0.0	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS9	9/22/2015	South of former power plant	0.5-0.7	0.0	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS10	9/22/2015	South of former power plant	0.5-0.7	0.0	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
* SS11	9/22/2015	South of former power plant	1.3-1.5	56	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS12	9/22/2015	Northwest of former power plant	0.5-0.7	0.2	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS13	9/22/2015	Location of former ASTs, north of former power plant	0.5-0.7	0.0	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS14	9/22/2015	North of former power plant	0.5-0.7	0.0	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS15	9/22/2015	Beneath former power plant	0.5-0.7	0.4	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
* SS16	9/22/2015	Beneath former power plant	0.5-0.7	11	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
* SS17	9/22/2015	Beneath former power plant and former generator location	0.5-0.7	0.8	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS18	9/22/2015	Beneath former power plant and former generator location	0.5-0.7	0.2	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS19	9/22/2015	Beneath former power plant	0.5-0.7	0.0	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
SS20	9/22/2015	Beneath former power plant	0.5-0.7	0.0	Brown to gray, *Silty Sand (SM)*; frozen to moist, trace gravel and organics
Quality Control Sample					
* TB	9/22/2015	Soil Trip Blank	-	-	Ottawa sand with methanol added in the laboratory

Notes:

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

^ = Field screening instrument was a Thermo Environmental Instruments 580B photoionization detector (PID).

\- = Not applicable

bgs = below ground surface

ppm = parts per million

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level (mg/kg)**	Sample ID Number^ and Soil Sample Depth in Feet bgs (See Table 1)						
			Surface Soil Samples						Trip Blank
			SS1 0.5-0.7	SS2 0.5-0.7	SS7 1.3-1.5	SS11 1.3-1.5	SS16 0.5-0.7	SS17 0.5-0.7	TB -
PID Headspace Reading - ppm	580B PID	-	0.3	0.4	0.4	56	11	0.8	-
Gasoline Range Organics (GRO) - mg/kg	AK 101	100	<1.31	<2.12 B	<2.80	<3.78 B	<3.86 B	<2.11	<1.25
Diesel Range Organics (DRO) - mg/kg	AK 102	200	<45.5	**34.4**	**51.1**	**8,850**	**6,040**	**12,400**	-
Residual Range Organics (RRO) - mg/kg	AK 103	2,000	**170**	**182**	**186**	**9,120**	**4,810**	**3,140**	-
Volatile Organic Compounds (VOCs)									
Benzene - mg/kg	EPA 8260B	16	<0.00660	<0.00530	<0.0140	<0.00945	<0.00965	<0.0105	<0.00620
Toluene - mg/kg	EPA 8260B	200	**0.0158 J**	**0.0138 J**	<0.0280	<0.0189	<0.0193	<0.0211	<0.0124
Ethylbenzene - mg/kg	EPA 8260B	72	<0.0132	<0.0106	<0.0280	<0.0189	<0.0193	<0.0211	<0.0124
Xylenes - mg/kg	EPA 8260B	57	<0.0395	**0.0364 J**	<0.0840	<0.0565	<0.0580	<0.0630	<0.0373
Naphthalene - mg/kg	EPA 8260B	42	<0.0264	<0.0212	<0.0560	**0.0427 J**	<0.0386	<0.0421	<0.0249
Trichlorofluoromethane - mg/kg	EPA 8260B	980	**0.117**	<0.0212	<0.0560	**0.0941**	**0.0367 J**	**0.0501 J**	<0.0249
Other VOC analytes	EPA 8260B	Various	ND	ND	ND	ND	ND	ND	ND
Polychlorinated Biphenyls (PCBs)	EPA 8082A	1	-	-	-	<0.0309	<0.0303	-	-
RCRA Metals									
Arsenic - mg/kg	EPA 6020A	12	**4.70**	**5.95**	**6.69**	**5.36**	**4.15**	**5.51**	-
Barium - mg/kg	EPA 6020A	25,000	**83.1**	**131**	**78.7**	**87.6**	**79.6**	**95.8**	-
Cadmium - mg/kg	EPA 6020A	120	**0.559**	**0.769**	**0.655**	**0.764**	**0.590**	**0.729**	-
Chromium - mg/kg	EPA 6020A	100,000	**13.8**	**14.5**	**20.7**	**18.2**	**14.5**	**17.4**	-
Lead - mg/kg	EPA 6020A	400	**10.6**	**10.2**	**13.6**	**11.8**	**8.17**	**10.7**	-
Mercury- mg/kg	EPA 6020A	3.1	**0.0526**	**0.0473**	**0.0881**	**0.0709**	**0.0529**	**0.0609**	-
Selenium - mg/kg	EPA 6020A	680	**0.917 J**	**1.37**	**1.78**	**1.41**	**0.508 J**	**0.680 J**	-
Silver - mg/kg	EPA 6020A	680	<0.114	**0.0991 J**	**0.168 J**	**0.142 J**	**0.0893 J**	**0.160 J**	-

Notes:

* = See laboratory results for compounds tested, methods, and laboratory reporting limits

** = GRO, DRO, and RRO soil cleanup levels are the applicable ADEC Method 1 standard listed in Table A2 and the remaining cleanup levels are the ADEC Method 2 standard listed in Table B1, 18 AAC 75, for the "Arctic Zone" (November 6, 2016)

^ = Sample ID No. preceded by "17754-" on the chain-of-custody form

ppm = Parts per million

mg/kg = Milligrams per kilogram

\- = Not tested or not applicable

<1.31 = Analyte not detected; laboratory limit of detection is 1.31 mg/kg

170 = Analyte detected at a concentration less than the applicable ADEC cleanup levels

8,850 = bolded and highlighted results exceed the applicable ADEC cleanup level

B = Reported concentration potentially affected by blank detection. See ADEC Laboratory Data Review Checklist (LDRC) for details.

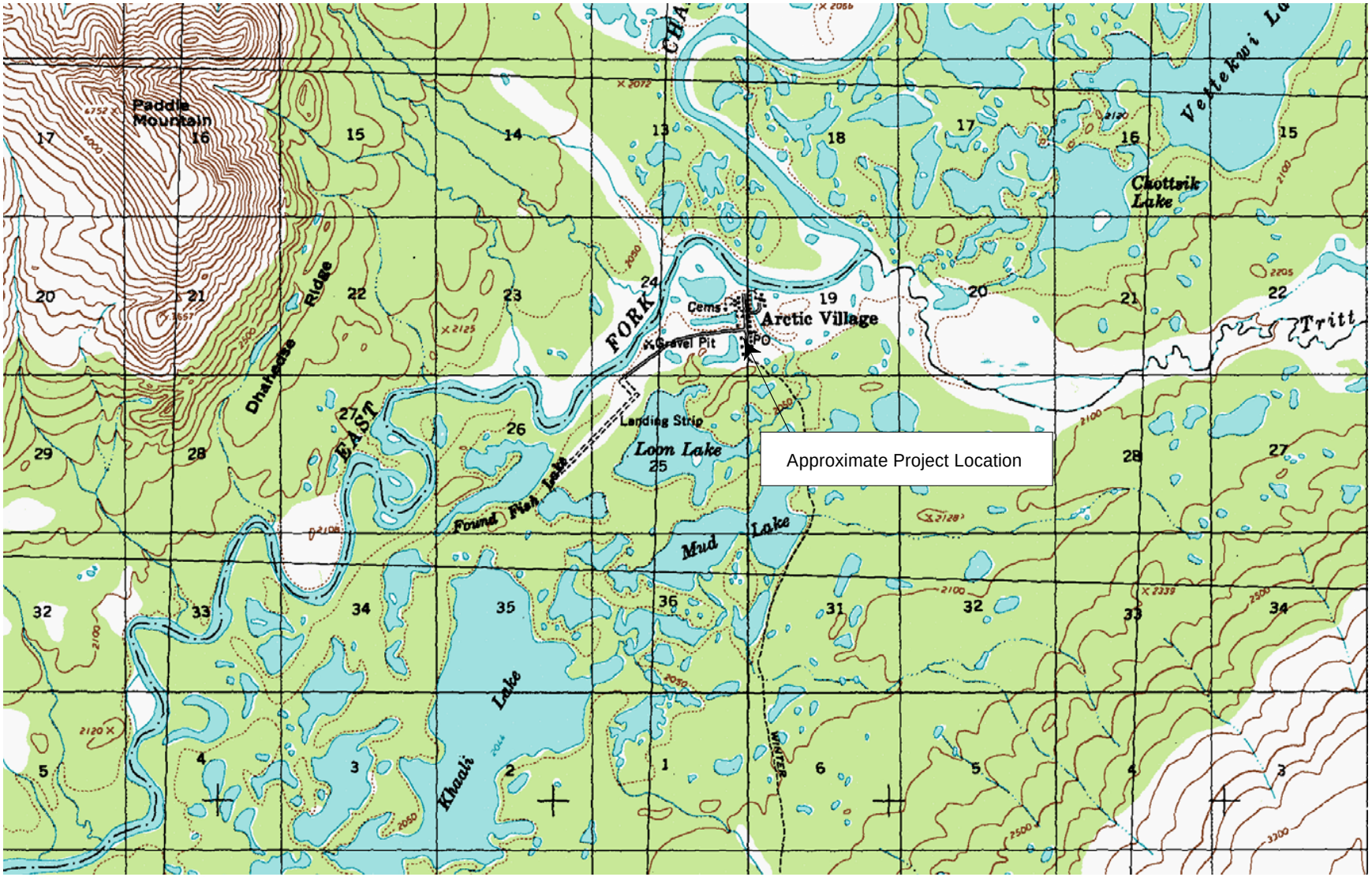
J = Analyte detected, but at a concentration less than the limit of quantitation. See the SGS laboratory report for details.

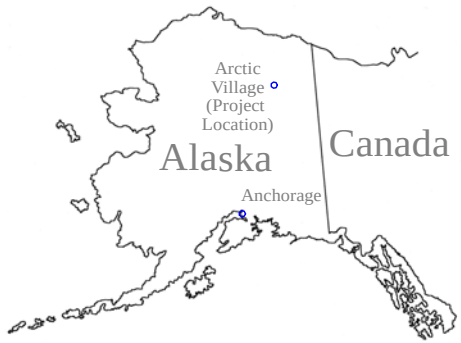
ND = Analyte not detected

TABLE 3
ESTIMATED QUANTITIES OF HAZARDOUS BUILDING MATERIALS

Material	Content	Location	Estimated Quantity
Asbestos Containing Materials (ACMs)			
Joint Compound	Chrysotile Asbestos	Throughout Walls and Ceilings	9,800 SF
Gray-Green Duct Sealants	Chrysotile Asbestos	Tank Room	50 LF
Black Roof Patching Tars	Chrysotile Asbestos	On Rolled Roofing Seems and Roof Flashings	2,850 SF
Boiler Gaskets and Sealants	Assumed ACM	Boiler Room	1 Lot
Lead-Containing Materials			
Paints	Lead	Throughout Structure	1 Lot
PCB-Containing Materials			
HID Light Ballasts	PCBs	Exterior of Structure	4 Ballasts
Fluorescent Light Ballasts	PCBs	Throughout Structure	24 Ballasts
Mercury-Containing Materials			
HID Lamps	Mercury	Exterior of Structure	4 Lamps
Fluorescent Lamps	Mercury	Throughout Structure	48 Lamps
Other Potentially Hazardous Building Materials			
Refrigeration Equipment	ODS	Adjacent to Southwest Corner of Structure	1 Each

Notes:
PCBs = Polychlorinated Biphenyls
HID = High Intensity Discharge
ODS = Ozone Depleting Substances





Elevation in Feet
Contour Interval 100 Feet
Taken from Arctic A-3, AK
1972 U.S. Geological Survey Quadrangle

0 1 2
APPROXIMATE SCALE IN MILES

N

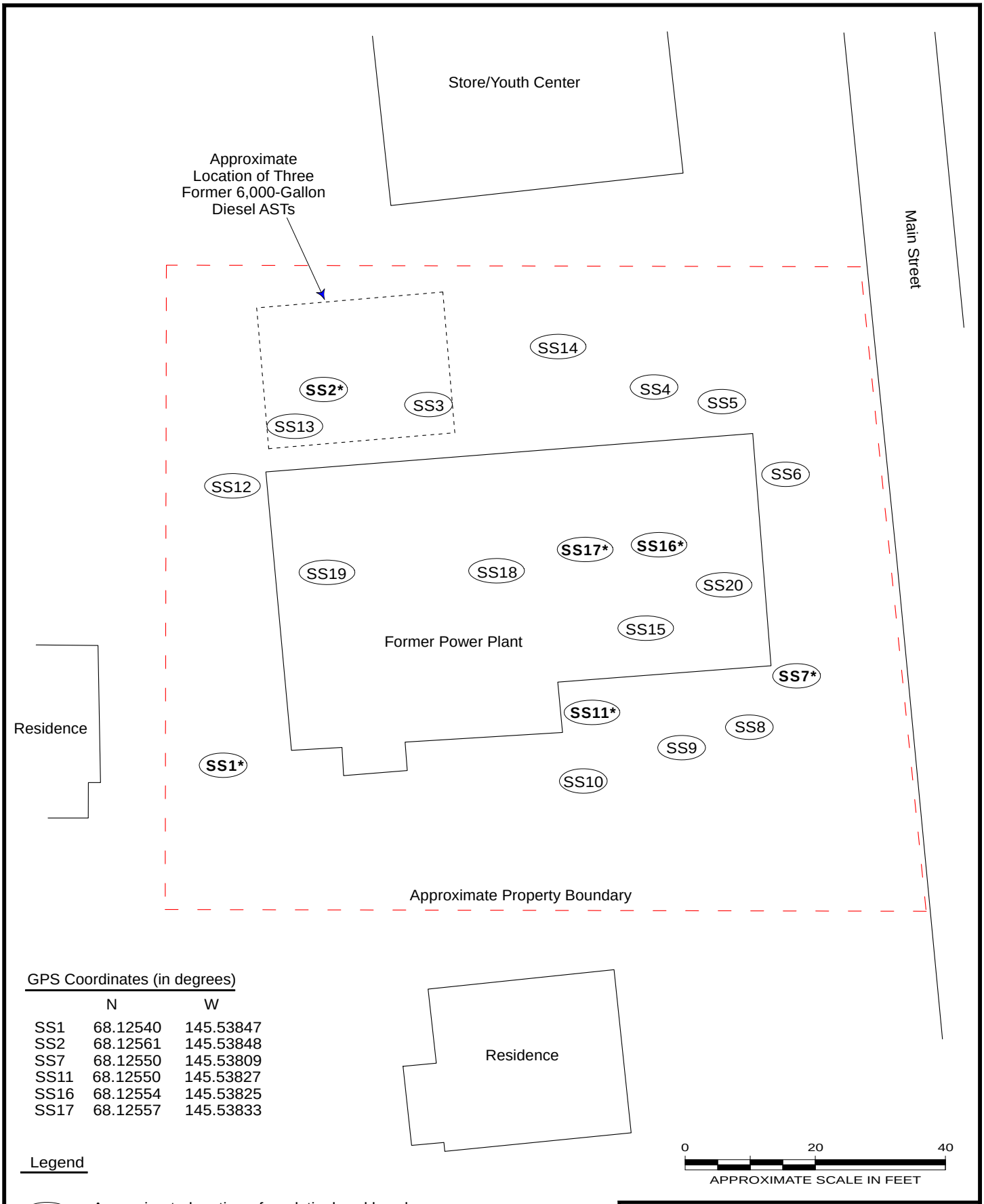
Former Arctic Village Powerplant
Arctic Village, Alaska

VICINITY MAP

April 2017 32-1-17754-001

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 1



GPS Coordinates (in degrees)

	N	W
SS1	68.12540	145.53847
SS2	68.12561	145.53848
SS7	68.12550	145.53809
SS11	68.12550	145.53827
SS16	68.12554	145.53825
SS17	68.12557	145.53833

0 20 40

APPROXIMATE SCALE IN FEET

Legend

SS1* Approximate location of analytical and headspace screening Sample SS1

SS3 Approximate location of headspace screening Sample SS3

N

Former Arctic Village Power Plant
Arctic Village, Alaska

SITE PLAN

April 2017

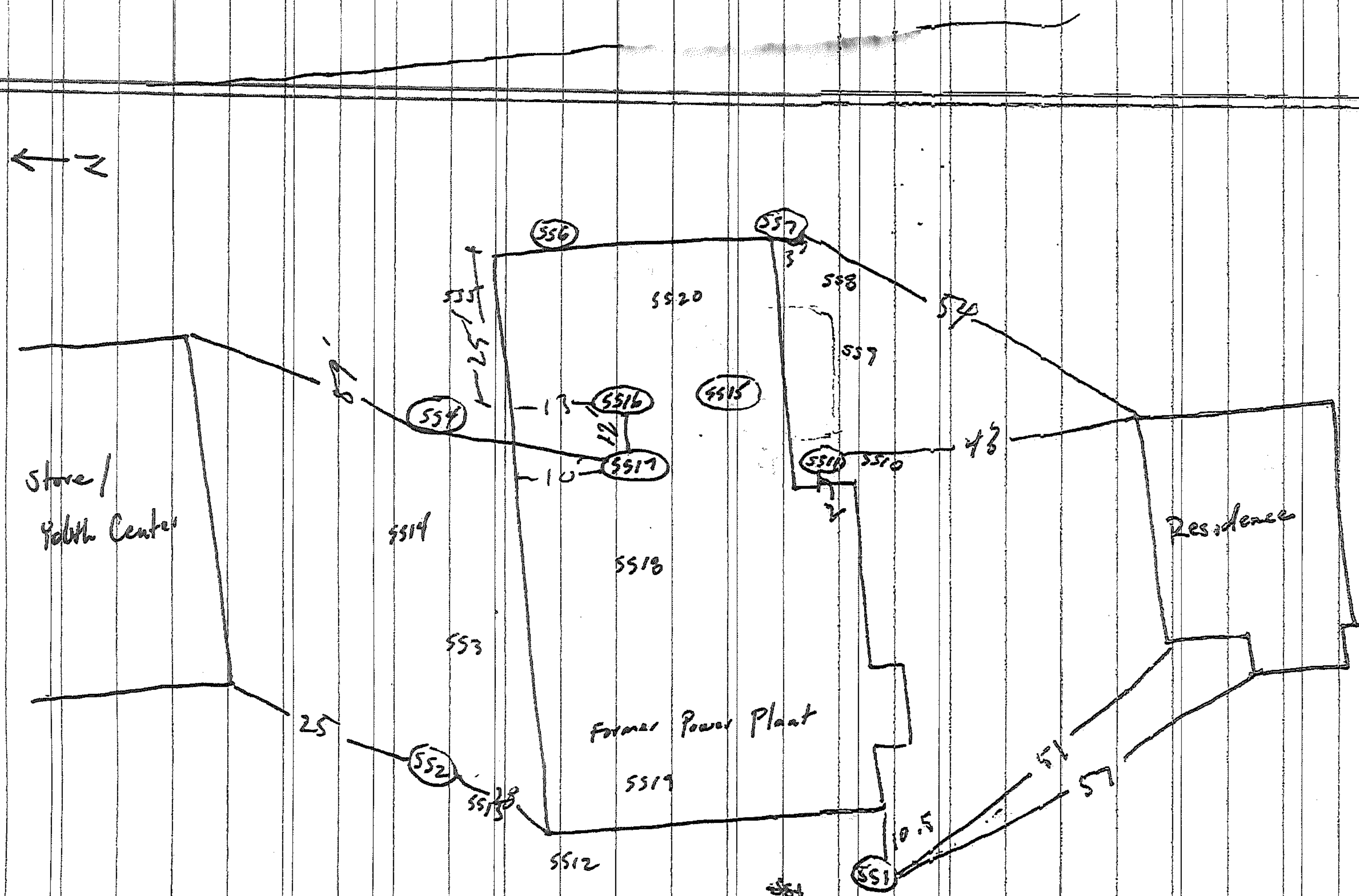
32-1-17754-001

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 2

APPENDIX A

FIELD NOTES


N
Store / Youth Center
Former Power Plant
Residence
SS1
SS2
SS3
SS4
SS5
SS6
SS7
SS8
SS9
SS10
SS11
SS12
SS13
SS14
SS15
SS16
SS17
SS18
SS19
SS20
25
25
89'
13
10'
12
3'
2'
54
48
51
57
10.5

17754-001 Former Arctic Village Power Plant 9/22/15

JCT

GPS Coordinates

	N	W
SS1	68.12540°	145.53847°
SS2	68.12561°	145.53848°
SS7	68.12550°	145.53809°
SS11	68.12550°	145.53827°
SS16	68.12554°	145.53825°
SS17	68.12557°	145.53833°

SAMPLE COLLECTION LOG

SHANNON & WILSON, INC

Project Number: 17754-001 Arctic Village (ADEC) Location: Arctic Village
Date: 9/22/15 Site: Former Power Plant
Sampler: JCT Sheet Number: 1

Sample Number	Location	Sample Time	Sample Depth	Sample Type	GPS Reading*	PID Reading	Soil Classification	Analyses
SS1	Southwest corner outside	1705	0.5	ES	Yes	0.3	Brown to gray, Silty Sand (SM); frozen to moist; trace gravel and organics	GRO, DRO, RRO, VOCs RCRA Metals
SS2	Northwest corner outside	1710	0.5	ES	Yes	0.4		GRO, DRO, RRO, VOCs and RCRA Metals
SS3	North side	—	0.5	FM	No	0.2		
SS4	North side	—	0.5	~~FM~~	No	0.2		~~GRO, DRO, RRO, VOCs RCRA Metals~~
SS5	Northeast corner	—	0.5	FM	No	0.0		
SS6	Northeast corner	—	0.5	~~FM~~	No	0.2		~~GRO, DRO, RRO, VOCs RCRA Metals~~
SS7	Southeast corner	1720	1.5	ES	Yes	0.4		GRO, DRO, RRO, VOCs RCRA Metals
SS8	Southeast corner	—	0.5	FM	No	0.0		
SS9	South side	—	0.5	FM	No	0.0		
SS10	South side	—	0.5	FM	No	0.0		
SS11	South Side	1730	~~0.5~~ 1.5	ES	~~Yes~~	~~0.6~~ 56		GRO, RRO, DRO, VOCs RCRA Metals
SS12	Northwest corner	—	0.5	FM	No	0.2		
SS13	Northwest corner	—	0.5	FM	No	0.0		
SS14	North side	—	0.5	FM	No	0.0		
SS15	Under building	—	0.5	~~ES~~ FM	No	0.4		~~GRO, RRO, RRO, VOCs RCRA Metals~~
SS16	Under building	1645	0.5	ES	Yes	11.0		GRO, DRO, RRO, VOCs PCBs
SS17	Under building	1655	0.5	ES	Yes	0.8		GRO, DRO, RRO, VOCs RCRA Metals

Sample Type

ES	Environmental sample
FD	Field duplicate
FM	Field Screening
TB	Trip blank
*	GPS readings only collected from analytical sample locations

SAMPLE COLLECTION LOG

SHANNON & WILSON, INC

Project Number:
Date:
Sampler:
Location:
Site:
Sheet Number:

Sample Number	Location	Sample Time	Sample Depth	Sample Type	GPS Reading*	PID Reading	Soil Classification	Analyses
SS18	Under building	—	0.5	FM	No	0.2	Brown to gray; Silty Sand (SM); frozen to moist; trace gravel and organics	
SS19	Under building	—	0.5	FM	No	0.0		
SS20	Under building	—	0.5	FM	No	0.0		

Sample Type

ES	Environmental sample
FD	Field duplicate
FM	Field Screening
TB	Trip blank
*	GPS readings only collected from analytical sample locations

APPENDIX B

SITE PHOTOGRAPHS

Photograph 1: Looking north at the former power plant. (September 22, 2015)

Photograph 2: Looking west at the location of Sample SS3 near the location of the former aboveground storage tanks. (September 22, 2015)

Former Arctic Village Power Plant Arctic Village, Alaska	
PHOTOGRAPHS 1 AND 2	
April 2017	32-1-17754-001
SHANNON & WILSON, INC. Geotechnical & Environmental Consultants	A-1

Photograph 3: Potential staining and the location of Sample SS1. (September 22, 2015)

Photograph 4: Location of Sample SS11. (September 22, 2015)

Photograph 5: Looking northwest at the former power plant and the Arctic Village Store/Youth Center. (September 22, 2015)

Photograph 6: Looking north at the former power plant and Main Street. (September 22, 2015)

APPENDIX C

RESULTS OF ANALYTICAL TESTING BY SGS NORTH AMERICA INC.

AND

ADEC LABORATORY DATA REVIEW CHECKLIST

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
907-433-3221

Report Number: **1155588**

Client Project: **17754-001 Arctic Village**

Dear Jacob Tracy,

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

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

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

Sincerely,
SGS North America Inc.

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

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

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1155588**
Project Name/Site: **17754-001 Arctic Village**
Project Contact: **Jacob Tracy**

Refer to sample receipt form for information on sample condition.

17754-SS1 (1155588001) PS

AK102 - The LOQ for DRO is elevated. The sample was diluted due to the dark color of the extract.

17754-SS11 (1155588004) PS

AK102/103 - Surrogate recoveries for 5a-androstane (0%) and n-triacontane (0%) do not meet QC criteria due to sample dilution (4X).

17754-SS16 (1155588005) PS

8082A - Surrogate recovery for decachlorobiphenyl (135 %) does not meet QC criteria due to matrix interference.
AK102/103 - Surrogate recoveries for 5a-androstane (0%) and n-triacontane (0%) do not meet QC criteria due to sample dilution (40X).

17754-SS17 (1155588006) PS

AK102/103 - Surrogate recoveries for 5a-androstane (0%) and n-triacontane (0%) do not meet QC criteria due to sample dilution (4X).

1155498069(1293465MS) (1293466) MS

8260B - MS recovery for hexachlorobutadiene (171%) does not meet QC criteria. Refer to LCS for accuracy.

1155618012MS (1294610) MS

6020A - Metals MS recovery for barium (127%) does not meet QC criteria. The post digestion spike was successful.

1155498069(1293465MSD) (1293467) MSD

8260B - MSD recovery for hexachlorobutadiene (151%) does not meet QC criteria. Refer to LCS for accuracy.

1155618012MSD (1294611) MSD

6020A - Metals MSD recovery for barium (126%) 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 & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8021B, 8082A, 8260B, 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
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
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
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
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
17754-SS1	1155588001	09/22/2015	09/24/2015	Soil/Solid (dry weight)
17754-SS2	1155588002	09/22/2015	09/24/2015	Soil/Solid (dry weight)
17754-SS7	1155588003	09/22/2015	09/24/2015	Soil/Solid (dry weight)
17754-SS11	1155588004	09/22/2015	09/24/2015	Soil/Solid (dry weight)
17754-SS16	1155588005	09/22/2015	09/24/2015	Soil/Solid (dry weight)
17754-SS17	1155588006	09/22/2015	09/24/2015	Soil/Solid (dry weight)
17754-TB	1155588007	09/22/2015	09/24/2015	Soil/Solid (dry weight)

Method	Method Description
AK102	Diesel/Residual Range Organics
AK103	Diesel/Residual Range Organics
AK101	Gasoline Range Organics (S)
SW6020A	Metals by ICP-MS (S)
SM21 2540G	Percent Solids SM2540G
SW8082A	SW8082 PCB's
SW8260B	VOC 8260 (S) Field Extracted

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Detectable Results Summary

Client Sample ID: **17754-SS1**
Lab Sample ID: 1155588001

	Parameter	Result	Units
Metals by ICP/MS	Arsenic	4.70	mg/Kg
	Barium	83.1	mg/Kg
	Cadmium	0.559	mg/Kg
	Chromium	13.8	mg/Kg
	Lead	10.6	mg/Kg
	Mercury	0.0526	mg/Kg
	Selenium	0.917J	mg/Kg
Semivolatile Organic Fuels	Residual Range Organics	170	mg/Kg
Volatile GC/MS	Toluene	15.8J	ug/Kg
	Trichlorofluoromethane	117	ug/Kg

Client Sample ID: **17754-SS2**
Lab Sample ID: 1155588002

	Parameter	Result	Units
Metals by ICP/MS	Arsenic	5.95	mg/Kg
	Barium	131	mg/Kg
	Cadmium	0.769	mg/Kg
	Chromium	14.5	mg/Kg
	Lead	10.2	mg/Kg
	Mercury	0.0473	mg/Kg
	Selenium	1.37	mg/Kg
	Silver	0.0991J	mg/Kg
Semivolatile Organic Fuels	Diesel Range Organics	34.4	mg/Kg
	Residual Range Organics	182	mg/Kg
Volatile Fuels	Gasoline Range Organics	0.684J	mg/Kg
Volatile GC/MS	o-Xylene	8.89J	ug/Kg
	P & M -Xylene	27.5J	ug/Kg
	Toluene	13.8J	ug/Kg
	Xylenes (total)	36.4J	ug/Kg

Client Sample ID: **17754-SS7**
Lab Sample ID: 1155588003

	Parameter	Result	Units
Metals by ICP/MS	Arsenic	6.69	mg/Kg
	Barium	78.7	mg/Kg
	Cadmium	0.655	mg/Kg
	Chromium	20.7	mg/Kg
	Lead	13.6	mg/Kg
	Mercury	0.0881	mg/Kg
	Selenium	1.78	mg/Kg
	Silver	0.168J	mg/Kg
Semivolatile Organic Fuels	Diesel Range Organics	51.1	mg/Kg
	Residual Range Organics	186	mg/Kg

SGS North America Inc.
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Detectable Results Summary

Client Sample ID: **17754-SS11**
Lab Sample ID: 1155588004

	Parameter	Result	Units
Metals by ICP/MS	Arsenic	5.36	mg/Kg
	Barium	87.6	mg/Kg
	Cadmium	0.764	mg/Kg
	Chromium	18.2	mg/Kg
	Lead	11.8	mg/Kg
	Mercury	0.0709	mg/Kg
	Selenium	1.41	mg/Kg
	Silver	0.142J	mg/Kg
Semivolatile Organic Fuels	Diesel Range Organics	8850	mg/Kg
	Residual Range Organics	9120	mg/Kg
Volatile Fuels	Gasoline Range Organics	2.84J	mg/Kg
Volatile GC/MS	Naphthalene	42.7J	ug/Kg
	Trichlorofluoromethane	94.1	ug/Kg

Client Sample ID: **17754-SS16**
Lab Sample ID: 1155588005

	Parameter	Result	Units
Metals by ICP/MS	Arsenic	4.15	mg/Kg
	Barium	79.6	mg/Kg
	Cadmium	0.590	mg/Kg
	Chromium	14.5	mg/Kg
	Lead	8.17	mg/Kg
	Mercury	0.0529	mg/Kg
	Selenium	0.508J	mg/Kg
	Silver	0.0893J	mg/Kg
Semivolatile Organic Fuels	Diesel Range Organics	6040	mg/Kg
	Residual Range Organics	4810	mg/Kg
Volatile Fuels	Gasoline Range Organics	1.99J	mg/Kg
Volatile GC/MS	Trichlorofluoromethane	36.7J	ug/Kg

Client Sample ID: **17754-SS17**
Lab Sample ID: 1155588006

	Parameter	Result	Units
Metals by ICP/MS	Arsenic	5.51	mg/Kg
	Barium	95.8	mg/Kg
	Cadmium	0.729	mg/Kg
	Chromium	17.4	mg/Kg
	Lead	10.7	mg/Kg
	Mercury	0.0609	mg/Kg
	Selenium	0.680J	mg/Kg
	Silver	0.160J	mg/Kg
Semivolatile Organic Fuels	Diesel Range Organics	12400	mg/Kg
	Residual Range Organics	3140	mg/Kg
Volatile GC/MS	Trichlorofluoromethane	50.1J	ug/Kg

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Results of **17754-SS1**

Client Sample ID: **17754-SS1**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588001
Lab Project ID: 1155588

Collection Date: 09/22/15 17:05
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):87.8
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	4.70		1.14	0.353	mg/Kg	10		10/05/15 19:26
Barium	83.1		0.341	0.107	mg/Kg	10		10/05/15 19:26
Cadmium	0.559		0.228	0.0706	mg/Kg	10		10/05/15 19:26
Chromium	13.8		0.455	0.137	mg/Kg	10		10/05/15 19:26
Lead	10.6		0.228	0.0706	mg/Kg	10		10/05/15 19:26
Mercury	0.0526		0.0455	0.0137	mg/Kg	10		10/05/15 19:26
Selenium	0.917	J	1.14	0.353	mg/Kg	10		10/05/15 19:26
Silver	0.114	U	0.228	0.0706	mg/Kg	10		10/05/15 19:26

Batch Information

Analytical Batch: MMS9117
Analytical Method: SW6020A
Analyst: EAB
Analytical Date/Time: 10/05/15 19:26
Container ID: 1155588001-A

Prep Batch: MXX29168
Prep Method: SW3050B
Prep Date/Time: 10/01/15 16:08
Prep Initial Wt./Vol.: 1.001 g
Prep Extract Vol: 50 mL

Print Date: 10/08/2015 1:32:12PM

J flagging is activated

Results of **17754-SS1**

Client Sample ID: **17754-SS1**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588001
Lab Project ID: 1155588

Collection Date: 09/22/15 17:05
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):87.8
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	45.5	U	91.1	28.2	mg/Kg	4		10/06/15 23:04
Surrogates								
5a Androstane (surr)	96.1		50-150		%	4		10/06/15 23:04

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 10/06/15 23:04
Container ID: 1155588001-A

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 09/29/15 15:54
Prep Initial Wt./Vol.: 30.028 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	170		91.1	28.2	mg/Kg	4		10/06/15 23:04
Surrogates								
n-Triacontane-d62 (surr)	89.6		50-150		%	4		10/06/15 23:04

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 10/06/15 23:04
Container ID: 1155588001-A

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 09/29/15 15:54
Prep Initial Wt./Vol.: 30.028 g
Prep Extract Vol: 1 mL

Results of **17754-SS1**

Client Sample ID: **17754-SS1**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588001
Lab Project ID: 1155588

Collection Date: 09/22/15 17:05
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):87.8
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.31	U	2.63	0.790	mg/Kg	1		10/03/15 18:26
Surrogates								
4-Bromofluorobenzene (surr)	89.9		50-150		%	1		10/03/15 18:26

Batch Information

Analytical Batch: VFC12710
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 10/03/15 18:26
Container ID: 1155588001-B

Prep Batch: VXX28009
Prep Method: SW5035A
Prep Date/Time: 09/22/15 17:05
Prep Initial Wt./Vol.: 73.44 g
Prep Extract Vol: 33.9734 mL

Results of **17754-SS1**

Client Sample ID: **17754-SS1**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588001
Lab Project ID: 1155588

Collection Date: 09/22/15 17:05
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):87.8
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
1,1,1-Trichloroethane	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
1,1,2,2-Tetrachloroethane	6.60	U	13.2	4.11	ug/Kg	1		09/27/15 21:15
1,1,2-Trichloroethane	5.25	U	10.5	3.27	ug/Kg	1		09/27/15 21:15
1,1-Dichloroethane	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
1,1-Dichloroethene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
1,1-Dichloropropene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
1,2,3-Trichlorobenzene	26.4	U	52.7	15.8	ug/Kg	1		09/27/15 21:15
1,2,3-Trichloropropane	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
1,2,4-Trichlorobenzene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
1,2,4-Trimethylbenzene	26.4	U	52.7	15.8	ug/Kg	1		09/27/15 21:15
1,2-Dibromo-3-chloropropane	52.5	U	105	32.7	ug/Kg	1		09/27/15 21:15
1,2-Dibromoethane	5.25	U	10.5	3.27	ug/Kg	1		09/27/15 21:15
1,2-Dichlorobenzene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
1,2-Dichloroethane	5.25	U	10.5	3.27	ug/Kg	1		09/27/15 21:15
1,2-Dichloropropane	5.25	U	10.5	3.27	ug/Kg	1		09/27/15 21:15
1,3,5-Trimethylbenzene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
1,3-Dichlorobenzene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
1,3-Dichloropropane	5.25	U	10.5	3.27	ug/Kg	1		09/27/15 21:15
1,4-Dichlorobenzene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
2,2-Dichloropropane	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
2-Butanone (MEK)	132	U	263	82.2	ug/Kg	1		09/27/15 21:15
2-Chlorotoluene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
2-Hexanone	132	U	263	82.2	ug/Kg	1		09/27/15 21:15
4-Chlorotoluene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
4-Isopropyltoluene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
4-Methyl-2-pentanone (MIBK)	132	U	263	82.2	ug/Kg	1		09/27/15 21:15
Benzene	6.60	U	13.2	4.11	ug/Kg	1		09/27/15 21:15
Bromobenzene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Bromochloromethane	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Bromodichloromethane	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Bromoform	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Bromomethane	106	U	211	65.3	ug/Kg	1		09/27/15 21:15
Carbon disulfide	52.5	U	105	32.7	ug/Kg	1		09/27/15 21:15
Carbon tetrachloride	6.60	U	13.2	4.11	ug/Kg	1		09/27/15 21:15
Chlorobenzene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Chloroethane	106	U	211	65.3	ug/Kg	1		09/27/15 21:15

Results of **17754-SS1**

Client Sample ID: **17754-SS1**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588001
Lab Project ID: 1155588

Collection Date: 09/22/15 17:05
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):87.8
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Chloromethane	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
cis-1,2-Dichloroethene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
cis-1,3-Dichloropropene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Dibromochloromethane	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Dibromomethane	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Dichlorodifluoromethane	26.4	U	52.7	15.8	ug/Kg	1		09/27/15 21:15
Ethylbenzene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Freon-113	52.5	U	105	32.7	ug/Kg	1		09/27/15 21:15
Hexachlorobutadiene	26.4	U	52.7	15.8	ug/Kg	1		09/27/15 21:15
Isopropylbenzene (Cumene)	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Methylene chloride	52.5	U	105	32.7	ug/Kg	1		09/27/15 21:15
Methyl-t-butyl ether	52.5	U	105	32.7	ug/Kg	1		09/27/15 21:15
Naphthalene	26.4	U	52.7	15.8	ug/Kg	1		09/27/15 21:15
n-Butylbenzene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
n-Propylbenzene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
o-Xylene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
P & M -Xylene	26.4	U	52.7	15.8	ug/Kg	1		09/27/15 21:15
sec-Butylbenzene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Styrene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
tert-Butylbenzene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Tetrachloroethene	6.60	U	13.2	4.11	ug/Kg	1		09/27/15 21:15
Toluene	15.8	J	26.3	8.22	ug/Kg	1		09/27/15 21:15
trans-1,2-Dichloroethene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
trans-1,3-Dichloropropene	13.2	U	26.3	8.22	ug/Kg	1		09/27/15 21:15
Trichloroethene	6.60	U	13.2	4.11	ug/Kg	1		09/27/15 21:15
Trichlorofluoromethane	117		52.7	15.8	ug/Kg	1		09/27/15 21:15
Vinyl acetate	52.5	U	105	32.7	ug/Kg	1		09/27/15 21:15
Vinyl chloride	5.25	U	10.5	3.27	ug/Kg	1		09/27/15 21:15
Xylenes (total)	39.5	U	79.0	24.0	ug/Kg	1		09/27/15 21:15
Surrogates								
1,2-Dichloroethane-D4 (surr)	95.5		71-136		%	1		09/27/15 21:15
4-Bromofluorobenzene (surr)	107		55-151		%	1		09/27/15 21:15
Toluene-d8 (surr)	104		85-116		%	1		09/27/15 21:15

Print Date: 10/08/2015 1:32:12PM

J flagging is activated

Results of **17754-SS1**

Client Sample ID: **17754-SS1**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588001
Lab Project ID: 1155588

Collection Date: 09/22/15 17:05
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):87.8
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS15297
Analytical Method: SW8260B
Analyst: SCL
Analytical Date/Time: 09/27/15 21:15
Container ID: 1155588001-B

Prep Batch: VXX27966
Prep Method: SW5035A
Prep Date/Time: 09/22/15 17:05
Prep Initial Wt./Vol.: 73.44 g
Prep Extract Vol: 33.9734 mL

Results of **17754-SS2**

Client Sample ID: **17754-SS2**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588002
Lab Project ID: 1155588

Collection Date: 09/22/15 17:10
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):94.9
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	5.95		1.04	0.322	mg/Kg	10		10/05/15 19:29
Barium	131		0.311	0.0975	mg/Kg	10		10/05/15 19:29
Cadmium	0.769		0.208	0.0643	mg/Kg	10		10/05/15 19:29
Chromium	14.5		0.415	0.125	mg/Kg	10		10/05/15 19:29
Lead	10.2		0.208	0.0643	mg/Kg	10		10/05/15 19:29
Mercury	0.0473		0.0415	0.0125	mg/Kg	10		10/05/15 19:29
Selenium	1.37		1.04	0.322	mg/Kg	10		10/05/15 19:29
Silver	0.0991	J	0.208	0.0643	mg/Kg	10		10/05/15 19:29

Batch Information

Analytical Batch: MMS9117
Analytical Method: SW6020A
Analyst: EAB
Analytical Date/Time: 10/05/15 19:29
Container ID: 1155588002-A

Prep Batch: MXX29168
Prep Method: SW3050B
Prep Date/Time: 10/01/15 16:08
Prep Initial Wt./Vol.: 1.015 g
Prep Extract Vol: 50 mL

Print Date: 10/08/2015 1:32:12PM

J flagging is activated

Results of **17754-SS2**

Client Sample ID: **17754-SS2**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588002
Lab Project ID: 1155588

Collection Date: 09/22/15 17:10
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):94.9
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	34.4		20.7	6.43	mg/Kg	1		10/07/15 01:08
Surrogates								
5a Androstane (surr)	104		50-150		%	1		10/07/15 01:08

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 10/07/15 01:08
Container ID: 1155588002-A

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 09/29/15 15:54
Prep Initial Wt./Vol.: 30.468 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	182		20.7	6.43	mg/Kg	1		10/07/15 01:08
Surrogates								
n-Triacontane-d62 (surr)	100		50-150		%	1		10/07/15 01:08

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 10/07/15 01:08
Container ID: 1155588002-A

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 09/29/15 15:54
Prep Initial Wt./Vol.: 30.468 g
Prep Extract Vol: 1 mL

Results of **17754-SS2**

Client Sample ID: **17754-SS2**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588002
Lab Project ID: 1155588

Collection Date: 09/22/15 17:10
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):94.9
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.684	J	2.12	0.635	mg/Kg	1		10/03/15 18:45
Surrogates								
4-Bromofluorobenzene (surr)	84.5		50-150		%	1		10/03/15 18:45

Batch Information

Analytical Batch: VFC12710
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 10/03/15 18:45
Container ID: 1155588002-B

Prep Batch: VXX28009
Prep Method: SW5035A
Prep Date/Time: 09/22/15 17:10
Prep Initial Wt./Vol.: 71.111 g
Prep Extract Vol: 28.594 mL

Print Date: 10/08/2015 1:32:12PM

J flagging is activated

Results of **17754-SS2**

Client Sample ID: **17754-SS2**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588002
Lab Project ID: 1155588

Collection Date: 09/22/15 17:10
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):94.9
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
1,1,1-Trichloroethane	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
1,1,2,2-Tetrachloroethane	5.30	U	10.6	3.30	ug/Kg	1		09/27/15 21:31
1,1,2-Trichloroethane	4.24	U	8.47	2.63	ug/Kg	1		09/27/15 21:31
1,1-Dichloroethane	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
1,1-Dichloroethene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
1,1-Dichloropropene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
1,2,3-Trichlorobenzene	21.2	U	42.4	12.7	ug/Kg	1		09/27/15 21:31
1,2,3-Trichloropropane	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
1,2,4-Trichlorobenzene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
1,2,4-Trimethylbenzene	21.2	U	42.4	12.7	ug/Kg	1		09/27/15 21:31
1,2-Dibromo-3-chloropropane	42.4	U	84.7	26.3	ug/Kg	1		09/27/15 21:31
1,2-Dibromoethane	4.24	U	8.47	2.63	ug/Kg	1		09/27/15 21:31
1,2-Dichlorobenzene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
1,2-Dichloroethane	4.24	U	8.47	2.63	ug/Kg	1		09/27/15 21:31
1,2-Dichloropropane	4.24	U	8.47	2.63	ug/Kg	1		09/27/15 21:31
1,3,5-Trimethylbenzene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
1,3-Dichlorobenzene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
1,3-Dichloropropane	4.24	U	8.47	2.63	ug/Kg	1		09/27/15 21:31
1,4-Dichlorobenzene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
2,2-Dichloropropane	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
2-Butanone (MEK)	106	U	212	66.1	ug/Kg	1		09/27/15 21:31
2-Chlorotoluene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
2-Hexanone	106	U	212	66.1	ug/Kg	1		09/27/15 21:31
4-Chlorotoluene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
4-Isopropyltoluene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
4-Methyl-2-pentanone (MIBK)	106	U	212	66.1	ug/Kg	1		09/27/15 21:31
Benzene	5.30	U	10.6	3.30	ug/Kg	1		09/27/15 21:31
Bromobenzene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Bromochloromethane	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Bromodichloromethane	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Bromoform	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Bromomethane	84.5	U	169	52.5	ug/Kg	1		09/27/15 21:31
Carbon disulfide	42.4	U	84.7	26.3	ug/Kg	1		09/27/15 21:31
Carbon tetrachloride	5.30	U	10.6	3.30	ug/Kg	1		09/27/15 21:31
Chlorobenzene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Chloroethane	84.5	U	169	52.5	ug/Kg	1		09/27/15 21:31

Results of **17754-SS2**

Client Sample ID: **17754-SS2**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588002
Lab Project ID: 1155588

Collection Date: 09/22/15 17:10
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):94.9
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Chloromethane	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
cis-1,2-Dichloroethene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
cis-1,3-Dichloropropene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Dibromochloromethane	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Dibromomethane	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Dichlorodifluoromethane	21.2	U	42.4	12.7	ug/Kg	1		09/27/15 21:31
Ethylbenzene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Freon-113	42.4	U	84.7	26.3	ug/Kg	1		09/27/15 21:31
Hexachlorobutadiene	21.2	U	42.4	12.7	ug/Kg	1		09/27/15 21:31
Isopropylbenzene (Cumene)	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Methylene chloride	42.4	U	84.7	26.3	ug/Kg	1		09/27/15 21:31
Methyl-t-butyl ether	42.4	U	84.7	26.3	ug/Kg	1		09/27/15 21:31
Naphthalene	21.2	U	42.4	12.7	ug/Kg	1		09/27/15 21:31
n-Butylbenzene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
n-Propylbenzene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
o-Xylene	8.89	J	21.2	6.61	ug/Kg	1		09/27/15 21:31
P & M -Xylene	27.5	J	42.4	12.7	ug/Kg	1		09/27/15 21:31
sec-Butylbenzene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Styrene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
tert-Butylbenzene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Tetrachloroethene	5.30	U	10.6	3.30	ug/Kg	1		09/27/15 21:31
Toluene	13.8	J	21.2	6.61	ug/Kg	1		09/27/15 21:31
trans-1,2-Dichloroethene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
trans-1,3-Dichloropropene	10.6	U	21.2	6.61	ug/Kg	1		09/27/15 21:31
Trichloroethene	5.30	U	10.6	3.30	ug/Kg	1		09/27/15 21:31
Trichlorofluoromethane	21.2	U	42.4	12.7	ug/Kg	1		09/27/15 21:31
Vinyl acetate	42.4	U	84.7	26.3	ug/Kg	1		09/27/15 21:31
Vinyl chloride	4.24	U	8.47	2.63	ug/Kg	1		09/27/15 21:31
Xylenes (total)	36.4	J	63.5	19.3	ug/Kg	1		09/27/15 21:31
Surrogates								
1,2-Dichloroethane-D4 (surr)	94.8		71-136		%	1		09/27/15 21:31
4-Bromofluorobenzene (surr)	107		55-151		%	1		09/27/15 21:31
Toluene-d8 (surr)	99.9		85-116		%	1		09/27/15 21:31

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J flagging is activated

Results of **17754-SS2**

Client Sample ID: **17754-SS2**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588002
Lab Project ID: 1155588

Collection Date: 09/22/15 17:10
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):94.9
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS15297
Analytical Method: SW8260B
Analyst: SCL
Analytical Date/Time: 09/27/15 21:31
Container ID: 1155588002-B

Prep Batch: VXX27966
Prep Method: SW5035A
Prep Date/Time: 09/22/15 17:10
Prep Initial Wt./Vol.: 71.111 g
Prep Extract Vol: 28.594 mL

Results of **17754-SS7**

Client Sample ID: **17754-SS7**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588003
Lab Project ID: 1155588

Collection Date: 09/22/15 17:20
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):68.4
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	6.69		1.37	0.424	mg/Kg	10		10/05/15 19:31
Barium	78.7		0.410	0.129	mg/Kg	10		10/05/15 19:31
Cadmium	0.655		0.273	0.0848	mg/Kg	10		10/05/15 19:31
Chromium	20.7		0.547	0.164	mg/Kg	10		10/05/15 19:31
Lead	13.6		0.273	0.0848	mg/Kg	10		10/05/15 19:31
Mercury	0.0881		0.0547	0.0164	mg/Kg	10		10/05/15 19:31
Selenium	1.78		1.37	0.424	mg/Kg	10		10/05/15 19:31
Silver	0.168	J	0.273	0.0848	mg/Kg	10		10/05/15 19:31

Batch Information

Analytical Batch: MMS9117
Analytical Method: SW6020A
Analyst: EAB
Analytical Date/Time: 10/05/15 19:31
Container ID: 1155588003-A

Prep Batch: MXX29168
Prep Method: SW3050B
Prep Date/Time: 10/01/15 16:08
Prep Initial Wt./Vol.: 1.069 g
Prep Extract Vol: 50 mL

Print Date: 10/08/2015 1:32:12PM

J flagging is activated

Results of **17754-SS7**

Client Sample ID: **17754-SS7**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588003
Lab Project ID: 1155588

Collection Date: 09/22/15 17:20
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):68.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	51.1		29.0	8.99	mg/Kg	1		10/07/15 01:28
Surrogates								
5a Androstane (surr)	107		50-150		%	1		10/07/15 01:28

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 10/07/15 01:28
Container ID: 1155588003-A

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 09/29/15 15:54
Prep Initial Wt./Vol.: 30.231 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	186		29.0	8.99	mg/Kg	1		10/07/15 01:28
Surrogates								
n-Triacontane-d62 (surr)	85.5		50-150		%	1		10/07/15 01:28

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 10/07/15 01:28
Container ID: 1155588003-A

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 09/29/15 15:54
Prep Initial Wt./Vol.: 30.231 g
Prep Extract Vol: 1 mL

Results of **17754-SS7**

Client Sample ID: **17754-SS7**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588003
Lab Project ID: 1155588

Collection Date: 09/22/15 17:20
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):68.4
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.80	U	5.60	1.68	mg/Kg	1		10/03/15 19:04
Surrogates								
4-Bromofluorobenzene (surr)	76.9		50-150		%	1		10/03/15 19:04

Batch Information

Analytical Batch: VFC12710
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 10/03/15 19:04
Container ID: 1155588003-B

Prep Batch: VXX28009
Prep Method: SW5035A
Prep Date/Time: 09/22/15 17:20
Prep Initial Wt./Vol.: 55.419 g
Prep Extract Vol: 42.4984 mL

Results of **17754-SS7**

Client Sample ID: **17754-SS7**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588003
Lab Project ID: 1155588

Collection Date: 09/22/15 17:20
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):68.4
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
1,1,1-Trichloroethane	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
1,1,2,2-Tetrachloroethane	14.0	U	28.0	8.74	ug/Kg	1		09/27/15 21:47
1,1,2-Trichloroethane	11.2	U	22.4	6.95	ug/Kg	1		09/27/15 21:47
1,1-Dichloroethane	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
1,1-Dichloroethene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
1,1-Dichloropropene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
1,2,3-Trichlorobenzene	56.0	U	112	33.6	ug/Kg	1		09/27/15 21:47
1,2,3-Trichloropropane	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
1,2,4-Trichlorobenzene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
1,2,4-Trimethylbenzene	56.0	U	112	33.6	ug/Kg	1		09/27/15 21:47
1,2-Dibromo-3-chloropropane	112	U	224	69.5	ug/Kg	1		09/27/15 21:47
1,2-Dibromoethane	11.2	U	22.4	6.95	ug/Kg	1		09/27/15 21:47
1,2-Dichlorobenzene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
1,2-Dichloroethane	11.2	U	22.4	6.95	ug/Kg	1		09/27/15 21:47
1,2-Dichloropropane	11.2	U	22.4	6.95	ug/Kg	1		09/27/15 21:47
1,3,5-Trimethylbenzene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
1,3-Dichlorobenzene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
1,3-Dichloropropane	11.2	U	22.4	6.95	ug/Kg	1		09/27/15 21:47
1,4-Dichlorobenzene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
2,2-Dichloropropane	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
2-Butanone (MEK)	280	U	560	175	ug/Kg	1		09/27/15 21:47
2-Chlorotoluene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
2-Hexanone	280	U	560	175	ug/Kg	1		09/27/15 21:47
4-Chlorotoluene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
4-Isopropyltoluene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
4-Methyl-2-pentanone (MIBK)	280	U	560	175	ug/Kg	1		09/27/15 21:47
Benzene	14.0	U	28.0	8.74	ug/Kg	1		09/27/15 21:47
Bromobenzene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Bromochloromethane	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Bromodichloromethane	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Bromoform	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Bromomethane	224	U	448	139	ug/Kg	1		09/27/15 21:47
Carbon disulfide	112	U	224	69.5	ug/Kg	1		09/27/15 21:47
Carbon tetrachloride	14.0	U	28.0	8.74	ug/Kg	1		09/27/15 21:47
Chlorobenzene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Chloroethane	224	U	448	139	ug/Kg	1		09/27/15 21:47

Results of **17754-SS7**

Client Sample ID: **17754-SS7**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588003
Lab Project ID: 1155588

Collection Date: 09/22/15 17:20
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):68.4
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Chloromethane	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
cis-1,2-Dichloroethene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
cis-1,3-Dichloropropene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Dibromochloromethane	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Dibromomethane	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Dichlorodifluoromethane	56.0	U	112	33.6	ug/Kg	1		09/27/15 21:47
Ethylbenzene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Freon-113	112	U	224	69.5	ug/Kg	1		09/27/15 21:47
Hexachlorobutadiene	56.0	U	112	33.6	ug/Kg	1		09/27/15 21:47
Isopropylbenzene (Cumene)	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Methylene chloride	112	U	224	69.5	ug/Kg	1		09/27/15 21:47
Methyl-t-butyl ether	112	U	224	69.5	ug/Kg	1		09/27/15 21:47
Naphthalene	56.0	U	112	33.6	ug/Kg	1		09/27/15 21:47
n-Butylbenzene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
n-Propylbenzene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
o-Xylene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
P & M -Xylene	56.0	U	112	33.6	ug/Kg	1		09/27/15 21:47
sec-Butylbenzene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Styrene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
tert-Butylbenzene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Tetrachloroethene	14.0	U	28.0	8.74	ug/Kg	1		09/27/15 21:47
Toluene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
trans-1,2-Dichloroethene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
trans-1,3-Dichloropropene	28.0	U	56.0	17.5	ug/Kg	1		09/27/15 21:47
Trichloroethene	14.0	U	28.0	8.74	ug/Kg	1		09/27/15 21:47
Trichlorofluoromethane	56.0	U	112	33.6	ug/Kg	1		09/27/15 21:47
Vinyl acetate	112	U	224	69.5	ug/Kg	1		09/27/15 21:47
Vinyl chloride	11.2	U	22.4	6.95	ug/Kg	1		09/27/15 21:47
Xylenes (total)	84.0	U	168	51.1	ug/Kg	1		09/27/15 21:47
Surrogates								
1,2-Dichloroethane-D4 (surr)	97.4		71-136		%	1		09/27/15 21:47
4-Bromofluorobenzene (surr)	104		55-151		%	1		09/27/15 21:47
Toluene-d8 (surr)	105		85-116		%	1		09/27/15 21:47

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J flagging is activated

Results of **17754-SS7**

Client Sample ID: **17754-SS7**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588003
Lab Project ID: 1155588

Collection Date: 09/22/15 17:20
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):68.4
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS15297
Analytical Method: SW8260B
Analyst: SCL
Analytical Date/Time: 09/27/15 21:47
Container ID: 1155588003-B

Prep Batch: VXX27966
Prep Method: SW5035A
Prep Date/Time: 09/22/15 17:20
Prep Initial Wt./Vol.: 55.419 g
Prep Extract Vol: 42.4984 mL

Results of **17754-SS11**

Client Sample ID: **17754-SS11**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588004
Lab Project ID: 1155588

Collection Date: 09/22/15 17:30
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.4
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	5.36		1.06	0.329	mg/Kg	10		10/05/15 19:33
Barium	87.6		0.318	0.0997	mg/Kg	10		10/05/15 19:33
Cadmium	0.764		0.212	0.0658	mg/Kg	10		10/05/15 19:33
Chromium	18.2		0.424	0.127	mg/Kg	10		10/05/15 19:33
Lead	11.8		0.212	0.0658	mg/Kg	10		10/05/15 19:33
Mercury	0.0709		0.0424	0.0127	mg/Kg	10		10/05/15 19:33
Selenium	1.41		1.06	0.329	mg/Kg	10		10/05/15 19:33
Silver	0.142	J	0.212	0.0658	mg/Kg	10		10/05/15 19:33

Batch Information

Analytical Batch: MMS9117
Analytical Method: SW6020A
Analyst: EAB
Analytical Date/Time: 10/05/15 19:33
Container ID: 1155588004-A

Prep Batch: MXX29168
Prep Method: SW3050B
Prep Date/Time: 10/01/15 16:08
Prep Initial Wt./Vol.: 1.173 g
Prep Extract Vol: 50 mL

Print Date: 10/08/2015 1:32:12PM

J flagging is activated

Results of **17754-SS11**

Client Sample ID: **17754-SS11**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588004
Lab Project ID: 1155588

Collection Date: 09/22/15 17:30
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.4
Location:

Results by **Polychlorinated Biphenyls**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Aroclor-1016	30.9	U	61.9	18.6	ug/Kg	1		10/02/15 00:19
Aroclor-1221	30.9	U	61.9	18.6	ug/Kg	1		10/02/15 00:19
Aroclor-1232	30.9	U	61.9	18.6	ug/Kg	1		10/02/15 00:19
Aroclor-1242	30.9	U	61.9	18.6	ug/Kg	1		10/02/15 00:19
Aroclor-1248	30.9	U	61.9	18.6	ug/Kg	1		10/02/15 00:19
Aroclor-1254	30.9	U	61.9	18.6	ug/Kg	1		10/02/15 00:19
Aroclor-1260	30.9	U	61.9	18.6	ug/Kg	1		10/02/15 00:19
Surrogates								
Decachlorobiphenyl (surr)	78		60-125		%	1		10/02/15 00:19

Batch Information

Analytical Batch: XGC9125
Analytical Method: SW8082A
Analyst: MCM
Analytical Date/Time: 10/02/15 00:19
Container ID: 1155588004-A

Prep Batch: XXX34277
Prep Method: SW3550C
Prep Date/Time: 09/30/15 09:27
Prep Initial Wt./Vol.: 22.612 g
Prep Extract Vol: 5 mL

Results of **17754-SS11**

Client Sample ID: **17754-SS11**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588004
Lab Project ID: 1155588

Collection Date: 09/22/15 17:30
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	8850		394	122	mg/Kg	4		10/06/15 22:44
Surrogates								
5a Androstane (surr)	0	*	50-150		%	4		10/06/15 22:44

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 10/06/15 22:44
Container ID: 1155588004-A

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 09/29/15 15:54
Prep Initial Wt./Vol.: 30.326 g
Prep Extract Vol: 4 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	9120		394	122	mg/Kg	4		10/06/15 22:44
Surrogates								
n-Triacontane-d62 (surr)	0	*	50-150		%	4		10/06/15 22:44

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 10/06/15 22:44
Container ID: 1155588004-A

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 09/29/15 15:54
Prep Initial Wt./Vol.: 30.326 g
Prep Extract Vol: 4 mL

Print Date: 10/08/2015 1:32:12PM

J flagging is activated

Results of **17754-SS11**

Client Sample ID: **17754-SS11**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588004
Lab Project ID: 1155588

Collection Date: 09/22/15 17:30
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.4
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.84	J	3.78	1.13	mg/Kg	1		10/03/15 19:23
Surrogates								
4-Bromofluorobenzene (surr)	64.3		50-150		%	1		10/03/15 19:23

Batch Information

Analytical Batch: VFC12710
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 10/03/15 19:23
Container ID: 1155588004-B

Prep Batch: VXX28009
Prep Method: SW5035A
Prep Date/Time: 09/22/15 17:30
Prep Initial Wt./Vol.: 60.828 g
Prep Extract Vol: 36.9412 mL

Print Date: 10/08/2015 1:32:12PM

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Results of **17754-SS11**

Client Sample ID: **17754-SS11**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588004
Lab Project ID: 1155588

Collection Date: 09/22/15 17:30
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.4
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
1,1,1-Trichloroethane	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
1,1,2,2-Tetrachloroethane	9.45	U	18.9	5.89	ug/Kg	1		09/27/15 22:03
1,1,2-Trichloroethane	7.55	U	15.1	4.69	ug/Kg	1		09/27/15 22:03
1,1-Dichloroethane	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
1,1-Dichloroethene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
1,1-Dichloropropene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
1,2,3-Trichlorobenzene	37.8	U	75.6	22.7	ug/Kg	1		09/27/15 22:03
1,2,3-Trichloropropane	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
1,2,4-Trichlorobenzene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
1,2,4-Trimethylbenzene	37.8	U	75.6	22.7	ug/Kg	1		09/27/15 22:03
1,2-Dibromo-3-chloropropane	75.5	U	151	46.9	ug/Kg	1		09/27/15 22:03
1,2-Dibromoethane	7.55	U	15.1	4.69	ug/Kg	1		09/27/15 22:03
1,2-Dichlorobenzene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
1,2-Dichloroethane	7.55	U	15.1	4.69	ug/Kg	1		09/27/15 22:03
1,2-Dichloropropane	7.55	U	15.1	4.69	ug/Kg	1		09/27/15 22:03
1,3,5-Trimethylbenzene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
1,3-Dichlorobenzene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
1,3-Dichloropropane	7.55	U	15.1	4.69	ug/Kg	1		09/27/15 22:03
1,4-Dichlorobenzene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
2,2-Dichloropropane	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
2-Butanone (MEK)	189	U	378	118	ug/Kg	1		09/27/15 22:03
2-Chlorotoluene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
2-Hexanone	189	U	378	118	ug/Kg	1		09/27/15 22:03
4-Chlorotoluene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
4-Isopropyltoluene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
4-Methyl-2-pentanone (MIBK)	189	U	378	118	ug/Kg	1		09/27/15 22:03
Benzene	9.45	U	18.9	5.89	ug/Kg	1		09/27/15 22:03
Bromobenzene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Bromochloromethane	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Bromodichloromethane	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Bromoform	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Bromomethane	151	U	302	93.7	ug/Kg	1		09/27/15 22:03
Carbon disulfide	75.5	U	151	46.9	ug/Kg	1		09/27/15 22:03
Carbon tetrachloride	9.45	U	18.9	5.89	ug/Kg	1		09/27/15 22:03
Chlorobenzene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Chloroethane	151	U	302	93.7	ug/Kg	1		09/27/15 22:03

Results of **17754-SS11**

Client Sample ID: **17754-SS11**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588004
Lab Project ID: 1155588

Collection Date: 09/22/15 17:30
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.4
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Chloromethane	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
cis-1,2-Dichloroethene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
cis-1,3-Dichloropropene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Dibromochloromethane	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Dibromomethane	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Dichlorodifluoromethane	37.8	U	75.6	22.7	ug/Kg	1		09/27/15 22:03
Ethylbenzene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Freon-113	75.5	U	151	46.9	ug/Kg	1		09/27/15 22:03
Hexachlorobutadiene	37.8	U	75.6	22.7	ug/Kg	1		09/27/15 22:03
Isopropylbenzene (Cumene)	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Methylene chloride	75.5	U	151	46.9	ug/Kg	1		09/27/15 22:03
Methyl-t-butyl ether	75.5	U	151	46.9	ug/Kg	1		09/27/15 22:03
Naphthalene	42.7	J	75.6	22.7	ug/Kg	1		09/27/15 22:03
n-Butylbenzene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
n-Propylbenzene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
o-Xylene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
P & M -Xylene	37.8	U	75.6	22.7	ug/Kg	1		09/27/15 22:03
sec-Butylbenzene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Styrene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
tert-Butylbenzene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Tetrachloroethene	9.45	U	18.9	5.89	ug/Kg	1		09/27/15 22:03
Toluene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
trans-1,2-Dichloroethene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
trans-1,3-Dichloropropene	18.9	U	37.8	11.8	ug/Kg	1		09/27/15 22:03
Trichloroethene	9.45	U	18.9	5.89	ug/Kg	1		09/27/15 22:03
Trichlorofluoromethane	94.1		75.6	22.7	ug/Kg	1		09/27/15 22:03
Vinyl acetate	75.5	U	151	46.9	ug/Kg	1		09/27/15 22:03
Vinyl chloride	7.55	U	15.1	4.69	ug/Kg	1		09/27/15 22:03
Xylenes (total)	56.5	U	113	34.5	ug/Kg	1		09/27/15 22:03
Surrogates								
1,2-Dichloroethane-D4 (surr)	99		71-136		%	1		09/27/15 22:03
4-Bromofluorobenzene (surr)	85.8		55-151		%	1		09/27/15 22:03
Toluene-d8 (surr)	105		85-116		%	1		09/27/15 22:03

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Results of **17754-SS11**

Client Sample ID: **17754-SS11**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588004
Lab Project ID: 1155588

Collection Date: 09/22/15 17:30
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.4
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS15297
Analytical Method: SW8260B
Analyst: SCL
Analytical Date/Time: 09/27/15 22:03
Container ID: 1155588004-B

Prep Batch: VXX27966
Prep Method: SW5035A
Prep Date/Time: 09/22/15 17:30
Prep Initial Wt./Vol.: 60.828 g
Prep Extract Vol: 36.9412 mL

Results of **17754-SS16**

Client Sample ID: **17754-SS16**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588005
Lab Project ID: 1155588

Collection Date: 09/22/15 16:45
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.8
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	4.15		1.15	0.355	mg/Kg	10		10/06/15 18:36
Barium	79.6		0.344	0.108	mg/Kg	10		10/06/15 18:36
Cadmium	0.590		0.229	0.0711	mg/Kg	10		10/06/15 18:36
Chromium	14.5		0.459	0.138	mg/Kg	10		10/06/15 18:36
Lead	8.17		0.229	0.0711	mg/Kg	10		10/06/15 18:36
Mercury	0.0529		0.0459	0.0138	mg/Kg	10		10/06/15 18:36
Selenium	0.508	J	1.15	0.355	mg/Kg	10		10/06/15 18:36
Silver	0.0893	J	0.229	0.0711	mg/Kg	10		10/06/15 18:36

Batch Information

Analytical Batch: MMS9119
Analytical Method: SW6020A
Analyst: EAB
Analytical Date/Time: 10/06/15 18:36
Container ID: 1155588005-A

Prep Batch: MXX29168
Prep Method: SW3050B
Prep Date/Time: 10/01/15 16:08
Prep Initial Wt./Vol.: 1.08 g
Prep Extract Vol: 50 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Results of **17754-SS16**

Client Sample ID: **17754-SS16**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588005
Lab Project ID: 1155588

Collection Date: 09/22/15 16:45
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.8
Location:

Results by **Polychlorinated Biphenyls**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Aroclor-1016	30.3	U	60.6	18.2	ug/Kg	1		10/02/15 00:31
Aroclor-1221	30.3	U	60.6	18.2	ug/Kg	1		10/02/15 00:31
Aroclor-1232	30.3	U	60.6	18.2	ug/Kg	1		10/02/15 00:31
Aroclor-1242	30.3	U	60.6	18.2	ug/Kg	1		10/02/15 00:31
Aroclor-1248	30.3	U	60.6	18.2	ug/Kg	1		10/02/15 00:31
Aroclor-1254	30.3	U	60.6	18.2	ug/Kg	1		10/02/15 00:31
Aroclor-1260	30.3	U	60.6	18.2	ug/Kg	1		10/02/15 00:31
Surrogates								
Decachlorobiphenyl (surr)	135	*	60-125		%	1		10/02/15 00:31

Batch Information

Analytical Batch: XGC9125
Analytical Method: SW8082A
Analyst: MCM
Analytical Date/Time: 10/02/15 00:31
Container ID: 1155588005-A

Prep Batch: XXX34277
Prep Method: SW3550C
Prep Date/Time: 09/30/15 09:27
Prep Initial Wt./Vol.: 23.003 g
Prep Extract Vol: 5 mL

Print Date: 10/08/2015 1:32:12PM

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Results of **17754-SS16**

Client Sample ID: **17754-SS16**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588005
Lab Project ID: 1155588

Collection Date: 09/22/15 16:45
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.8
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	6040		985	305	mg/Kg	40		10/07/15 11:34
Surrogates								
5a Androstane (surr)	0	*	50-150		%	40		10/07/15 11:34

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 10/07/15 11:34
Container ID: 1155588005-A

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 09/29/15 15:54
Prep Initial Wt./Vol.: 30.158 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	4810		985	305	mg/Kg	40		10/07/15 11:34
Surrogates								
n-Triacontane-d62 (surr)	0	*	50-150		%	40		10/07/15 11:34

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 10/07/15 11:34
Container ID: 1155588005-A

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 09/29/15 15:54
Prep Initial Wt./Vol.: 30.158 g
Prep Extract Vol: 1 mL

Print Date: 10/08/2015 1:32:12PM

J flagging is activated

Results of **17754-SS16**

Client Sample ID: **17754-SS16**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588005
Lab Project ID: 1155588

Collection Date: 09/22/15 16:45
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.8
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.99	J	3.86	1.16	mg/Kg	1		10/03/15 19:42
Surrogates								
4-Bromofluorobenzene (surr)	79.8		50-150		%	1		10/03/15 19:42

Batch Information

Analytical Batch: VFC12710
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 10/03/15 19:42
Container ID: 1155588005-B

Prep Batch: VXX28009
Prep Method: SW5035A
Prep Date/Time: 09/22/15 16:45
Prep Initial Wt./Vol.: 57.912 g
Prep Extract Vol: 36.1421 mL

Results of **17754-SS16**

Client Sample ID: **17754-SS16**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588005
Lab Project ID: 1155588

Collection Date: 09/22/15 16:45
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.8
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
1,1,1-Trichloroethane	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
1,1,2,2-Tetrachloroethane	9.65	U	19.3	6.03	ug/Kg	1		09/27/15 22:19
1,1,2-Trichloroethane	7.75	U	15.5	4.79	ug/Kg	1		09/27/15 22:19
1,1-Dichloroethane	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
1,1-Dichloroethene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
1,1-Dichloropropene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
1,2,3-Trichlorobenzene	38.6	U	77.3	23.2	ug/Kg	1		09/27/15 22:19
1,2,3-Trichloropropane	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
1,2,4-Trichlorobenzene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
1,2,4-Trimethylbenzene	38.6	U	77.3	23.2	ug/Kg	1		09/27/15 22:19
1,2-Dibromo-3-chloropropane	77.5	U	155	47.9	ug/Kg	1		09/27/15 22:19
1,2-Dibromoethane	7.75	U	15.5	4.79	ug/Kg	1		09/27/15 22:19
1,2-Dichlorobenzene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
1,2-Dichloroethane	7.75	U	15.5	4.79	ug/Kg	1		09/27/15 22:19
1,2-Dichloropropane	7.75	U	15.5	4.79	ug/Kg	1		09/27/15 22:19
1,3,5-Trimethylbenzene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
1,3-Dichlorobenzene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
1,3-Dichloropropane	7.75	U	15.5	4.79	ug/Kg	1		09/27/15 22:19
1,4-Dichlorobenzene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
2,2-Dichloropropane	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
2-Butanone (MEK)	193	U	386	121	ug/Kg	1		09/27/15 22:19
2-Chlorotoluene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
2-Hexanone	193	U	386	121	ug/Kg	1		09/27/15 22:19
4-Chlorotoluene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
4-Isopropyltoluene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
4-Methyl-2-pentanone (MIBK)	193	U	386	121	ug/Kg	1		09/27/15 22:19
Benzene	9.65	U	19.3	6.03	ug/Kg	1		09/27/15 22:19
Bromobenzene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Bromochloromethane	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Bromodichloromethane	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Bromoform	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Bromomethane	155	U	309	95.8	ug/Kg	1		09/27/15 22:19
Carbon disulfide	77.5	U	155	47.9	ug/Kg	1		09/27/15 22:19
Carbon tetrachloride	9.65	U	19.3	6.03	ug/Kg	1		09/27/15 22:19
Chlorobenzene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Chloroethane	155	U	309	95.8	ug/Kg	1		09/27/15 22:19

Print Date: 10/08/2015 1:32:12PM

J flagging is activated

Results of **17754-SS16**

Client Sample ID: **17754-SS16**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588005
Lab Project ID: 1155588

Collection Date: 09/22/15 16:45
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.8
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Chloromethane	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
cis-1,2-Dichloroethene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
cis-1,3-Dichloropropene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Dibromochloromethane	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Dibromomethane	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Dichlorodifluoromethane	38.6	U	77.3	23.2	ug/Kg	1		09/27/15 22:19
Ethylbenzene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Freon-113	77.5	U	155	47.9	ug/Kg	1		09/27/15 22:19
Hexachlorobutadiene	38.6	U	77.3	23.2	ug/Kg	1		09/27/15 22:19
Isopropylbenzene (Cumene)	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Methylene chloride	77.5	U	155	47.9	ug/Kg	1		09/27/15 22:19
Methyl-t-butyl ether	77.5	U	155	47.9	ug/Kg	1		09/27/15 22:19
Naphthalene	38.6	U	77.3	23.2	ug/Kg	1		09/27/15 22:19
n-Butylbenzene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
n-Propylbenzene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
o-Xylene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
P & M -Xylene	38.6	U	77.3	23.2	ug/Kg	1		09/27/15 22:19
sec-Butylbenzene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Styrene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
tert-Butylbenzene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Tetrachloroethene	9.65	U	19.3	6.03	ug/Kg	1		09/27/15 22:19
Toluene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
trans-1,2-Dichloroethene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
trans-1,3-Dichloropropene	19.3	U	38.6	12.1	ug/Kg	1		09/27/15 22:19
Trichloroethene	9.65	U	19.3	6.03	ug/Kg	1		09/27/15 22:19
Trichlorofluoromethane	36.7	J	77.3	23.2	ug/Kg	1		09/27/15 22:19
Vinyl acetate	77.5	U	155	47.9	ug/Kg	1		09/27/15 22:19
Vinyl chloride	7.75	U	15.5	4.79	ug/Kg	1		09/27/15 22:19
Xylenes (total)	58.0	U	116	35.2	ug/Kg	1		09/27/15 22:19
Surrogates								
1,2-Dichloroethane-D4 (surr)	99.7		71-136		%	1		09/27/15 22:19
4-Bromofluorobenzene (surr)	90.7		55-151		%	1		09/27/15 22:19
Toluene-d8 (surr)	104		85-116		%	1		09/27/15 22:19

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Results of **17754-SS16**

Client Sample ID: **17754-SS16**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588005
Lab Project ID: 1155588

Collection Date: 09/22/15 16:45
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):80.8
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS15297
Analytical Method: SW8260B
Analyst: SCL
Analytical Date/Time: 09/27/15 22:19
Container ID: 1155588005-B

Prep Batch: VXX27966
Prep Method: SW5035A
Prep Date/Time: 09/22/15 16:45
Prep Initial Wt./Vol.: 57.912 g
Prep Extract Vol: 36.1421 mL

Results of **17754-SS17**

Client Sample ID: **17754-SS17**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588006
Lab Project ID: 1155588

Collection Date: 09/22/15 16:55
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):78.8
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	5.51		1.16	0.361	mg/Kg	10		10/06/15 18:38
Barium	95.8		0.349	0.109	mg/Kg	10		10/06/15 18:38
Cadmium	0.729		0.233	0.0722	mg/Kg	10		10/06/15 18:38
Chromium	17.4		0.466	0.140	mg/Kg	10		10/06/15 18:38
Lead	10.7		0.233	0.0722	mg/Kg	10		10/06/15 18:38
Mercury	0.0609		0.0466	0.0140	mg/Kg	10		10/06/15 18:38
Selenium	0.680	J	1.16	0.361	mg/Kg	10		10/06/15 18:38
Silver	0.160	J	0.233	0.0722	mg/Kg	10		10/06/15 18:38

Batch Information

Analytical Batch: MMS9119
Analytical Method: SW6020A
Analyst: EAB
Analytical Date/Time: 10/06/15 18:38
Container ID: 1155588006-A

Prep Batch: MXX29168
Prep Method: SW3050B
Prep Date/Time: 10/01/15 16:08
Prep Initial Wt./Vol.: 1.089 g
Prep Extract Vol: 50 mL

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Results of **17754-SS17**

Client Sample ID: **17754-SS17**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588006
Lab Project ID: 1155588

Collection Date: 09/22/15 16:55
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):78.8
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	12400		405	125	mg/Kg	4		10/06/15 22:03
Surrogates								
5a Androstane (surr)	0	*	50-150		%	4		10/06/15 22:03

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK102
Analyst: KJO
Analytical Date/Time: 10/06/15 22:03
Container ID: 1155588006-A

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 09/29/15 15:54
Prep Initial Wt./Vol.: 30.078 g
Prep Extract Vol: 4 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	3140		405	125	mg/Kg	4		10/06/15 22:03
Surrogates								
n-Triacontane-d62 (surr)	0	*	50-150		%	4		10/06/15 22:03

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK103
Analyst: KJO
Analytical Date/Time: 10/06/15 22:03
Container ID: 1155588006-A

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 09/29/15 15:54
Prep Initial Wt./Vol.: 30.078 g
Prep Extract Vol: 4 mL

Print Date: 10/08/2015 1:32:12PM

J flagging is activated

Results of **17754-SS17**

Client Sample ID: **17754-SS17**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588006
Lab Project ID: 1155588

Collection Date: 09/22/15 16:55
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):78.8
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.11	U	4.21	1.26	mg/Kg	1		10/03/15 20:01
Surrogates								
4-Bromofluorobenzene (surr)	58		50-150		%	1		10/03/15 20:01

Batch Information

Analytical Batch: VFC12710
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 10/03/15 20:01
Container ID: 1155588006-B

Prep Batch: VXX28009
Prep Method: SW5035A
Prep Date/Time: 09/22/15 16:55
Prep Initial Wt./Vol.: 55.311 g
Prep Extract Vol: 36.7042 mL

Results of **17754-SS17**

Client Sample ID: **17754-SS17**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588006
Lab Project ID: 1155588

Collection Date: 09/22/15 16:55
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):78.8
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
1,1,1-Trichloroethane	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
1,1,2,2-Tetrachloroethane	10.5	U	21.0	6.57	ug/Kg	1		09/27/15 22:35
1,1,2-Trichloroethane	8.40	U	16.8	5.22	ug/Kg	1		09/27/15 22:35
1,1-Dichloroethane	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
1,1-Dichloroethene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
1,1-Dichloropropene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
1,2,3-Trichlorobenzene	42.1	U	84.2	25.3	ug/Kg	1		09/27/15 22:35
1,2,3-Trichloropropane	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
1,2,4-Trichlorobenzene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
1,2,4-Trimethylbenzene	42.1	U	84.2	25.3	ug/Kg	1		09/27/15 22:35
1,2-Dibromo-3-chloropropane	84.0	U	168	52.2	ug/Kg	1		09/27/15 22:35
1,2-Dibromoethane	8.40	U	16.8	5.22	ug/Kg	1		09/27/15 22:35
1,2-Dichlorobenzene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
1,2-Dichloroethane	8.40	U	16.8	5.22	ug/Kg	1		09/27/15 22:35
1,2-Dichloropropane	8.40	U	16.8	5.22	ug/Kg	1		09/27/15 22:35
1,3,5-Trimethylbenzene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
1,3-Dichlorobenzene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
1,3-Dichloropropane	8.40	U	16.8	5.22	ug/Kg	1		09/27/15 22:35
1,4-Dichlorobenzene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
2,2-Dichloropropane	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
2-Butanone (MEK)	211	U	421	131	ug/Kg	1		09/27/15 22:35
2-Chlorotoluene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
2-Hexanone	211	U	421	131	ug/Kg	1		09/27/15 22:35
4-Chlorotoluene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
4-Isopropyltoluene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
4-Methyl-2-pentanone (MIBK)	211	U	421	131	ug/Kg	1		09/27/15 22:35
Benzene	10.5	U	21.0	6.57	ug/Kg	1		09/27/15 22:35
Bromobenzene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Bromochloromethane	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Bromodichloromethane	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Bromoform	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Bromomethane	169	U	337	104	ug/Kg	1		09/27/15 22:35
Carbon disulfide	84.0	U	168	52.2	ug/Kg	1		09/27/15 22:35
Carbon tetrachloride	10.5	U	21.0	6.57	ug/Kg	1		09/27/15 22:35
Chlorobenzene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Chloroethane	169	U	337	104	ug/Kg	1		09/27/15 22:35

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Results of **17754-SS17**

Client Sample ID: **17754-SS17**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588006
Lab Project ID: 1155588

Collection Date: 09/22/15 16:55
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):78.8
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Chloromethane	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
cis-1,2-Dichloroethene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
cis-1,3-Dichloropropene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Dibromochloromethane	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Dibromomethane	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Dichlorodifluoromethane	42.1	U	84.2	25.3	ug/Kg	1		09/27/15 22:35
Ethylbenzene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Freon-113	84.0	U	168	52.2	ug/Kg	1		09/27/15 22:35
Hexachlorobutadiene	42.1	U	84.2	25.3	ug/Kg	1		09/27/15 22:35
Isopropylbenzene (Cumene)	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Methylene chloride	84.0	U	168	52.2	ug/Kg	1		09/27/15 22:35
Methyl-t-butyl ether	84.0	U	168	52.2	ug/Kg	1		09/27/15 22:35
Naphthalene	42.1	U	84.2	25.3	ug/Kg	1		09/27/15 22:35
n-Butylbenzene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
n-Propylbenzene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
o-Xylene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
P & M -Xylene	42.1	U	84.2	25.3	ug/Kg	1		09/27/15 22:35
sec-Butylbenzene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Styrene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
tert-Butylbenzene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Tetrachloroethene	10.5	U	21.0	6.57	ug/Kg	1		09/27/15 22:35
Toluene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
trans-1,2-Dichloroethene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
trans-1,3-Dichloropropene	21.1	U	42.1	13.1	ug/Kg	1		09/27/15 22:35
Trichloroethene	10.5	U	21.0	6.57	ug/Kg	1		09/27/15 22:35
Trichlorofluoromethane	50.1	J	84.2	25.3	ug/Kg	1		09/27/15 22:35
Vinyl acetate	84.0	U	168	52.2	ug/Kg	1		09/27/15 22:35
Vinyl chloride	8.40	U	16.8	5.22	ug/Kg	1		09/27/15 22:35
Xylenes (total)	63.0	U	126	38.4	ug/Kg	1		09/27/15 22:35
Surrogates								
1,2-Dichloroethane-D4 (surr)	95.9		71-136		%	1		09/27/15 22:35
4-Bromofluorobenzene (surr)	84.4		55-151		%	1		09/27/15 22:35
Toluene-d8 (surr)	102		85-116		%	1		09/27/15 22:35

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Results of **17754-SS17**

Client Sample ID: **17754-SS17**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588006
Lab Project ID: 1155588

Collection Date: 09/22/15 16:55
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):78.8
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS15297
Analytical Method: SW8260B
Analyst: SCL
Analytical Date/Time: 09/27/15 22:35
Container ID: 1155588006-B

Prep Batch: VXX27966
Prep Method: SW5035A
Prep Date/Time: 09/22/15 16:55
Prep Initial Wt./Vol.: 55.311 g
Prep Extract Vol: 36.7042 mL

Results of **17754-TB**

Client Sample ID: **17754-TB**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588007
Lab Project ID: 1155588

Collection Date: 09/22/15 18:00
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.25	U	2.49	0.746	mg/Kg	1		10/03/15 15:53
Surrogates								
4-Bromofluorobenzene (surr)	88.8		50-150		%	1		10/03/15 15:53

Batch Information

Analytical Batch: VFC12710
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 10/03/15 15:53
Container ID: 1155588007-A

Prep Batch: VXX28009
Prep Method: SW5035A
Prep Date/Time: 09/22/15 18:00
Prep Initial Wt./Vol.: 50.235 g
Prep Extract Vol: 25 mL

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J flagging is activated

Results of **17754-TB**

Client Sample ID: **17754-TB**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588007
Lab Project ID: 1155588

Collection Date: 09/22/15 18:00
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
1,1,1-Trichloroethane	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
1,1,2,2-Tetrachloroethane	6.20	U	12.4	3.88	ug/Kg	1		09/27/15 20:27
1,1,2-Trichloroethane	4.97	U	9.95	3.09	ug/Kg	1		09/27/15 20:27
1,1-Dichloroethane	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
1,1-Dichloroethene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
1,1-Dichloropropene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
1,2,3-Trichlorobenzene	24.9	U	49.8	14.9	ug/Kg	1		09/27/15 20:27
1,2,3-Trichloropropane	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
1,2,4-Trichlorobenzene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
1,2,4-Trimethylbenzene	24.9	U	49.8	14.9	ug/Kg	1		09/27/15 20:27
1,2-Dibromo-3-chloropropane	49.8	U	99.5	30.9	ug/Kg	1		09/27/15 20:27
1,2-Dibromoethane	4.97	U	9.95	3.09	ug/Kg	1		09/27/15 20:27
1,2-Dichlorobenzene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
1,2-Dichloroethane	4.97	U	9.95	3.09	ug/Kg	1		09/27/15 20:27
1,2-Dichloropropane	4.97	U	9.95	3.09	ug/Kg	1		09/27/15 20:27
1,3,5-Trimethylbenzene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
1,3-Dichlorobenzene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
1,3-Dichloropropane	4.97	U	9.95	3.09	ug/Kg	1		09/27/15 20:27
1,4-Dichlorobenzene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
2,2-Dichloropropane	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
2-Butanone (MEK)	125	U	249	77.6	ug/Kg	1		09/27/15 20:27
2-Chlorotoluene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
2-Hexanone	125	U	249	77.6	ug/Kg	1		09/27/15 20:27
4-Chlorotoluene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
4-Isopropyltoluene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
4-Methyl-2-pentanone (MIBK)	125	U	249	77.6	ug/Kg	1		09/27/15 20:27
Benzene	6.20	U	12.4	3.88	ug/Kg	1		09/27/15 20:27
Bromobenzene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Bromochloromethane	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Bromodichloromethane	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Bromoform	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Bromomethane	99.5	U	199	61.7	ug/Kg	1		09/27/15 20:27
Carbon disulfide	49.8	U	99.5	30.9	ug/Kg	1		09/27/15 20:27
Carbon tetrachloride	6.20	U	12.4	3.88	ug/Kg	1		09/27/15 20:27
Chlorobenzene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Chloroethane	99.5	U	199	61.7	ug/Kg	1		09/27/15 20:27

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Results of **17754-TB**

Client Sample ID: **17754-TB**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588007
Lab Project ID: 1155588

Collection Date: 09/22/15 18:00
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Chloromethane	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
cis-1,2-Dichloroethene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
cis-1,3-Dichloropropene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Dibromochloromethane	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Dibromomethane	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Dichlorodifluoromethane	24.9	U	49.8	14.9	ug/Kg	1		09/27/15 20:27
Ethylbenzene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Freon-113	49.8	U	99.5	30.9	ug/Kg	1		09/27/15 20:27
Hexachlorobutadiene	24.9	U	49.8	14.9	ug/Kg	1		09/27/15 20:27
Isopropylbenzene (Cumene)	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Methylene chloride	49.8	U	99.5	30.9	ug/Kg	1		09/27/15 20:27
Methyl-t-butyl ether	49.8	U	99.5	30.9	ug/Kg	1		09/27/15 20:27
Naphthalene	24.9	U	49.8	14.9	ug/Kg	1		09/27/15 20:27
n-Butylbenzene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
n-Propylbenzene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
o-Xylene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
P & M -Xylene	24.9	U	49.8	14.9	ug/Kg	1		09/27/15 20:27
sec-Butylbenzene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Styrene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
tert-Butylbenzene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Tetrachloroethene	6.20	U	12.4	3.88	ug/Kg	1		09/27/15 20:27
Toluene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
trans-1,2-Dichloroethene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
trans-1,3-Dichloropropene	12.4	U	24.9	7.76	ug/Kg	1		09/27/15 20:27
Trichloroethene	6.20	U	12.4	3.88	ug/Kg	1		09/27/15 20:27
Trichlorofluoromethane	24.9	U	49.8	14.9	ug/Kg	1		09/27/15 20:27
Vinyl acetate	49.8	U	99.5	30.9	ug/Kg	1		09/27/15 20:27
Vinyl chloride	4.97	U	9.95	3.09	ug/Kg	1		09/27/15 20:27
Xylenes (total)	37.3	U	74.6	22.7	ug/Kg	1		09/27/15 20:27
Surrogates								
1,2-Dichloroethane-D4 (surr)	94.6		71-136		%	1		09/27/15 20:27
4-Bromofluorobenzene (surr)	103		55-151		%	1		09/27/15 20:27
Toluene-d8 (surr)	98.3		85-116		%	1		09/27/15 20:27

Print Date: 10/08/2015 1:32:12PM

J flagging is activated

Results of **17754-TB**

Client Sample ID: **17754-TB**
Client Project ID: **17754-001 Arctic Village**
Lab Sample ID: 1155588007
Lab Project ID: 1155588

Collection Date: 09/22/15 18:00
Received Date: 09/24/15 15:30
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS15297
Analytical Method: SW8260B
Analyst: SCL
Analytical Date/Time: 09/27/15 20:27
Container ID: 1155588007-A

Prep Batch: VXX27966
Prep Method: SW5035A
Prep Date/Time: 09/22/15 18:00
Prep Initial Wt./Vol.: 50.235 g
Prep Extract Vol: 25 mL

Method Blank

Blank ID: MB for HBN 1721706 [MXX/29168]
Blank Lab ID: 1294607

Matrix: Soil/Solid (dry weight)

QC for Samples:
1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006

Results by **SW6020A**

Parameter	Results	LOQ/CL	DL	Units
Arsenic	0.500U	1.00	0.310	mg/Kg
Barium	0.150U	0.300	0.0940	mg/Kg
Cadmium	0.100U	0.200	0.0620	mg/Kg
Chromium	0.200U	0.400	0.120	mg/Kg
Lead	0.100U	0.200	0.0620	mg/Kg
Mercury	0.0200U	0.0400	0.0120	mg/Kg
Selenium	0.500U	1.00	0.310	mg/Kg
Silver	0.100U	0.200	0.0620	mg/Kg

Batch Information

Analytical Batch: MMS9117
Analytical Method: SW6020A
Instrument: Perkin Elmer Sciex ICP-MS P3
Analyst: EAB
Analytical Date/Time: 10/5/2015 6:25:18PM

Prep Batch: MXX29168
Prep Method: SW3050B
Prep Date/Time: 10/1/2015 4:08:52PM
Prep Initial Wt./Vol.: 1 g
Prep Extract Vol: 50 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1155588 [MXX29168]
Blank Spike Lab ID: 1294608
Date Analyzed: 10/05/2015 18:27

Spike Duplicate ID: LCSD for HBN 1155588 [MXX29168]
Spike Duplicate Lab ID: 1294609
Matrix: Soil/Solid (dry weight)

QC for Samples: 1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006

Results by **SW6020A**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Arsenic	50	51.7	103	50	52.2	104	(82-118)	0.96	(< 20)
Barium	50	48.6	97	50	47.6	95	(86-116)	2.20	(< 20)
Cadmium	5	5.12	102	5	5.01	100	(84-116)	2.18	(< 20)
Chromium	20	19.8	99	20	19.9	100	(83-119)	0.51	(< 20)
Lead	50	53.0	106	50	53.5	107	(84-118)	0.85	(< 20)
Mercury	0.5	0.523	105	0.5	0.527	105	(74-126)	0.69	(< 20)
Selenium	50	53.7	107	50	52.3	105	(80-119)	2.75	(< 20)
Silver	5	5.14	103	5	5.03	101	(83-118)	2.14	(< 20)

Batch Information

Analytical Batch: **MMS9117**
Analytical Method: **SW6020A**
Instrument: **Perkin Elmer Sciex ICP-MS P3**
Analyst: **EAB**

Prep Batch: **MXX29168**
Prep Method: **SW3050B**
Prep Date/Time: **10/01/2015 16:08**
Spike Init Wt./Vol.: 50 mg/Kg Extract Vol: 50 mL
Dupe Init Wt./Vol.: 50 mg/Kg Extract Vol: 50 mL

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Matrix Spike Summary

Original Sample ID: 1155618012
MS Sample ID: 1294610 MS
MSD Sample ID: 1294611 MSD

Analysis Date: 10/05/2015 18:32
Analysis Date: 10/05/2015 18:34
Analysis Date: 10/05/2015 18:37
Matrix: Soil/Solid (dry weight)

QC for Samples: 1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006

Results by **SW6020A**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Arsenic	8.55	49.1	55.3	95	48.8	53.4	92	82-118	3.38	(< 20)
Barium	50.8	49.1	113	127 *	48.8	112	126 *	86-116	0.41	(< 20)
Cadmium	0.0884J	4.91	5.05	101	4.88	4.91	99	84-116	2.93	(< 20)
Chromium	14.3	19.6	33.9	100	19.5	35.3	107	83-119	3.85	(< 20)
Lead	5.46	49.1	57.6	106	48.8	55.3	102	84-118	4.13	(< 20)
Mercury	0.0201U	0.491	0.528	108	0.488	0.503	103	74-126	4.97	(< 20)
Selenium	0.408J	49.1	52.4	106	48.8	50.7	103	80-119	3.27	(< 20)
Silver	0.101U	4.91	5.09	104	4.88	4.92	101	83-118	3.50	(< 20)

Batch Information

Analytical Batch: MMS9117
Analytical Method: SW6020A
Instrument: Perkin Elmer Sciex ICP-MS P3
Analyst: EAB
Analytical Date/Time: 10/5/2015 6:34:45PM

Prep Batch: MXX29168
Prep Method: Soils/Solids Digest for Metals by ICP-MS
Prep Date/Time: 10/1/2015 4:08:52PM
Prep Initial Wt./Vol.: 1.06g
Prep Extract Vol: 50.00mL

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Bench Spike Summary

Original Sample ID: 1155618012
MS Sample ID: 1294612 BND
MSD Sample ID:

Analysis Date: 10/05/2015 18:32
Analysis Date: 10/05/2015 18:41
Analysis Date:
Matrix: Soil/Solid (dry weight)

QC for Samples: 1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006

Results by **SW6020A**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Barium	50.8	251	304	101				80-120		

Batch Information

Analytical Batch: MMS9117
Analytical Method: SW6020A
Instrument: Perkin Elmer Sciex ICP-MS P3
Analyst: EAB
Analytical Date/Time: 10/5/2015 6:41:51PM

Prep Batch: MXX29168
Prep Method: Soils/Solids Digest for Metals by ICP-MS
Prep Date/Time: 10/1/2015 4:08:52PM
Prep Initial Wt./Vol.: 1.03g
Prep Extract Vol: 50.00mL

Print Date: 10/08/2015 1:32:18PM

Method Blank

Blank ID: MB for HBN 1721561 [SPT/9753]
Blank Lab ID: 1294079

Matrix: Soil/Solid (dry weight)

QC for Samples:
1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT9753
Analytical Method: SM21 2540G
Instrument:
Analyst: A.R
Analytical Date/Time: 9/29/2015 6:25:00PM

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Duplicate Sample Summary

Original Sample ID: 1155618001
Duplicate Sample ID: 1294080
Analysis Date: 09/29/2015 18:25
Matrix: Soil/Solid (dry weight)

QC for Samples:

1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	91.1	91.2	%	0.10	(< 15)

Batch Information

Analytical Batch: SPT9753
Analytical Method: SM21 2540G
Instrument:
Analyst: A.R

Print Date: 10/08/2015 1:32:20PM

Method Blank

Blank ID: MB for HBN 1721428 [VXX/27966]
Blank Lab ID: 1293463

Matrix: Soil/Solid (dry weight)

QC for Samples:
1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006, 1155588007

Results by **SW8260B**

Parameter	Results	LOQ/CL	DL	Units
1,1,1,2-Tetrachloroethane	12.5U	25.0	7.80	ug/Kg
1,1,1-Trichloroethane	12.5U	25.0	7.80	ug/Kg
1,1,2,2-Tetrachloroethane	6.25U	12.5	3.90	ug/Kg
1,1,2-Trichloroethane	5.00U	10.0	3.10	ug/Kg
1,1-Dichloroethane	12.5U	25.0	7.80	ug/Kg
1,1-Dichloroethene	12.5U	25.0	7.80	ug/Kg
1,1-Dichloropropene	12.5U	25.0	7.80	ug/Kg
1,2,3-Trichlorobenzene	25.0U	50.0	15.0	ug/Kg
1,2,3-Trichloropropane	12.5U	25.0	7.80	ug/Kg
1,2,4-Trichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,2,4-Trimethylbenzene	25.0U	50.0	15.0	ug/Kg
1,2-Dibromo-3-chloropropane	50.0U	100	31.0	ug/Kg
1,2-Dibromoethane	5.00U	10.0	3.10	ug/Kg
1,2-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,2-Dichloroethane	5.00U	10.0	3.10	ug/Kg
1,2-Dichloropropane	5.00U	10.0	3.10	ug/Kg
1,3,5-Trimethylbenzene	12.5U	25.0	7.80	ug/Kg
1,3-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,3-Dichloropropane	5.00U	10.0	3.10	ug/Kg
1,4-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
2,2-Dichloropropane	12.5U	25.0	7.80	ug/Kg
2-Butanone (MEK)	125U	250	78.0	ug/Kg
2-Chlorotoluene	12.5U	25.0	7.80	ug/Kg
2-Hexanone	125U	250	78.0	ug/Kg
4-Chlorotoluene	12.5U	25.0	7.80	ug/Kg
4-Isopropyltoluene	12.5U	25.0	7.80	ug/Kg
4-Methyl-2-pentanone (MIBK)	125U	250	78.0	ug/Kg
Benzene	6.25U	12.5	3.90	ug/Kg
Bromobenzene	12.5U	25.0	7.80	ug/Kg
Bromochloromethane	12.5U	25.0	7.80	ug/Kg
Bromodichloromethane	12.5U	25.0	7.80	ug/Kg
Bromoform	12.5U	25.0	7.80	ug/Kg
Bromomethane	100U	200	62.0	ug/Kg
Carbon disulfide	50.0U	100	31.0	ug/Kg
Carbon tetrachloride	6.25U	12.5	3.90	ug/Kg
Chlorobenzene	12.5U	25.0	7.80	ug/Kg
Chloroethane	100U	200	62.0	ug/Kg
Chloroform	12.5U	25.0	7.80	ug/Kg

Method Blank

Blank ID: MB for HBN 1721428 [VXX/27966]
Blank Lab ID: 1293463

Matrix: Soil/Solid (dry weight)

QC for Samples:
1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006, 1155588007

Results by **SW8260B**

Parameter	Results	LOQ/CL	DL	Units
Chloromethane	12.5U	25.0	7.80	ug/Kg
cis-1,2-Dichloroethene	12.5U	25.0	7.80	ug/Kg
cis-1,3-Dichloropropene	12.5U	25.0	7.80	ug/Kg
Dibromochloromethane	12.5U	25.0	7.80	ug/Kg
Dibromomethane	12.5U	25.0	7.80	ug/Kg
Dichlorodifluoromethane	25.0U	50.0	15.0	ug/Kg
Ethylbenzene	12.5U	25.0	7.80	ug/Kg
Freon-113	50.0U	100	31.0	ug/Kg
Hexachlorobutadiene	25.0U	50.0	15.0	ug/Kg
Isopropylbenzene (Cumene)	12.5U	25.0	7.80	ug/Kg
Methylene chloride	50.0U	100	31.0	ug/Kg
Methyl-t-butyl ether	50.0U	100	31.0	ug/Kg
Naphthalene	25.0U	50.0	15.0	ug/Kg
n-Butylbenzene	12.5U	25.0	7.80	ug/Kg
n-Propylbenzene	12.5U	25.0	7.80	ug/Kg
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
sec-Butylbenzene	12.5U	25.0	7.80	ug/Kg
Styrene	12.5U	25.0	7.80	ug/Kg
tert-Butylbenzene	12.5U	25.0	7.80	ug/Kg
Tetrachloroethene	6.25U	12.5	3.90	ug/Kg
Toluene	12.5U	25.0	7.80	ug/Kg
trans-1,2-Dichloroethene	12.5U	25.0	7.80	ug/Kg
trans-1,3-Dichloropropene	12.5U	25.0	7.80	ug/Kg
Trichloroethene	6.25U	12.5	3.90	ug/Kg
Trichlorofluoromethane	25.0U	50.0	15.0	ug/Kg
Vinyl acetate	50.0U	100	31.0	ug/Kg
Vinyl chloride	5.00U	10.0	3.10	ug/Kg
Xylenes (total)	37.5U	75.0	22.8	ug/Kg
Surrogates				
1,2-Dichloroethane-D4 (surr)	96.6	71-136		%
4-Bromofluorobenzene (surr)	104	55-151		%
Toluene-d8 (surr)	107	85-116		%

Method Blank

Blank ID: MB for HBN 1721428 [VXX/27966]
Blank Lab ID: 1293463

Matrix: Soil/Solid (dry weight)

QC for Samples:
1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006, 1155588007

Results by **SW8260B**

Parameter	Results	LOQ/CL	DL	Units

Batch Information

Analytical Batch: VMS15297
Analytical Method: SW8260B
Instrument: VQA 7890/5975 GC/MS
Analyst: SCL
Analytical Date/Time: 9/27/2015 6:52:00PM

Prep Batch: VXX27966
Prep Method: SW5035A
Prep Date/Time: 9/27/2015 12:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1155588 [VXX27966]
Blank Spike Lab ID: 1293464
Date Analyzed: 09/27/2015 19:07

Matrix: Soil/Solid (dry weight)

QC for Samples: 1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006, 1155588007

Results by **SW8260B**

Blank Spike (ug/Kg)

Parameter	Spike	Result	Rec (%)	CL
1,1,1,2-Tetrachloroethane	750	795	106	(78-125)
1,1,1-Trichloroethane	750	748	100	(73-130)
1,1,2,2-Tetrachloroethane	750	828	110	(70-124)
1,1,2-Trichloroethane	750	839	112	(78-121)
1,1-Dichloroethane	750	713	95	(76-125)
1,1-Dichloroethene	750	794	106	(70-131)
1,1-Dichloropropene	750	786	105	(76-125)
1,2,3-Trichlorobenzene	750	820	109	(66-130)
1,2,3-Trichloropropane	750	777	104	(73-125)
1,2,4-Trichlorobenzene	750	764	102	(67-129)
1,2,4-Trimethylbenzene	750	801	107	(75-123)
1,2-Dibromo-3-chloropropane	750	647	86	(61-132)
1,2-Dibromoethane	750	832	111	(78-122)
1,2-Dichlorobenzene	750	770	103	(78-121)
1,2-Dichloroethane	750	709	95	(73-128)
1,2-Dichloropropane	750	789	105	(76-123)
1,3,5-Trimethylbenzene	750	791	105	(73-124)
1,3-Dichlorobenzene	750	788	105	(77-121)
1,3-Dichloropropane	750	821	109	(77-121)
1,4-Dichlorobenzene	750	785	105	(75-120)
2,2-Dichloropropane	750	748	100	(67-133)
2-Butanone (MEK)	2250	1840	82	(51-148)
2-Chlorotoluene	750	728	97	(75-122)
2-Hexanone	2250	2110	94	(53-145)
4-Chlorotoluene	750	779	104	(72-124)
4-Isopropyltoluene	750	814	109	(73-127)
4-Methyl-2-pentanone (MIBK)	2250	2150	96	(65-135)
Benzene	750	786	105	(77-121)
Bromobenzene	750	787	105	(78-121)
Bromochloromethane	750	760	101	(78-125)
Bromodichloromethane	750	738	98	(75-127)
Bromoform	750	771	103	(67-132)
Bromomethane	750	870	116	(53-143)
Carbon disulfide	1130	1210	108	(63-132)

Blank Spike Summary

Blank Spike ID: LCS for HBN 1155588 [VXX27966]
Blank Spike Lab ID: 1293464
Date Analyzed: 09/27/2015 19:07

Matrix: Soil/Solid (dry weight)

QC for Samples: 1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006, 1155588007

Results by **SW8260B**

Blank Spike (ug/Kg)

Parameter	Spike	Result	Rec (%)	CL
Carbon tetrachloride	750	746	100	(70-135)
Chlorobenzene	750	796	106	(79-120)
Chloroethane	750	760	101	(59-139)
Chloroform	750	731	97	(78-123)
Chloromethane	750	715	95	(50-136)
cis-1,2-Dichloroethene	750	761	101	(77-123)
cis-1,3-Dichloropropene	750	801	107	(74-126)
Dibromochloromethane	750	802	107	(74-126)
Dibromomethane	750	755	101	(78-125)
Dichlorodifluoromethane	750	703	94	(29-149)
Ethylbenzene	750	791	105	(76-122)
Freon-113	1130	1160	103	(66-136)
Hexachlorobutadiene	750	802	107	(61-135)
Isopropylbenzene (Cumene)	750	780	104	(68-134)
Methylene chloride	750	825	110	(70-128)
Methyl-t-butyl ether	1130	1160	103	(73-125)
Naphthalene	750	764	102	(62-129)
n-Butylbenzene	750	806	108	(70-128)
n-Propylbenzene	750	803	107	(73-125)
o-Xylene	750	787	105	(77-123)
P & M -Xylene	1500	1580	105	(77-124)
sec-Butylbenzene	750	831	111	(73-126)
Styrene	750	748	100	(76-124)
tert-Butylbenzene	750	823	110	(73-125)
Tetrachloroethene	750	799	107	(73-128)
Toluene	750	815	109	(77-121)
trans-1,2-Dichloroethene	750	777	104	(74-125)
trans-1,3-Dichloropropene	750	842	112	(71-130)
Trichloroethene	750	747	100	(77-123)
Trichlorofluoromethane	750	701	94	(62-140)
Vinyl acetate	750	756	101	(50-151)
Vinyl chloride	750	776	103	(56-135)
Xylenes (total)	2250	2370	105	(78-124)

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1155588 [VXX27966]
Blank Spike Lab ID: 1293464
Date Analyzed: 09/27/2015 19:07

Matrix: Soil/Solid (dry weight)

QC for Samples: 1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006, 1155588007

Results by **SW8260B**

		Blank Spike (%)		
Parameter	Spike	Result	Rec (%)	CL
Surrogates				
1,2-Dichloroethane-D4 (surr)	750	94.8	95	(71-136)
4-Bromofluorobenzene (surr)	750	107	107	(55-151)
Toluene-d8 (surr)	750	111	111	(85-116)

Batch Information

Analytical Batch: **VMS15297**
Analytical Method: **SW8260B**
Instrument: **VQA 7890/5975 GC/MS**
Analyst: **SCL**

Prep Batch: **VXX27966**
Prep Method: **SW5035A**
Prep Date/Time: **09/27/2015 00:00**
Spike Init Wt./Vol.: 750 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1293465
MS Sample ID: 1293466 MS
MSD Sample ID: 1293467 MSD

Analysis Date: 09/27/2015 20:43
Analysis Date: 09/27/2015 19:23
Analysis Date: 09/27/2015 19:39
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006, 1155588007

Results by **SW8260B**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,1,1,2-Tetrachloroethane	15.2U	910	929	102	910	933	103	78-125	0.42	(< 20)
1,1,1-Trichloroethane	15.2U	910	925	102	910	905	99	73-130	2.20	(< 20)
1,1,2,2-Tetrachloroethane	7.60U	910	968	106	910	1020	112	70-124	4.90	(< 20)
1,1,2-Trichloroethane	6.05U	910	966	106	910	1010	110	78-121	4.00	(< 20)
1,1-Dichloroethane	15.2U	910	878	96	910	858	94	76-125	2.20	(< 20)
1,1-Dichloroethene	15.2U	910	997	110	910	957	105	70-131	4.10	(< 20)
1,1-Dichloropropene	15.2U	910	965	106	910	949	104	76-125	1.70	(< 20)
1,2,3-Trichlorobenzene	30.4U	910	1060	117	910	968	106	66-130	9.40	(< 20)
1,2,3-Trichloropropane	15.2U	910	904	99	910	964	106	73-125	6.40	(< 20)
1,2,4-Trichlorobenzene	15.2U	910	998	110	910	920	101	67-129	8.10	(< 20)
1,2,4-Trimethylbenzene	30.4U	910	938	103	910	912	100	75-123	2.80	(< 20)
1,2-Dibromo-3-chloropropane	60.5U	910	791	87	910	884	97	61-132	11.00	(< 20)
1,2-Dibromoethane	6.05U	910	968	106	910	983	108	78-122	1.60	(< 20)
1,2-Dichlorobenzene	15.2U	910	879	97	910	887	98	78-121	0.96	(< 20)
1,2-Dichloroethane	6.05U	910	835	92	910	824	91	73-128	1.30	(< 20)
1,2-Dichloropropane	6.05U	910	937	103	910	931	102	76-123	0.71	(< 20)
1,3,5-Trimethylbenzene	15.2U	910	941	103	910	930	102	73-124	1.20	(< 20)
1,3-Dichlorobenzene	15.2U	910	888	98	910	904	99	77-121	1.80	(< 20)
1,3-Dichloropropane	6.05U	910	940	103	910	955	105	77-121	1.60	(< 20)
1,4-Dichlorobenzene	15.2U	910	902	99	910	918	101	75-120	1.80	(< 20)
2,2-Dichloropropane	15.2U	910	898	99	910	868	95	67-133	3.40	(< 20)
2-Butanone (MEK)	152U	2730	2290	84	2730	2480	91	51-148	8.10	(< 20)
2-Chlorotoluene	15.2U	910	956	105	910	859	94	75-122	10.80	(< 20)
2-Hexanone	152U	2730	2630	96	2730	2780	102	53-145	5.30	(< 20)
4-Chlorotoluene	15.2U	910	936	103	910	921	101	72-124	1.60	(< 20)
4-Isopropyltoluene	15.2U	910	991	109	910	951	105	73-127	4.10	(< 20)
4-Methyl-2-pentanone (MIBK)	152U	2730	2380	87	2730	2660	98	65-135	11.30	(< 20)
Benzene	7.60U	910	949	104	910	938	103	77-121	1.20	(< 20)
Bromobenzene	15.2U	910	913	100	910	929	102	78-121	1.70	(< 20)
Bromochloromethane	15.2U	910	895	98	910	872	96	78-125	2.60	(< 20)
Bromodichloromethane	15.2U	910	870	96	910	855	94	75-127	1.80	(< 20)
Bromoform	15.2U	910	901	99	910	917	101	67-132	1.80	(< 20)
Bromomethane	122U	910	972	107	910	951	104	53-143	2.20	(< 20)
Carbon disulfide	60.5U	1370	1520	111	1370	1460	107	63-132	4.00	(< 20)
Carbon tetrachloride	7.60U	910	923	101	910	905	99	70-135	2.00	(< 20)
Chlorobenzene	15.2U	910	949	104	910	932	102	79-120	1.70	(< 20)
Chloroethane	122U	910	909	100	910	870	96	59-139	4.30	(< 20)

Print Date: 10/08/2015 1:32:26PM

Matrix Spike Summary

Original Sample ID: 1293465
MS Sample ID: 1293466 MS
MSD Sample ID: 1293467 MSD

Analysis Date: 09/27/2015 20:43
Analysis Date: 09/27/2015 19:23
Analysis Date: 09/27/2015 19:39
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006, 1155588007

Results by **SW8260B**

		Matrix Spike (ug/Kg)				Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)		Spike	Result	Rec (%)		CL	RPD (%)	RPD CL
Chloroform	15.2U	910	881	97		910	861	95		78-123	2.40	(< 20)
Chloromethane	15.2U	910	828	91		910	794	87		50-136	4.30	(< 20)
cis-1,2-Dichloroethene	15.2U	910	925	102		910	913	100		77-123	1.30	(< 20)
cis-1,3-Dichloropropene	15.2U	910	918	101		910	921	101		74-126	0.26	(< 20)
Dibromochloromethane	15.2U	910	924	102		910	939	103		74-126	1.70	(< 20)
Dibromomethane	15.2U	910	884	97		910	882	97		78-125	0.27	(< 20)
Dichlorodifluoromethane	30.4U	910	777	85		910	747	82		29-149	4.00	(< 20)
Ethylbenzene	15.2U	910	939	103		910	921	101		76-122	1.90	(< 20)
Freon-113	60.5U	1370	1420	104		1370	1380	101		66-136	2.60	(< 20)
Hexachlorobutadiene	30.4U	910	1550	171	*	910	1370	151	*	61-135	12.40	(< 20)
Isopropylbenzene (Cumene)	15.2U	910	922	101		910	888	98		68-134	3.80	(< 20)
Methylene chloride	60.5U	910	976	107		910	913	100		70-128	6.70	(< 20)
Methyl-t-butyl ether	60.5U	1370	1340	98		1370	1360	99		73-125	1.40	(< 20)
Naphthalene	30.4U	910	990	109		910	963	106		62-129	2.70	(< 20)
n-Butylbenzene	15.2U	910	1050	116		910	969	106		70-128	8.40	(< 20)
n-Propylbenzene	15.2U	910	957	105		910	942	104		73-125	1.60	(< 20)
o-Xylene	15.2U	910	925	102		910	923	101		77-123	0.16	(< 20)
P & M -Xylene	30.4U	1820	1870	102		1820	1870	103		77-124	0.23	(< 20)
sec-Butylbenzene	15.2U	910	1010	110		910	944	104		73-126	6.30	(< 20)
Styrene	15.2U	910	871	96		910	817	90		76-124	6.40	(< 20)
tert-Butylbenzene	15.2U	910	990	109		910	946	104		73-125	4.50	(< 20)
Tetrachloroethene	7.60U	910	950	104		910	928	102		73-128	2.40	(< 20)
Toluene	15.2U	910	984	108		910	975	107		77-121	0.96	(< 20)
trans-1,2-Dichloroethene	15.2U	910	963	106		910	937	103		74-125	2.70	(< 20)
trans-1,3-Dichloropropene	15.2U	910	963	106		910	990	109		71-130	2.90	(< 20)
Trichloroethene	7.60U	910	899	99		910	884	97		77-123	1.70	(< 20)
Trichlorofluoromethane	30.4U	910	779	86		910	796	87		62-140	2.10	(< 20)
Vinyl acetate	60.5U	910	822	90		910	851	94		50-151	3.40	(< 20)
Vinyl chloride	6.05U	910	930	102		910	893	98		56-135	4.10	(< 20)
Xylenes (total)	45.5U	2730	2790	102		2730	2790	102		78-124	0.10	(< 20)
Surrogates												
1,2-Dichloroethane-D4 (surr)		910	825	91		910	819	90		71-136	0.74	
4-Bromofluorobenzene (surr)		2430	1910	79		2430	1950	80		55-151	2.30	
Toluene-d8 (surr)		910	1020	112		910	1010	111		85-116	0.60	

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Matrix Spike Summary

Original Sample ID: 1293465
MS Sample ID: 1293466 MS
MSD Sample ID: 1293467 MSD

Analysis Date:
Analysis Date: 09/27/2015 19:23
Analysis Date: 09/27/2015 19:39
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006, 1155588007

Results by **SW8260B**

		Matrix Spike (%)			Spike Duplicate (%)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL

Batch Information

Analytical Batch: VMS15297
Analytical Method: SW8260B
Instrument: VQA 7890/5975 GC/MS
Analyst: SCL
Analytical Date/Time: 9/27/2015 7:23:00PM

Prep Batch: VXX27966
Prep Method: Vol. Extraction SW8260 Field Extracted L
Prep Date/Time: 9/27/2015 12:00:00AM
Prep Initial Wt./Vol.: 41.19g
Prep Extract Vol: 25.00mL

Print Date: 10/08/2015 1:32:26PM

Method Blank

Blank ID: MB for HBN 1721965 [VXX/28009]
Blank Lab ID: 1295321

Matrix: Soil/Solid (dry weight)

QC for Samples:
1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006, 1155588007

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.768J	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	89.3	50-150		%

Batch Information

Analytical Batch: VFC12710
Analytical Method: AK101
Instrument: Agilent 7890 PID/FID
Analyst: CRD
Analytical Date/Time: 10/3/2015 2:36:00PM

Prep Batch: VXX28009
Prep Method: SW5035A
Prep Date/Time: 10/3/2015 8:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1155588 [VXX28009]
Blank Spike Lab ID: 1295322
Date Analyzed: 10/03/2015 14:56

Spike Duplicate ID: LCSD for HBN 1155588 [VXX28009]
Spike Duplicate Lab ID: 1295325
Matrix: Soil/Solid (dry weight)

QC for Samples: 1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006, 1155588007

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	10.0	9.92	99	10.0	9.79	98	(60-120)	1.30	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	91.8	92	1.25	92.8	93	(50-150)	1.10	

Batch Information

Analytical Batch: **VFC12710**
Analytical Method: **AK101**
Instrument: **Agilent 7890 PID/FID**
Analyst: **CRD**

Prep Batch: **VXX28009**
Prep Method: **SW5035A**
Prep Date/Time: **10/03/2015 08:00**
Spike Init Wt./Vol.: 10.0 mg/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 10.0 mg/Kg Extract Vol: 25 mL

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Matrix Spike Summary

Original Sample ID: 1155498015
MS Sample ID: 1295323 MS
MSD Sample ID: 1295324 MSD

Analysis Date: 10/03/2015 16:12
Analysis Date: 10/03/2015 16:32
Analysis Date: 10/03/2015 16:51
Matrix: Soil/Solid (dry weight)

QC for Samples: 1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006, 1155588007

Results by **AK101**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	1.35U	9.47	9.30	98	9.47	9.12	97	60-120	1.90	(< 20)
Surrogates										
4-Bromofluorobenzene (surr)		1.18	0.936	79	1.18	0.918	78	50-150	2.00	

Batch Information

Analytical Batch: VFC12710
Analytical Method: AK101
Instrument: Agilent 7890 PID/FID
Analyst: CRD
Analytical Date/Time: 10/3/2015 4:32:00PM

Prep Batch: VXX28009
Prep Method: AK101 Extraction (S)
Prep Date/Time: 10/3/2015 8:00:00AM
Prep Initial Wt./Vol.: 56.38g
Prep Extract Vol: 25.00mL

Print Date: 10/08/2015 1:32:30PM

Method Blank

Blank ID: MB for HBN 1721543 [XXX/34270]
Blank Lab ID: 1294014

Matrix: Soil/Solid (dry weight)

QC for Samples:
1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
5a Androstane (surr)	99.6	60-120		%

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK102
Instrument: HP 7890A FID SV E F
Analyst: KJO
Analytical Date/Time: 10/7/2015 12:06:00AM

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 9/29/2015 3:54:49PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

Print Date: 10/08/2015 1:32:31PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1155588 [XXX34270]
Blank Spike Lab ID: 1294015
Date Analyzed: 10/07/2015 00:27

Spike Duplicate ID: LCSD for HBN 1155588 [XXX34270]
Spike Duplicate Lab ID: 1294016
Matrix: Soil/Solid (dry weight)

QC for Samples: 1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006

Results by **AK102**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	167	168	101	167	171	103	(75-125)	1.70	(< 20)
Surrogates									
5a Androstane (surr)	3.33	104	104	3.33	103	103	(60-120)	0.64	

Batch Information

Analytical Batch: **XFC12139**
Analytical Method: **AK102**
Instrument: **HP 7890A FID SV E F**
Analyst: **KJO**

Prep Batch: **XXX34270**
Prep Method: **SW3550C**
Prep Date/Time: **09/29/2015 15:54**
Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL

Print Date: 10/08/2015 1:32:33PM

Method Blank

Blank ID: MB for HBN 1721543 [XXX/34270]
Blank Lab ID: 1294014

Matrix: Soil/Solid (dry weight)

QC for Samples:
1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
n-Triacontane-d62 (surr)	105	60-120		%

Batch Information

Analytical Batch: XFC12139
Analytical Method: AK103
Instrument: HP 7890A FID SV E F
Analyst: KJO
Analytical Date/Time: 10/7/2015 12:06:00AM

Prep Batch: XXX34270
Prep Method: SW3550C
Prep Date/Time: 9/29/2015 3:54:49PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1155588 [XXX34270]
Blank Spike Lab ID: 1294015
Date Analyzed: 10/07/2015 00:27

Spike Duplicate ID: LCSD for HBN 1155588 [XXX34270]
Spike Duplicate Lab ID: 1294016
Matrix: Soil/Solid (dry weight)

QC for Samples: 1155588001, 1155588002, 1155588003, 1155588004, 1155588005, 1155588006

Results by **AK103**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Organics	167	171	103	167	174	104	(60-120)	1.60	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	3.33	99.2	99	3.33	100	100	(60-120)	1.30	

Batch Information

Analytical Batch: **XFC12139**
Analytical Method: **AK103**
Instrument: **HP 7890A FID SV E F**
Analyst: **KJO**

Prep Batch: **XXX34270**
Prep Method: **SW3550C**
Prep Date/Time: **09/29/2015 15:54**
Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL

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Method Blank

Blank ID: MB for HBN 1721571 [XXX/34277]
Blank Lab ID: 1294126

Matrix: Soil/Solid (dry weight)

QC for Samples:
1155588004, 1155588005

Results by **SW8082A**

Parameter	Results	LOQ/CL	DL	Units
Aroclor-1016	25.0U	50.0	15.0	ug/Kg
Aroclor-1221	25.0U	50.0	15.0	ug/Kg
Aroclor-1232	25.0U	50.0	15.0	ug/Kg
Aroclor-1242	25.0U	50.0	15.0	ug/Kg
Aroclor-1248	25.0U	50.0	15.0	ug/Kg
Aroclor-1254	25.0U	50.0	15.0	ug/Kg
Aroclor-1260	25.0U	50.0	15.0	ug/Kg
Surrogates				
Decachlorobiphenyl (surr)	102	60-125		%

Batch Information

Analytical Batch: XGC9127
Analytical Method: SW8082A
Instrument: HP 6890 Series II ECD SV L R
Analyst: MCM
Analytical Date/Time: 10/3/2015 7:21:00PM

Prep Batch: XXX34277
Prep Method: SW3550C
Prep Date/Time: 9/30/2015 9:27:12AM
Prep Initial Wt./Vol.: 22.5 g
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1155588 [XXX34277]
Blank Spike Lab ID: 1294127
Date Analyzed: 10/03/2015 19:33

Spike Duplicate ID: LCSD for HBN 1155588 [XXX34277]
Spike Duplicate Lab ID: 1294128
Matrix: Soil/Solid (dry weight)

QC for Samples: 1155588004, 1155588005

Results by **SW8082A**

	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Aroclor-1016	222	178	80	222	167	75	(47-134)	6.45	(< 30)
Aroclor-1260	222	204	92	222	202	91	(53-140)	1.09	(< 30)
Surrogates									
Decachlorobiphenyl (surr)	222	100	100	222	100	100	(60-125)	0.00	

Batch Information

Analytical Batch: **XGC9127**
Analytical Method: **SW8082A**
Instrument: **HP 6890 Series II ECD SV L R**
Analyst: **MCM**

Prep Batch: **XXX34277**
Prep Method: **SW3550C**
Prep Date/Time: **09/30/2015 09:27**
Spike Init Wt./Vol.: 222 ug/Kg Extract Vol: 5 mL
Dupe Init Wt./Vol.: 222 ug/Kg Extract Vol: 5 mL

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1155588

SHANNON & WILSON, INC.
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CHAIN-OF-CUSTODY RECORD

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Laboratory SGS
Attn: Tori

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO / VOCs WA101/EPA 8260B	DRO / RRO Ax.102 / L03	RCRA metals	PCBs			Total Number of Containers	Remarks/Matrix
17754-SS1	1 A-B	1705	9/22/15			X	X	X				2	Soil
SS2	2 A-B	1710				X	X	X				2	
SS7	3 A-B	1720				X	X	X				2	
SS11	4 A-B	1730				X	X	X	X			2	
SS16	5 A-B	1645				X	X	X	X			2	
SS17	6 A-B	1655				X	X	X				2	
TB	7 A	1800				X						1	Trip blank

Project Information	Sample Receipt
Project Number: 17754-001	Total Number of Containers
Project Name: Arctic Village	COC Seals/Intact? Y/N/NA
Contact: JCT	Received Good Cond./Cold
Ongoing Project? Yes ☒ No ☐	Delivery Method:
Sampler: JCT	(attach shipping bill, if any)

Instructions
Requested Turnaround Time: Standard
Special Instructions: Level II deliverables

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1529	Signature: Time:	Signature: Time:
Printed Name: Jake Tranel Date: 9/24/15	Printed Name: Date:	Printed Name: Date:
Company: SGW	Company:	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time:	Signature: Time:	Signature: Time: 1530
Printed Name: Date:	Printed Name: Date:	Printed Name: Tori Loughran Date: 9/24/15
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

7.0/08

No. 30656

SGS

Returned Bottles Inventory

Name of individual returning bottles: —

Date Received: 9/24/2015

Client Name: S&W

Received by: D. C

Project Name: Arctic Village

SGS PM: VLP

HDPE/Nalgene:	~~1-L~~						
	500-ml						
	250-ml or 8-oz						
	125-ml or 4-oz						
	60-ml or 2-oz						
	other						
amber glass:	~~1-L~~						
	500-ml						
	250-ml or 8-oz	23					
	125-ml or 4-oz with ~~or without~~ septa						
	40-ml VOA vial						
	other						
Subtotal:	23						

Note: Returned bottles (regardless of size/pres.) are billed back at $4/bottle ***unless otherwise quoted.***

Amount to Invoice Client $: 92$

WO#: 1155588

1155588

SAMPLE RECEIPT FORM

Review Criteria:	Yes	N/A	No	Comments/Action Taken:
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	☐ ☑	☑ ☐	☐ ☐	***Exemption permitted if sampler hand carries/delivers.***
Temperature blank compliant* (i.e., 0-6°C after CF)? *If >6 °C, were samples collected <8 hours ago?* *If <0 °C, were all sample containers ice free?* Cooler ID: [1] _____ @ 7.0 _____ w/ Therm.ID: D8 _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ If samples are 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."	☐ ☐ ☐	☐ ☐ ☑	☑ ☑ ☐	***Exemption permitted if chilled & collected <8 hrs ago.*** Proceed per client. ***Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.***
Delivery method (specify all that apply): ☑Client (hand carried) ☐USPS ☐Lynden ☐AK Air ☐Alert Courier ☐UPS ☐FedEx ☐RAVN ☐C&D Delivery ☐Carlile ☐Pen Air ☐Warp Speed ☐Other: _____ → *For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?*	☐	☑	☐	
	Yes	N/A	No	
Were samples received within hold time? Do samples **match COC*** (i.e., sample IDs, dates/times collected)? Were analyses requested unambiguous?	☑ ☑ ☑	☐ ☐ ☐	☐ ☐ ☐	***Note: Refer to form F-083 "Sample Guide" for hold times.*** ***Note: If times differ <1hr, record details and login per COC.***
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): ☑Bubble Wrap ☐Separate plastic bags ☐Vermiculite ☐Other:	☑	☐	☐	
Were **proper containers** (type/mass/volume/preservative*) used? Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples? Were all VOA vials **free of headspace** (i.e., bubbles ≤6 mm)? Were all soil VOAs **field extracted** with MeOH+BFB?	☑ ☑ ☐ ☑	☐ ☐ ☑ ☐	☐ ☐ ☐ ☐	☐ ***Exemption permitted for metals (e.g., 200.8/6020A).***
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was **pH verified and compliant**? If pH was adjusted, were bottles flagged (i.e., stickers)?	☐ ☐	☑ ☑	☐ ☐	
For **special handling** (e.g., "MI" soils, foreign soils, lab filter for dissolved…, lab extract for volatiles, Ref Lab, limited volume), were bottles/paperwork flagged (e.g., sticker)?	☐	☑	☐	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	☐	☑	☐	
For **SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP**, were containers / paperwork flagged accordingly?	☐	☑	☐	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	☐	☑	☐	SRF Completed by: D.C 09/24/2015 PM notified:
Was **PEER REVIEW** of ***sample numbering/labeling completed?***	☑	☐	☐	Peer Reviewed by: KPV
Additional notes (if applicable):				

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

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1155588001-A	No Preservative Required	OK			
1155588001-B	Methanol field pres. 4 C	OK			
1155588002-A	No Preservative Required	OK			
1155588002-B	Methanol field pres. 4 C	OK			
1155588003-A	No Preservative Required	OK			
1155588003-B	Methanol field pres. 4 C	OK			
1155588004-A	No Preservative Required	OK			
1155588004-B	Methanol field pres. 4 C	OK			
1155588005-A	No Preservative Required	OK			
1155588005-B	Methanol field pres. 4 C	OK			
1155588006-A	No Preservative Required	OK			
1155588006-B	Methanol field pres. 4 C	OK			
1155588007-A	Methanol field pres. 4 C	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.
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.
BU - The container was received with headspace greater than 6mm.

LABORATORY DATA REVIEW CHECKLIST

Completed by: Jake Tracy
Title: Environmental Engineering Staff
Date: March 2016

CS Report Name: Former Arctic Village Power Plant, Arctic Village, Alaska
Laboratory Report Date: October 8, 2015

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: SGS North America, Inc.
Laboratory Report Number: 1155588

ADEC File Number:
ADEC RecKey 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: *Samples were not transferred.*

2. Chain of Custody (COC)

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

b. Correct analyses requested? **Yes / No / NA** (please explain)
Comments**:**

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
Yes / No / NA (please explain)
Comments: *The Cooler temperature blank was 7.0° Celsius.*

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: *The sample receipt form notes that the samples were received in good condition.*

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: *It was recorded on the sample receipt form that the cooler had a temperature blank temperature of 7.0°* C.

e. Data quality or usability affected? Please explain. **NA**
Comments: *It is our opinion that the slightly elevated temperature does not affect the overall usability of the samples.*

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:

- *The LOQ for DRO is elevated. The sample was diluted due to the dark color of the extract in soil Sample SS1.*
- *Surrogate recoveries for 5a-androstane (0%) and n-triacontane (0%) do not meet QC criteria due to sample dilution for Samples SS11, SS16, and SS17.*
- *Surrogate recovery for decachlorobiphenyl (135%) does not meet QC criteria due to matrix interference in Sample SS16.*
- *The MS/MSD recoveries for hexachlorobutadiene did not meet QC criteria. The laboratory noted to refer to the LCS for accuracy.*
- *The MS/MSD recovery for barium did not meet QC criteria. The laboratory noted that a post digestion spike was successful.*

c. Were corrective actions documented? **Yes / No / NA** (please explain)
Comments: *See above.*

d. What is the effect on data quality/usability, according to the case narrative?
Comments: *The case narrative does not discuss the effect on the data quality/usability, except to refer to the LCS for accuracy in the case of MS/MSD recovery failures.*

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: *The LOQs for multiple soil analytes exceed the ADEC cleanup levels. With the exception of 1,2-dibromoethane (EDB), 1,2-dichloroethane, 1,2,3-trichloropropane, methylene chloride, and vinyl chloride, the reporting limits (LODs) for these analytes are less than ADEC cleanup levels. These analytes were not detected in the project samples.*

e. Data quality or usability affected? Please explain.
Comments: *There is a potential that 1,2-dichloroethane, 1,2,3-trichloropropane, methylene chloride, and vinyl chloride are present in the project samples at concentrations less than the LOQ but greater than ADEC cleanup levels.*

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: An e*stimated concentration of GRO was detected in the method blank at concentrations less than the LOQ.*

iii. If above LOQ, what samples are affected? ***NA***
Comments: *Although less than the LOQ, each sample is potentially affected.*

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined? **Yes / No / NA** (please explain)
Comments: *Although the reported GRO concentration in the method blank described above is less than the LOQ, detectable concentrations in Samples SS2, SS11, and SS16 are "B" flagged when the reported sample concentration is within 10x the reported method blank concentration. If both the sample and method blank concentrations are reported at levels less than the LOQ, the sample concentration is reported as non-detect at the LOQ.*

Data quality or usability affected? Please explain. ***NA***
Comments: *The data are considered acceptable for the purposes of this report.*

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%; 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:

Data quality or usability affected? Please explain. ***NA***
Comments: *Data quality/usability is unaffected.*

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: *For DRO and RRO analyses, the surrogate recoveries for 5a-androstane and n-triacontane do not meet QC criteria due to sample dilution in Samples SS11, SS16, and SS17. Also, for PCBs, the surrogate recovery for decachlorobiphenyl does not meet QC criteria due to matrix interference.*

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: *The sample results with failed surrogate recoveries are flagged on Table 2 of this report.*

Data quality or usability affected? ***NA***
Comments: *The affected sample results are potentially biased low.*

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: *Only one cooler was used to transport the samples.*

iii. All results less than LOQ? **Yes / No / NA** (please explain)
Comments:

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

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

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
Yes / No / NA (please explain)
Comments: *A field duplicate was not collected in accordance with our ADEC-approved work plan.*

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? (Use the comment section to explain why or why not.)
Comments:

f. Decontamination or Equipment Blank (if applicable)
Yes / No / NA (please explain)
Comments: *Decontamination/equipment blanks were not included in the ADEC-approved work plan.*

i. All results less than PQL? **Yes / No / NA** (please explain)
Comments:

ii. If above PQL, 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: *Laboratory specific data flags/qualifiers are defined on Page 3 of the laboratory report.*

APPENDIX D

HAZARDOUS BUILDING MATERIALS SURVEY

HAZARDOUS MATERIALS ASSESSMENT

ARCTIC VILLAGE FORMER POWER PLANT HAZARDOUS MATERIALS ASSESSMENT

ARCTIC VILLAGE, ALASKA

Surveyed
September 22, 2015

Report Date
October 15, 2015

EHS-ALASKA, INC.
ENGINEERING, HEALTH & SAFETY CONSULTANTS
11901 BUSINESS BLVD., SUITE 208
EAGLE RIVER, ALASKA 99577-7701

HAZARDOUS MATERIALS ASSESSMENT

ARCTIC VILLAGE FORMER POWER PLANT HAZARDOUS MATERIALS ASSESSMENT

ARCTIC VILLAGE, ALASKA

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APPENDICES

HAZARDOUS MATERIALS ASSESSMENT

ARCTIC VILLAGE FORMER POWER PLANT HAZARDOUS MATERIALS ASSESSMENT

ARCTIC VILLAGE, ALASKA

OVERVIEW

The former Arctic Village Power Plant, located in Arctic Village, Alaska, was surveyed for the presence of asbestos-containing materials (ACM), and other potentially hazardous materials as a part of the design services for the Arctic Village Former Power Plant Hazardous Materials Assessment Demolition Project. The survey also provided a "good faith" inspection for hazardous materials that may be disturbed during the demolition. The proposed work includes the disturbance, demolition, removal and disposal of lead-containing paints and/or lead-containing materials that is incidental to the demolition project. Mr. Travis G. Juliussen of EHS-Alaska, Inc. (EHS-Alaska) conducted the inspection in September 2015. It will be the contractor's responsibility to take this baseline data, and to conduct hazardous materials removal in compliance with all regulatory requirements.

A. GENERALIZED REQUIREMENTS FOR HAZARDOUS MATERIALS

Potentially hazardous materials have been identified in the former Arctic Village Power Plant that will be affected by the proposed demolition. Those materials include asbestos, lead, polychlorinated bi-phenyls (PCBs), mercury. Not all materials were tested for potentially hazardous components, other potentially hazardous materials, including those exterior to the building, such as contamination from underground fuel tanks may be present, but are not part of this report.

It is the Contractor's responsibility to take this baseline data to coordinate and fully develop a hazardous materials removal design that will identify the presence, locations and quantities of asbestos and/or other hazardous materials that will be affected by this project. The removal and disposal of potentially hazardous materials are highly regulated, and it is anticipated that removal and disposal of asbestos, lead and chemical hazards will be conducted by a subcontractor to the general contractor who is qualified for such removal. It is anticipated that the general contractor and other trades will be able to conduct their work using engineering controls and work practices to control worker exposure and to keep airborne contaminants out of adjacent occupied areas.

Settled and concealed dusts in areas not subject to routine cleaning are present throughout the building, including the roof, and inside and on top of architectural, mechanical, electrical, and structural elements, and those dusts are assumed to contain regulated air contaminants. There are damaged materials in the building which could cause a hazard to building occupants, depending on the specific work items involved and on the means and methods employed when working in the affected areas, construction workers could be exposed to regulated air contaminants from the debris and dusts in excess of the OSHA Permissible Exposure Limits (PELs).

The settled and concealed dusts were examined by an EPA Certified Building Inspector but were not sampled. The inspector determined that some of the dusts are "asbestos debris" from an asbestos-containing building material (ACBM). Based on similar sampling from similar buildings, the inspector also determined that the "normal" settled dusts are unlikely to contain more than one percent (1%) asbestos by weight, and therefore are not an asbestos-containing material (ACM). Reference 40 CFR 763.83.

B. BUILDING DESCRIPTION

The former Arctic Village Power Plant building is currently abandoned with no heat or electricity servicing the building. It was reportedly built in 1976 by the U.S. Public Health Service as a washeteria. The building is a one-story building with prefabricated insulated wood panels, with foam insulation, aluminum siding, and a deteriorated rolled roofing system. The building has a pile foundation and concrete floors throughout.

Interior finishes included plywood exterior walls and ceilings with gypsum wall board (GWB) interior walls typical throughout. As reported in 2007, the building contains a 10,000 gallon wood-stave above ground potable water holding tank, an insulated above ground hot water holding tank, 1 diesel-fueled generator, 1 electrical transformer, 3 pressure tanks, 1 chlorine tank, 1 boiler, and a commercial sized washer and dryer. The building has piles of discarded construction materials including piping, wood, windows, and trash.

C. SAMPLING AND ANALYSIS

1. Asbestos-Containing Materials

The survey included sampling of suspect ACM materials. The samples were analyzed for the presence of asbestos by polarized light microscopy (PLM), the method of analysis recommended by the U.S. Environmental Protection Agency (EPA) to determine the composition of suspected asbestos-containing materials (EPA method 600/M4-82-020). Only materials containing more than 1% total asbestos were classified as "asbestos-containing" based on EPA and the Occupational Safety and Health Administration (OSHA) criteria. Samples that were analyzed to have less than 10% asbestos were "point-counted" by the laboratory for more accuracy. Samples that are listed as having a "Trace by Point Count" had asbestos fibers found in the material, but the fibers were not present at the counting grids. Table 1 in Part D below contains a summary list of the asbestos bulk samples and the applicable results.

The Bulk Asbestos samples were analyzed for asbestos content by International Asbestos Testing Laboratories (IATL), Mt. Laurel, New Jersey a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.

EPA regulations under 40 CFR 763 requires the use of Polarized Light Microscopy (PLM) to determine whether or not a material contains asbestos. While PLM analysis does a good job for most materials, it does have some limitations, both in the size of the fibers that are visible under a standard optical microscope, and because the organic matrix that the fibers are bound within can obscure the fibers. At the discretion of the building inspector and the client, some types of samples may be analyzed or re-analyzed by what is called TEM NOB, or Transmission Electron Microscopy for Non-Friable Organically Bound materials, which was done using ELAP 198.4, EPA-600/R-93/116 Section 2.5 for "asbestos in bulk building materials by TEM Gravimetry". TEM NOB is the definitive method for determining if asbestos is present, but TEM NOB use is not required by the EPA. TEM NOB analysis was not done for this project.

Field survey data sheets and laboratory reports of the bulk samples are included in Appendix A. Drawings showing sample locations are included as Appendix D.

2. Lead-Containing Materials

Nearly all surfaces in the building were coated with paint and most surfaces had been repainted. EHS-Alaska tested paint throughout the affected areas of the building using an XLp300A X-Ray Fluorescence (XRF) lead paint analyzer (Serial # 81530 with software version 5.2F). Refer to the Lead Paint Screening Table in Appendix C that identifies the surfaces tested, and the results. The Paint Test Locations are shown in Appendix D.

EPA and the Department of Housing and Urban Development (HUD) have defined lead-based paint as any paint or other surface coating that contains lead equal to or in excess of 1.0 milligram per square centimeter (mg/cm^2) or 0.5 percent by weight. XRF results are classified as positive (lead is present at 1.0 mg/cm^2 or greater), negative (less than 1.0 mg/cm^2 of lead was present) or inconclusive (the XRF could not make a conclusive positive or negative determination). Tests that were invalid due to operator error are shown as void tests.

A Performance Characteristic Sheet (PCS) for the NITON XLp300A is available upon request. This PCS data provides supplemental information to be used in conjunction with Chapter 7 of the "HUD Guidelines". Performance parameters provided in the PCS are applicable when operating the instrument using the manufacturer's instructions and the procedures described in Chapter 7 of the "HUD Guidelines". The instrument was operated in accordance with manufacturer's instructions and Chapter 7 of the HUD Guidelines. No substrate correction is required for this instrument. There is no inconclusive classification for this instrument when using the 1.0 mg/cm^2 threshold.

3. PCB-Containing Material

Two bulk samples were collected from the concrete floor and analyzed for total PCBs. Bulk samples of concrete were collected by scraping the concrete. Samples were analyzed for total PCBs by EMSL Analytical, Inc, 200 Route 130 North, Cinnaminson, New Jersey. Results of the total PCB analysis for each sample was used to determine if the bulk concrete samples are considered PCB bulk product waste. Field Survey Data Sheets and Lab results are included in Appendix B. A rough sketch showing sample locations is provided in Appendix D.

4. Suspect Fungal Growth

The survey included a visual examination of the building for suspect fungal growth. Fungal growth was noted in the mechanical room at the center of the building, but no samples were authorized for this project, and therefore identification of the suspect fungal growth is unknown.

D. SURVEY RESULTS

1. Asbestos-Containing Materials

Asbestos field survey data sheets and laboratory reports are included as Appendix A. Refer to Appendix D for sample locations. The following Table 1A lists the samples taken in September 2015, and the results of the laboratory analysis.

TABLE 1A

SAMPLE NUMBER	***MATERIAL***	***LOCATION***	***ASBESTOS CONTENT***
AV0915-A01	Gray flexible sealant	From perimeter of large exterior bay swinging door at south end of area S2 – Photo 192	None Detected
AV0915-A02	Gray flexible sealant	From perimeter of large exterior bay swinging door at north end of area S1 – Photo 194	None Detected
AV0915-A03	Gypsum wall board (GWB)	From damaged area at south end of west wall in area S2 – Photo 196	None Detected
AV0915-A04	Tan brittle mastic	From loose FRP panels on floor in center of area S2 – Photo 198	None Detected
AV0915-A05	**Joint compound**	**From damaged area at south end of west GWB wall in area S2 – Photo 200**	**1.4% Chrysotile**
AV0915-A06	**Joint compound**	**From corner at east end of GWB wall behind generator in area S2 – Photo 201**	**2.3% Chrysotile**

SAMPLE NUMBER	***MATERIAL***	***LOCATION***	***ASBESTOS CONTENT***
AV0915-A07	Joint compound	From vertical seams of plywood wall at north side of area S2 – Photo 205	None Detected
AV0915-A08	**Joint compound**	**From damaged area of GWB wall on north side of hallway between Tank area and Bathroom area B1 – Photo 207**	**1.6% Chrysotile**
AV0915-A09	Tan brittle mastic	From "Marlite" wall panels on plywood surfaced partition walls in bathroom area B1 – Photo 209	None Detected
AV0915-A10	Tan brittle mastic	From "Marlite" wall panels on plywood surfaced walls on west wall behind shower in bathroom area B1 – Photo 210	None Detected
AV0915-A11	Gypsum wall board (GWB)	From damaged wall area at north wall of Laundry room – Photo 212	None Detected
AV0915-A12	**Joint compound**	**From damaged GWB wall area at north wall of Laundry room – Photo 213**	**1.6% Chrysotile**
AV0915-A13	White gummy window glazing sealant	From perimeter of glass to frame at window on west wall of Laundry room – Photo 219	None Detected
AV0915-A14	Tan brittle mastic	From "Marlite" wall panels on plywood surfaced partition walls in bathroom area B2 – Photo 221	None Detected
AV0915-A15	**Joint compound**	**From damaged GWB wall area at south west corner of Tank room – Photo 224**	**1.8% Chrysotile**
AV0915-A16	White gummy window glazing sealant	From perimeter of glass to frame at window on west wall of Tank room – Photo 225	None Detected
AV0915-A17	**Joint compound**	**From damaged GWB wall area on south wall of Mechanical room M1 – Photo 226**	**2.1% Chrysotile**
AV0915-A18	Gypsum wall board (GWB)	From damaged GWB wall area on south wall of Mechanical room M1 – Photo 226	None Detected
AV0915-A19	**Green hard duct mastic**	**From partially collapsed ductwork in southeast corner of Tank room – Photo 233**	**6.9% Chrysotile**
AV0915-A20	**Green hard duct mastic**	**From partially collapsed ductwork in southeast corner of Tank room – Photo 234**	**7.5% Chrysotile**
AV0915-A21	**Joint compound**	**From damaged GWB wall area on east wall of Tank room – Photo 231**	**1.6% Chrysotile**

SAMPLE NUMBER	*MATERIAL*	*LOCATION*	*ASBESTOS CONTENT*
AV0915-A22	Black fibrous chimney insulation	From 3 foot section of "Metalbestos" chimney stack laying on Laundry room floor in the northeast corner – Photo 235	None Detected
AV0915-A23	4" brown cove base; with brown mastic	From base of east wall in bathroom area B1 – Photo 242	None Detected – Both Layers
AV0915-A24	4" brown cove base; with brown mastic	From base of south wall in bathroom area B1 – Photo 243	None Detected – Both Layers
AV0915-A25	4" brown cove base; with brown mastic	From base of center partition wall in bathroom area B2 – Photo 244	None Detected – Both Layers
AV0915-A26	Black granulated rolled roofing	From damaged roof area above area S2 – Photo 253	None Detected
AV0915-A27	Black felt paper	From damaged roof area above area S2 – Photo 253	None Detected
AV0915-A28	**Black tar patch**	**From seam of rolled roofing at damaged roof area above area S2 – Photo 253**	**1.6% Chrysotile**
AV0915-A29	**Black tar patch**	**From edge of roof flashing on granulated rolled roofing over Mechanical room area– Photo 255**	**1.4% Chrysotile**
AV0915-A30	**Black granulated rolled roofing; lab reported with tar**	**From damaged roof area above Mechanical room area – Photo 256**	**Trace Chrysotile**
AV0915-A31	Black felt paper	From damaged roof area above Mechanical room area – Photo 256	None Detected
AV0915-A32	**Black tar patch**	**From rolled roofing seam near peak of roof above Tank room area – Photo 257**	**PC 0.5% Chrysotile**
The testing method used (polarized light microscopy [PLM]) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-asbestos containing, confirmation should be made by quantitative transmission electron microscopy (TEM).			

The following materials have been found to contain asbestos in this or previous surveys, or were assumed to contain asbestos.

1. Joint compound in gypsum wallboard systems on the ceilings and walls.
2. Joint compound applied to plywood walls.
3. Ventilation system duct sealants and mastics.
4. Asbestos-containing patching tars.
5. Boiler gaskets and sealants.

The effects of the following asbestos-containing materials on the proposed demolition are discussed below.

Joint Compound
Joint compound on gypsum board walls and ceilings throughout the building contained asbestos. No asbestos was detected in the gypsum board. Joint compound was damaged and exposed in multiple locations throughout the building and is considered friable in its current condition. There was some joint compound noted to have been applied to the plywood finished walls. There was only one sample taken of that joint compound, and because the remainder of the joint compound in the building contained asbestos, the joint compound on the plywood is assumed to contain asbestos. The building should only be accessed by trained individuals wearing proper PPE. The joint compound will be removed by this project.

Duct Sealants
Gray-Green Sealants at joints of the ductwork contained asbestos as well as mastics that apparently glued insulation to the ducts. The sealants and mastics were in good condition and was not friable and will be removed by this project.

Roof Patching Tars
Asbestos–containing roofing patching tars on the seams of the rolled roofing membrane and on flashings contained asbestos. This material is not friable and will be removed by this project.

Boiler Gaskets and Sealants
Due to their age, gaskets and sealants on the boiler are assumed to be asbestos-containing. These materials are difficult to sample without disassembly of equipment.. These materials were in good condition but may become friable during removal. The gaskets and sealants will be removed by this project.

2. Asbestos in Dusts

The settled and concealed dusts were examined by an EPA Certified Building Inspector but no samples for asbestos in dusts were authorized for this project. Based on their visual inspection and experience from similar buildings, the inspector determined that the typical settled and concealed dusts are not “asbestos debris” from an asbestos-containing building material (ACBM). Based on similar sampling from similar buildings, the inspector also determined that the dusts are unlikely to contain more than one percent (1%) asbestos by weight, and therefore are not an asbestos-containing material (ACM).

3. Lead-Containing Materials

Lead-Testing
EHS-Alaska tested paint throughout the affected areas of the building using a NITON XRF lead paint analyzer. Lead in paints tested varied from a trace amount to 0.04 mg/cm^2 in the former Power Plant Building. Lead in paints tested varied from trace to 1.60 mg/cm^2 in the Pump House Building located at the water’s edge. Refer to the Lead Paint Screening Table in Appendix C that identifies the surfaces tested, and the results. The Paint Test Locations are shown in the Drawings in Appendix D.

Paints
Lead based paints (paint containing more than 1.0 mg/cm^2 of lead) were identified in the project on the exterior of the Pump House Building located at the water’s edge. Lead was detected at very low levels in most of the surfaces tested. Low levels of lead found by XRF testing does not mean that the paints are free of lead, the paints may contain lead. However, these paints may not present a hazard to occupants or workers performing renovation or demolition if lead-safe work practices are followed.

Metallic Lead in Batteries, Pipe Solder and Flashing
Metallic lead items identified in the building included lead solder at copper piping and roof flashings, as well as batteries for the generator and other backup equipment. If removed during demolition they should be recycled or disposed of as hazardous waste.

4. PCB-Containing Materials

Light Ballasts
Older fluorescent lights typically have PCB-containing ballasts. PCB-containing ballasts in fluorescent lights were banned in 1978, but manufacturers were allowed to use up existing stocks, and lights may have been reused from other facilities. The survey included examination of what were considered to be representative light fixtures, but not all fixtures were able to be accessed. All lights shall be inspected during removal. Unless ballasts were marked "No PCBs," they must be assumed to contain PCBs and must be disposed of as a hazardous waste when removed for disposal. Fluorescent light fixtures with PCB-containing ballasts were found in the building. The fluorescent light fixtures will be removed by this project.

Older HID lights may have PCB-containing ballasts. Due to height restrictions and sealed ballast enclosures, the HID fixtures were not able to be accessed. All HID lights shall be inspected during removal or relocation. If ballasts are not marked "No PCBs," we suggest contacting the manufacturer of the lights to determine if the ballasts contain PCB's, or assume that they contain PCB's and be disposed of as a hazardous waste. HID light fixtures with assumed PCB-containing ballasts will be removed by this project.

Bulk Products
Bulk samples were collected from the concrete floor.

The following Table 4A summarizes the PCB Bulk samples taken September 22, 2015 by EHS-Alaska, Inc. Field Survey Data Sheets and Lab results are included in Appendix B. A rough sketch showing sample locations is provided in Appendix D.

TABLE 4A

SAMPLE NUMBER	***MATERIAL***	***LOCATION***	***TOTAL PCB CONCENTRATION***
AV0915-P01	Gray concrete	Approx. 12 inches from NE edge of transformer – Photo 259	None Detected
AV0915-P02	Gray concrete	Approx. 4 feet from NE edge of transformer – Photo 261	None Detected
Total PCB's listed herein includes the sum of all congeners of PCB's. Refer to the laboratory reports for the concentrations of the various congeners of PCBs found in the samples.			

5. Mercury-Containing Materials

Fluorescent Lamps
Fluorescent lamps use mercury to excite the phosphor crystals that coat the inside of the lamp. These lamps contain from 15 to 48 milligrams of mercury depending on their age and manufacturer. The fluorescent light fixtures will be removed by this project.

High Intensity Discharge Lamps
High Intensity Discharge (HID) lamps use mercury and sodium vapors in the lamp, and also typically have lead-containing solders at the bases. These lamps contain varying amounts of mercury depending on their age and manufacturer. HID light fixtures will be removed by this project.

All mercury-containing items being removed by this project are required to be disposed of as hazardous waste or recycled.

6. Other Hazardous Materials

Soil Contamination
The scope of work for EHS-Alaska, Inc. did not include investigation of soils for petroleum or other contaminations.

Refrigerants
Refrigerators were identified outside the building that may contain ozone depleting refrigerants. Ozone depleting substances (ODS) are regulated by the EPA and must be removed by certified technicians prior to equipment disposal.

7. Suspect Fungal Growth

Fungal growth was observed throughout the mechanical room in the center of the building on the floor, walls, and ceiling. Water is entering the ceiling area above the mechanical room freely due to missing roof vents. There were large portions of the rolled roofing that were missing, with distributed leakage throughout the cracks in the plywood. Fungal growth was also observed in the laundry room on the wall separating the laundry room from the mechanical room. The cove base in bathroom area B1 was frozen to the gypsum wall board which indicates an active moisture issue. Bathroom area B1 is located adjacent to the mechanical room to the east.

It should be noted that due to the black discoloration of the most of the walls and ceilings due to what appears to be soot from the diesel generator and an unknown black substance on the floor throughout most of the shop area, it was difficult to visually verify the presence of suspect fungal growth throughout a large portion of the building. Key photos are included in Appendix E. A rough sketch showing room labels is provided in Appendix D.

E. REGULATORY CONSTRAINTS

1. Asbestos-Containing Materials

The Federal Occupational Safety and Health Administration (29 CFR 1926.1101) and the State of Alaska Department of Labor (8 AAC 61) have promulgated regulations requiring testing for airborne asbestos fibers; setting allowable exposure limits for workers potentially exposed to airborne asbestos fibers; establishing contamination controls, work practices, and medical surveillance; and setting worker certification and protection requirements. These regulations apply to all workplace activities involving asbestos-containing materials.

The EPA regulations, 40 CFR 61, National Emission Standards for Hazardous Air Pollutants (NESHAP), established procedures for handling ACM during removal and disposal. The NESHAP regulations address three categories of ACM in a building being demolished:

1. Friable, or regulated ACM (RACM) which must be removed from a building before the building is demolished
2. Category I non-friable ACM (resilient flooring, asphalt roofing products, packing and gaskets)
3. Category II non-friable ACM (non-friable ACM other than Category I ACM).

If allowed by the disposal site, the EPA allows Category I and II non-friable ACM to remain in a building during demolition if: (1) Category I ACM is not in poor condition and is not friable and (2) the probability is low that Category II ACM will become crumbled, pulverized or reduced to powder during demolition. The condition of the ACM and method of demolition will generally determine if Category I and II non-friable ACM may be left in the building during demolition. This EPA standard also requires that no visible emissions be generated from the ACM during removal and transportation and does not allow intentional burning of any building containing ACM.

The EPA regulations require an owner (or the owner's contractor) to notify the EPA of asbestos removal operations and to establish responsibility for the removal, transportation, and disposal of asbestos-containing materials.

The disposal of asbestos waste is regulated by the EPA, the Alaska Department of Environmental Conservation, and the disposal site operator. Wastes being transported to the disposal site must be sealed in leak tight containers prior to disposal and must be accompanied by disposal permits and waste manifests.

2. Dusts with Asbestos

Settled and concealed dusts above ceilings, and at other areas that are not routinely cleaned (such as inside ducts and at roofs, etc.) are assumed to have measurable concentrations of asbestos. Based on sampling of similar settled and concealed dusts at similar buildings, those dusts are assumed to contain less than 1 percent asbestos. Normal settled and concealed dusts are distinct and treated differently from debris resulting from damaged asbestos-containing materials. The gypsum wall board has such extensive damage that access to the building is recommended to be restricted to certified abatement workers.

Background levels of asbestos in dusts for a particular location will depend on many factors, including whether or not asbestos occurs naturally in soils in the area.

Likely sources of asbestos in dusts include natural occurrences of asbestos

The types of asbestos found in settled and concealed dusts often contain actinolite, anthophylite, and tremolite forms of asbestos which are not commonly found in bulk samples taken of materials from buildings. Those forms of asbestos may come from natural occurrences of asbestos in an outside source, such as rock or ore deposits, which appear to be common in the Alaska.

3. Lead-Containing Materials

The EPA Standard 40 CFR 745, Lead-Based Paint Poisoning Prevention in Certain Residential Structures, defines lead–based paint hazards and regulates lead based paint activities in target housing and child-occupied facilities. The requirements of this regulation include training certification, pre-work notifications, work practice standards and record keeping. Areas typically classified as child occupied facilities may include but are not limited to: day care facilities, preschools, kindergarten classrooms, restrooms, multipurpose rooms, cafeterias, gyms, libraries and other areas routinely used by children under 6 years of age. New training requirements for Firms (Contractors) and Renovators (Workers) became effective on April 22, 2010. The building is not classified as a child occupied facility, therefore the requirements of 40 CFR 745 do not apply.

Federal OSHA (29 CFR 1926.62) and the State of Alaska (8 AAC Chapter 61) have promulgated regulations that apply to all construction work where employees may be exposed to lead. The disturbance of any surfaces painted with lead-containing paint requires lead-trained personnel, personnel protective procedures, and air monitoring until exposure levels can be determined. If initial monitoring verifies that the work practices being used are not exposing workers, monitoring and protection procedures may be relaxed. Experience has shown that some paints in most buildings will contain low concentrations of lead and disturbance of those paints are still regulated under the OSHA lead standard, 29 CFR 1926.62. Low levels of lead found by XRF testing does not mean that the paints are free of lead, the paints may contain lead, and OSHA regulations apply anytime measurable amounts of lead are present in paints.

Settled and concealed dust above ceilings, and at other areas that are not routinely cleaned are assumed to have measurable concentrations of lead. Background levels of lead in dusts for a particular location will depend on many factors, including whether or not engines utilizing leaded gasoline were run in or near a building, and upon the age of the building, and thus the age of the dusts. Because the type of

disturbance, quantity of lead dusts, cohesiveness of the dusts and room sizes will change, the airborne lead levels expected during the project will depend on the contractor's means and methods of conducting the work. The mere presence of lead in the dusts does not necessarily imply that a "hazard" exists which would require the use of specially trained workers to "abate" the "hazard".

There is no established correlation between settled or adhered lead dust concentrations and airborne concentrations. The OSHA regulations are essentially "performance based", if workers are exposed above the permissible exposure limits, then all of the requirements in the regulations become effective.

The EPA requires that actual construction or demolition debris that contains lead or lead-containing paint or other heavy metals be tested using the TCLP test to determine if the waste must be treated as hazardous waste. All federal, state and local standards regulating lead and lead-containing wastes are required to be followed during the renovation or demolition of portions of this building.

There are no hazardous waste landfills in Alaska and the lead-containing wastes (if shown to be hazardous waste) will have to be packaged for shipping and disposal. This report assumes that disposal will take place in Seattle or elsewhere in the Pacific Northwest.

4. PCB-Containing Materials

The EPA has promulgated regulations (40 CFR Part 761) that cover the proper handling and disposal of PCB-containing materials. PCB-containing ballasts were found by this survey, and any removed PCB-containing equipment is required to be disposed of at fully permitted hazardous waste facilities. The EPA regulates liquid PCBs differently from non-liquid materials. Workers who remove or handle PCB-containing or PCB-contaminated materials or who transport or dispose of PCB wastes must be trained and certified in hazardous waste operations and emergency response (HAZWOPER) as required by 29 CFR 1910.120 and the State of Alaska Department of Labor (8 AAC 61). The Department of Transportation under 49 CFR Parts 100-199 regulates the marking, packaging, handling and transportation of hazardous materials. All federal, state and local standards regulating PCBs and PCB waste must be followed during this project.

5. Mercury-Containing Materials

Mercury-containing lamps are classified by the EPA as Universal Wastes. The EPA encourages that all Universal Wastes be recycled in accordance with 40 CFR 273. Mercury and mercury-containing products are considered hazardous waste if TCLP testing of the waste for mercury confirms the mercury content to be greater than the EPA criteria of 0.2 mg/l.

6. Other Hazardous Materials

Refrigerants
Refrigerators were present outside the building that are scheduled for removal. Typically, refrigeration systems with ODS shall be maintained in order to prevent discharge of ODS. Systems that are to be removed, or dismantled shall have refrigerants containing ODS recovered and disposed of or recycled in accordance with 40 CFR 82.

Chemical Hazards
The EPA has promulgated regulations (40 CFR Parts 260 to 299 amongst others) that cover the proper handling and disposal of waste chemicals, including listed wastes, which are ignitable, corrosive, reactive, toxic, or an acute hazardous waste or wastes that exhibit the characteristics of toxicity. All construction workers who are required to remove or handle chemical hazards or to transport or dispose of chemical wastes shall be trained and certified as required by the U.S. Department of Labor (29 CFR 1910.120) and the State of Alaska Department of Labor (8 AAC 61). Transportation of chemical hazards are regulated by Department of Transportation regulations under 49 CFR Parts 171 to 178 amongst others.

7. Suspect Fungal Growth

While no regulations exist for disturbance of fungal growth, they can be hazardous to breathe. The gypsum wall board that had asbestos-containing joint compound was also the primary material that had moisture damage and suspect fungal growth. The gypsum wall board will likely be removed prior to demolition under asbestos abatement conditions by certified workers. The use of respirators by qualified, trained workers should be required during demolition and removal of water damaged structure, furnishings, and debris.

Molds are found in virtually every environment and can be detected, indoors and outdoors, year round. Molds reproduce by means of tiny spores, which are extremely small and usually not visible to the naked eye. Mold spores spread by floating through outdoor and indoor air. Outdoors, molds play a part in nature by breaking down organic matter such as fallen leaves and dead trees. Mold may begin growing indoors when mold spores land on surfaces that are wet. Although there are thousands of types (genus-species) of molds, a relatively small number account for most indoor and water damage situations. Some mold are considered worse (more allergenic or toxic) than others. The most "common" mold Cladosporium is widespread inside and outside and is typically not considered as bad as some other molds. The wet "black" molds Chaetomium and Stachybotrys often occur on sheetrock and are considered problem molds. They have large spores and tend not to occur at high levels in the air unless disturbed. They require very damp conditions for growth. The most common "problem" molds are Aspergillus-Penicillium. They are considered "opportunistic" molds and require only moderately damp conditions for growth. They have very small spores which easily become airborne.

Currently, there are no federal standards or recommendations for acceptable exposures to airborne concentrations of mold or mold spores. Research on the health effects of mold exposure is ongoing. According to the Occupational Safety and Health Administration (OSHA), most typical indoor air exposures to mold do not present a risk of adverse health effects. Molds can cause adverse effects by producing allergens (substances that can cause allergic reactions). For those people who are sensitive to molds, exposure can cause symptoms such as nasal stuffiness, eye irritation, wheezing, or skin irritation. Severe reactions may occur among workers exposed to large amounts of molds in occupational settings, such as farmers working around moldy hay. Severe reactions may include fever and shortness of breath. Potential health concerns as well as building damage are important reasons to prevent mold growth and to remediate existing problem areas. The advice of a medical professional should always be sought if there are any emerging health issues.

Since mold spores are ever-present in the environment, it is virtually impossible to make a building mold-free. The goal of any remediation efforts is to remove the mold "growth" after ensuring all moisture intrusion problems have been corrected. Workers who may disturb mold spores should use good work practices and follow the guidelines in IICRC S520, Standard and Reference Guide for Professional Mold Remediation.

8. ESTIMATED HAZARDOUS MATERIALS QUANTITIES

The following table summarizes the asbestos-containing materials and other hazardous materials that have been identified at the former power plant building:

Material	Content	Location	Estimated Quantity
Asbestos-Containing Materials	**Asbestos**		
Joint compound	Chrysotile	Throughout walls & ceilings	9800 SF
Gray-green duct sealants	Chrysotile	Tank room	50 LF
Black roof patching tars	Chrysotile	On rolled roofing seams and roof flashings	2850 SF
Boiler gaskets and sealants.	Assumed	Boiler room	1 Lot

Lead-Containing Materials			
Paints	Lead	Throughout	1 Lot
PCB-Containing Materials			
HID light ballasts	PCB	Exterior - Check all before demo	4 Each
Fluorescent light ballasts	PCB	Throughout – Check all before demo	24 Each
Mercury-Containing Materials			
Fluorescent Lamps	Hg	Throughout	2 Each
HID Lamps	Hg	Exterior	4 Each
Other Potential Hazardous Materials			
Refrigeration equipment with ODS		Exterior at SW corner	1 Each

H. RECOMMENDATIONS

1. Asbestos-Containing Materials

The asbestos-containing materials identified in the building are typically in intact condition and are classified as both friable and non-friable ACM. All asbestos-containing materials that will be disturbed by the planned demolition work are required to be removed by trained asbestos workers.

2. Dusts with Asbestos

Dusts with measurable concentrations of asbestos are assumed to be present, and are primarily debris from asbestos-containing materials, or as debris from asbestos-containing materials and are required to be removed by trained asbestos workers.

3. Lead-Containing Materials

Federal OSHA (29 CFR 1926.62) and the State of Alaska (8 AAC Chapter 61) have promulgated regulations that apply to all construction work where employees may be exposed to lead, including disturbance of paints with low concentrations of lead.

The EPA Standard 40 CFR 745, Lead-Based Paint Poisoning Prevention in Certain Residential Structures, defines lead–based paint hazards and regulates lead based paint activities in target housing and child-occupied facilities. Contractors disturbing lead-based paints in target housing and child occupied facilities must comply with 40 CFR 745.

Worker exposure to lead may be able to be controlled below the OSHA permissible exposure limit if proper engineering controls and procedures are used during renovation. Lead is a potentially hazardous waste and the EPA requires that all wastes that contains lead be tested to determine if they must be treated as hazardous waste. A TCLP test of the waste stream(s) produced by the Contractor's means and methods are required to be performed to determine if those wastes will be hazardous or non-hazardous.

4. PCB-Containing Materials

PCB-containing ballasts scheduled for removal or replacement will need to be removed, handled, packaged and disposed of in accordance with all regulations.

5. Mercury-Containing Materials

If any mercury-containing materials are removed or replaced, they will need to be removed, handled, packaged and disposed of in accordance with all regulations. If mercury-containing lamps and thermostats are handled and disposed of in accordance with the Universal Waste Regulations, no TCLP test is required. If the Contractor chooses to perform a TCLP test of fluorescent lamps, the test shall be conducted in accordance with the requirements of ANSI/NEMA Standard Procedure for Fluorescent Lamp Sample Preparation and Toxicity Characteristic Leaching Procedure, C78.LL 1256-2003 or latest version.

6. Other Hazardous Materials

If any radioactive materials are removed or replaced, they will need to be removed, handled, packaged and disposed of in accordance with all regulations.

Refrigeration units with ODS scheduled for removal will need to be removed, handled, packaged and disposed of in accordance with all regulations.

Chemicals shall be properly disposed of in accordance with all regulations and the requirements of the disposal site. These chemicals may alternatively be utilized or recycled by the contractor.

7. Suspect Fungal Growth

EPA guide EPA 402-K-01-001, Mold Remediation in Schools and Commercial Buildings, sets forth recommendations regarding mold remediation and worker protection. It is recommended that an experienced, qualified contractor be hired to perform the work at the site including demolition of structure and finishes that have had the asbestos removed, but surfaces with suspect fungal growth are still present, in accordance with this guide, amongst other publications regarding mold remediation.

I. LIMITATIONS

The conclusions and recommendations contained in this report are based upon professional opinions with regard to the subject matter. These opinions have been arrived at in accordance with currently accepted environmental consulting and engineering standards and practices and are subject to the following inherent limitations:

1. Accuracy of Information

The laboratory reports utilized in this assessment were provided by the accredited laboratories cited in this report. Although the conclusions, opinions, and recommendations are based in part, on such information, our services did not include the verification of accuracy or authenticity of such reports. Should such information provided be found to be inaccurate or unreliable, EHS-Alaska, Inc. reserves the right to amend or revise its conclusions, opinions, and/or recommendations.

2. Site Conditions

This survey is not intended to be utilized as the sole design document for abatement. This survey was conducted while the site was unoccupied. All inspections were performed with furniture, equipment and/or stored items in place. The scope of work for this survey did not include identification of all potentially hazardous materials that may be present at this site, and was limited to the scope of work agreed upon with our client. Although a concerted effort was made to identify those common hazardous materials likely to be affected by this project, some hazardous materials may have been hidden by furniture, equipment or stored items and may not have been identified. The survey investigated representative materials and items, such as lights and mechanical components. Variations may occur between materials and items that appear to be the same, but are actually of different construction or materials. Other asbestos-containing or potentially hazardous materials may be present in the facilities

that were concealed by structural members, walls, ceilings or floor coverings, or in materials where testing was not conducted.

Additionally, the limited mold assessment included only a visual evaluation of the former power plant building, and no other structures were included in the assessment. No air sampling was conducted to assess potential mold exposures to potential occupants or workers.

The findings we have presented within this report were based on limited research and on the visual survey that was conducted at this site at the time and date specified. They should not be construed as a definite conclusion regarding the microbiological materials at this site. The data presented in this report should be considered representative of the time of our site inspection. Changes in site conditions can occur with time, because of natural variations in airborne concentrations, seasonal variations, differing airflow patterns through the buildings, and human activity. Actual conditions in areas not investigated may differ from those in this report.

Different people have highly variable reactions to microbial agents. None of the information contained herein should be construed as medical advice or a call to action for evacuation. Any decision relative to medical significance should be made by a qualified physician. The results given throughout this study are valid only for the locations and dates indicated. EHS-Alaska, Inc. is not responsible for any action, legal or otherwise, or lack of action resulting from the interpretation of data during this assessment.

EHS-Alaska, Inc. followed currently accepted industrial hygiene practices, including professional opinions based on observations. The recommendations were derived in part from the "Assessment, Remediation, and Post-Remediation Verification of Mold in Buildings," published in 2004 by the American Industrial Hygiene Association (AIHA), the New York City Department of Health “Guidelines on Assessment and Remediation of Fungi in Indoor Environments” updated in 2002 and “Bioaerosols: Assessment and Control”, by the American Conference of Governmental Industrial Hygienists (ACGIH), published in 1999. These guidelines are generally accepted as “industry standard” for microbial remediation protocols. Other than this, no warranty is implied or intended.

3. Changing Regulatory Constraints

The regulations concerning hazardous materials are constantly changing, including the interpretations of the regulations by the local and national regulating agencies. Should the regulations or their interpretation be changed from our current understanding, EHS-Alaska, Inc. reserves the right to amend or revise its conclusions, opinions, and/or recommendations.

APPENDIX A

Asbestos Bulk Sample
Field Survey Data Sheets
and
Laboratory Reports

EHS ALASKA INCORPORATED

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PROJECT NO:	PROJECT NAME:	FACILITY:	COLLECTION DATE:
7398-01	Arctic Village Former Power Plant Assessment	Arctic Village Former Power Plant Building	09/22/2015

CHAIN OF CUSTODY RECORD

ANALYSIS REQUESTED:
- ☒ PLM BULK
- ☐ PLM DUST
- ☐ TEM BULK
- ☐ LEAD DUST
- ☐ LEAD TCLP
- ☐ LEAD PPM
- ☐ TEM MICROVAC DUST (ASTM 5756)

TYPE:	TURNAROUND:	DISPOSAL:	QUANTITY
☒ ASBESTOS ☐ LEAD	3 DAY	NORMAL	32

RECEIVED
IATL
SEP 28 2015

COLLECTED BY (signature)

Travis Juliussen
PRINTED NAME

20130898/10596-01-04
CERT# / AHERA#

Fed Ex
SHIPPING METHOD

7745 8996 0400
COURIER (signature)

9-25-15 11:00am
DATE/TIME

SELECTED LABORATORY

SAMPLES ACCEPTED BY

DATE/TIME

ANALYST'S SIGNATURE

DATE 9/30/15

SPECIAL INSTRUCTIONS / COMMENTS:

LAB: DO NOT ANALYZE PAINT OR WOOD. RETURN A SIGNED COPY OF THIS FORM WITH THE FINAL REPORT TO EHS-ALASKA, INC.

See sample location drawing for more detailed explanation of exact locations.

E-MAILED 9/28/15

9/28/15 10-1-15

FIELD SURVEY DATA ND = NONE DETECTED

EHS SAMPLE NO. / LAB ID NO	SAMPLE DESCRIPTION, (COLOR, MATERIAL TYPE, LAYERS, FRIABILITY)	LOCATION/COMMENTS (INCLUDING PHOTO/XREF)	RESULTS FOR EHS-ALASKA USE ONLY
AV0915-A01 5749666	Gray flexible sealant	From perimeter of large exterior bay swinging door at south end of area S2 – Photo 192	ND
AV0915-A02 5749667	Gray flexible sealant	From perimeter of large exterior bay swinging door at north end of area S1 – Photo 194	ND
AV0915-A03 5749668	Gypsum wall board (GWB)	From damaged area at south end of west wall in area S2 – Photo 196	ND
AV0915-A04 5749669	Tan brittle mastic	From remnant FRP panels on floor in center of area S2 – Photo 198	ND
AV0915-A05 5749670	Joint compound	From damaged area at south end of west GWB wall in area S2 – Photo 200	1.4% Chrysotile
AV0915-A06 5749671	Joint compound	From corner at east end of GWB wall behind generator in area S2 – Photo 201	2.3% Chrysotile
AV0915-A07 5749672	Joint compound	From vertical seams of plywood wall at north side of area S2 – Photo 205	ND
AV0915-A08 5749673	Joint compound	From damaged area of GWB wall on north side of hallway between Tank area and Bathroom area B1 – Photo 207	1.6% Chrysotile
AV0915-A09 5749674	Tan brittle mastic	From "Marlite" wall panels on plywood surfaced partition walls in bathroom area B1 – Photo 209	ND
AV0915-A10 5749675	Tan brittle mastic	From "Marlite" wall panels on plywood surfaced walls on west wall behind shower in bathroom area B1 – Photo 210	ND

EHS ALASKA INCORPORATED

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PROJECT NO:	PROJECT NAME:	FACILITY:	COLLECTION DATE:
7398-01	Arctic Village Former Power Plant Assessment	Arctic Village Former Power Plant Building	09/22/2015

FIELD SURVEY DATA

EHS SAMPLE NO. / LAB ID NO	SAMPLE DESCRIPTION, (COLOR, MATERIAL TYPE, LAYERS, FRIABILITY)	LOCATION/COMMENTS (INCLUDING PHOTO/XREF)	RESULTS FOR EHS-ALASKA USE ONLY
AV0915-A11 5749676	Gypsum wall board (GWB)	From damaged wall area at north wall of Laundry room – Photo 212	ND
AV0915-A12 5749677	Joint compound	From damaged GWB wall area at north wall of Laundry room – Photo 213	1.6% Chrysotile
AV0915-A13 5749678	White gummy window glazing sealant	From perimeter of glass to frame at window on west wall of Laundry room – Photo 219	ND
AV0915-A14 5749679	Tan brittle mastic	From "Marlite" wall panels on plywood surfaced partition walls in bathroom area B2 – Photo 221	ND
AV0915-A15 5749680	Joint compound	From damaged GWB wall area at south west corner of Tank room – Photo 224	1.8% Chrysotile
AV0915-A16 5749681	White gummy window glazing sealant	From perimeter of glass to frame at window on west wall of Tank room – Photo 225	ND
AV0915-A17 5749682	Joint compound	From damaged GWB wall area on south wall of Mechanical room M1 – Photo 226	2.1% Chrysotile
AV0915-A18 5749683	Gypsum wall board (GWB)	From damaged GWB wall area on south wall of Mechanical room M1 – Photo 226	ND
AV0915-A19 5749684	Green hard duct mastic	From partially collapsed ductwork in southeast corner of Tank room – Photo 233	6.9% Chrysotile
AV0915-A20 5749685	Green hard duct mastic	From partially collapsed ductwork in southeast corner of Tank room – Photo 234	7.5% Chrysotile
AV0915-A21 5749686	Joint compound	From damaged GWB wall area on east wall of Tank room – Photo 231	1.6% Chrysotile
AV0915-A22 5749687	Black fibrous duct insulation	From 3 foot section of "Metalbestos" duct laying on Laundry room floor in the northeast corner – Photo 235	ND
AV0915-A23 5749688	4" brown cove base; with brown mastic	From base of east wall in bathroom area B1 – Photo 242	ND BOTH LAYERS
AV0915-A24 5749689	4" brown cove base; with brown mastic	From base of south wall in bathroom area B1 – Photo 243	ND BOTH LAYERS
AV0915-A25 5749690	4" brown cove base; with brown mastic	From base of center partition wall in bathroom area B2 – Photo 244	ND BOTH LAYERS
AV0915-A26 5749691	Black granulated rolled roofing	From damaged roof area above area S2 – Photo 253	ND

EHS ALASKA INCORPORATED

EHS-Alaska, Inc.
11901 Business Blvd., Suite 208, Eagle River, AK 99577
(907) 694-1383 • (907) 694-1382 fax
e-mail • ehsak@ehs-alaska.com

PROJECT NO:	PROJECT NAME:	FACILITY:	COLLECTION DATE:
7398-01	Arctic Village Former Power Plant Assessment	Arctic Village Former Power Plant Building	09/22/2015

FIELD SURVEY DATA

EHS SAMPLE NO. / LAB ID NO	SAMPLE DESCRIPTION, (COLOR, MATERIAL TYPE, LAYERS, FRIABILITY)	LOCATION/COMMENTS (INCLUDING PHOTO/XREF)	RESULTS FOR EHS-ALASKA USE ONLY
AV0915-A27 5749692	Black felt paper	From damaged roof area above area S2 – Photo 253	ND
AV0915-A28 5749693	Black tar patch	From seam of rolled roofing at damaged roof area above area S2 – Photo 253	1.6% Chrysotile
AV0915-A29 5749694	Black tar patch	From edge of roof flashing on granulated rolled roofing over Mechanical room area– Photo 255	1.4% Chrysotile
AV0915-A30 5749695	Black granulated rolled roofing	From damaged roof area above Mechanical room area – Photo 256	PC Trace Chrysotile
AV0915-A31 5749696	Black felt paper	From damaged roof area above Mechanical room area – Photo 256	ND
AV0915-A32 5749697	Black tar patch	From rolled roofing seam near peak of roof above Tank room area – Photo 257	PC 0.5% Chrysotile
--END--	--END--	--END--	

IATL **International Asbestos Testing Laboratories**

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: EHS Alaska Incorporated
11901 Business Blvd., Ste 208
Eagle River AK 99577-7701

Report Date: 9/30/2015
Report No.: 375228
Project: Arctic Village Former Power
Project No.: 7398-01

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5749666 **Description / Location:** Grey Caulk
Client No.: AV0915-A01 PerimeterOfLgExtBaySwingingDoorAtSEnd

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 5749667 **Description / Location:** Grey Caulk
Client No.: AV0915-A02 PerimeterOfLgExtBaySwingingDoorAtNEnd

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 5749668 **Description / Location:** Tan/White Sheetrock
Client No.: AV0915-A03 Damaged Area At SEnd Of WWall InAreaS2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	5	Cellulose	93
		2	Fibrous Glass	

Lab No.: 5749669 **Description / Location:** Tan Mastic
Client No.: AV0915-A04 Remnant FRP PanelsOnFloorInCenterAreaS2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: US EPA 600/R-93/116 by Polarized Light Microscopy, (ELAP 198.1 where applicable)

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: M. Mirza

Approved By: Frank E. Ehrenfeld, III
Laboratory Director

Date: 9/30/2015

IATL **International Asbestos Testing Laboratories**

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CERTIFICATE OF ANALYSIS

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Eagle River AK 99577-7701

Report Date: 9/30/2015
Report No.: 375228
Project: Arctic Village Former Power
Project No.: 7398-01

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5749670 **Description / Location:** White Joint Compound
Client No.: AV0915-A05 Damaged AreaAtSEndOfW GWB Wall InAreaS2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.4	Chrysotile	None Detected	None Detected	PC 98.6

Lab No.: 5749671 **Description / Location:** White Joint Compound; Corner At
Client No.: AV0915-A06 E EndOf GWB Wall BehindGeneratorInAreaS2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 2.3	Chrysotile	None Detected	None Detected	PC 97.7

Lab No.: 5749672 **Description / Location:** Lt.Tan Joint Compound; Vertical Seams
Client No.: AV0915-A07 Of Plywood Wall At N Side Of Area S2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 5749673 **Description / Location:** White Joint Compound; Damaged Area Of
Client No.: AV0915-A08 GWB Wall On N Side Of Hallway

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.6	Chrysotile	None Detected	None Detected	PC 98.4

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: US EPA 600/R-93/116 by Polarized Light Microscopy, (ELAP 198.1 where applicable)

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: M. Mirza

Date: 9/30/2015

IATL **International Asbestos Testing Laboratories**

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CERTIFICATE OF ANALYSIS

Client: EHS Alaska Incorporated
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Eagle River AK 99577-7701

Report Date: 9/30/2015
Report No.: 375228
Project: Arctic Village Former Power
Project No.: 7398-01

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5749674 **Description / Location:** Off-White Mastic;Marlite Wall Panels
Client No.: AV0915-A09 On Plywood Surfaced Partition Walls

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 5749675 **Description / Location:** Lt.Tan Mastic;Marlite Wall Panels
Client No.: AV0915-A10 On Plywood Surfaced Walls On W Wall

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 5749676 **Description / Location:** White Sheetrock
Client No.: AV0915-A11 Damaged Wall Area At N Wall Of LaundryRm

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	Trace	Cellulose	98
		2	Fibrous Glass	

Lab No.: 5749677 **Description / Location:** White Joint Compound; Damaged
Client No.: AV0915-A12 GWB Wall Area At N Wall Of LaundryRm

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.6	Chrysotile	None Detected	None Detected	PC 98.4

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: US EPA 600/R-93/116 by Polarized Light Microscopy, (ELAP 198.1 where applicable)

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: M. Mirza

Date: 9/30/2015

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CERTIFICATE OF ANALYSIS

Client: EHS Alaska Incorporated
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Eagle River AK 99577-7701

Report Date: 9/30/2015
Report No.: 375228
Project: Arctic Village Former Power
Project No.: 7398-01

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5749678 **Description / Location:** White Putty; Perimeter Of Glass
Client No.: AV0915-A13 To Frame At WindowOn W Wall Of LaundryRm

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 5749679 **Description / Location:** Lt.Tan Mastic; Marlite Wall Panels On
Client No.: AV0915-A14 PlywoodSurfacedParatitionWallsInBathrm

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 5749680 **Description / Location:** White Joint Compound; Damaged GWB
Client No.: AV0915-A15 Wall Area At SW Corner Of Tank Rm

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.8	Chrysotile	None Detected	None Detected	PC 98.2

Lab No.: 5749681 **Description / Location:** White Putty; Perimeter Of Glass To
Client No.: AV0915-A16 Frame At Window On W Wall Of Tank Rm

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: US EPA 600/R-93/116 by Polarized Light Microscopy, (ELAP 198.1 where applicable)

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: M. Mirza

Date: 9/30/2015

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CERTIFICATE OF ANALYSIS

Client: EHS Alaska Incorporated
11901 Business Blvd., Ste 208
Eagle River AK 99577-7701

Report Date: 9/30/2015
Report No.: 375228
Project: Arctic Village Former Power
Project No.: 7398-01

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5749682 **Description / Location:** White Joint Compound; Damaged GWB
Client No.: AV0915-A17 Area On S Wall Of Mechanical Rm M1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 2.1	Chrysotile	None Detected	None Detected	PC 97.9

Lab No.: 5749683 **Description / Location:** White Sheetrock; Damaged GWB Wall
Client No.: AV0915-A18 Area On S Wall Of Mechanical Rm M1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	Trace	Cellulose	98
		2	Fibrous Glass	

Lab No.: 5749684 **Description / Location:** Dk.Green Mastic; Partially Collapsed
Client No.: AV0915-A19 Ductwork In SE Corner Of Tank Rm

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 6.9	Chrysotile	None Detected	None Detected	PC 93.1

Lab No.: 5749685 **Description / Location:** Dk.Green Mastic; Partially Collapsed
Client No.: AV0915-A20 Ductwork In SE Corner Of Tank Rm

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 7.5	Chrysotile	None Detected	None Detected	PC 92.5

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: US EPA 600/R-93/116 by Polarized Light Microscopy, (ELAP 198.1 where applicable)

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: M. Mirza

Date: 9/30/2015

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CERTIFICATE OF ANALYSIS

Client: EHS Alaska Incorporated
11901 Business Blvd., Ste 208
Eagle River AK 99577-7701

Report Date: 9/30/2015
Report No.: 375228
Project: Arctic Village Former Power
Project No.: 7398-01

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5749686 **Description / Location:** White Joint Compound
Client No.: AV0915-A21 Damaged GWB Wall On E Wall Of Tank Rm

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.6	Chrysotile	None Detected	None Detected	PC 98.4

Lab No.: 5749687 **Description / Location:** Black Insulation; 3' Section Of
Client No.: AV0915-A22 MetalbestosDuctLayingOnLaundryRmFlr

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	80	Mineral Wool	20

Lab No.: 5749688 **Description / Location:** Brown Cove Base; 4"
Client No.: AV0915-A23 Base Of E Wall In Bathroom Area B1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 5749688 **Description / Location:** Brown Mastic **Layer No.:** 2
Client No.: AV0915-A23 Base Of E Wall In Bathroom Area B1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: US EPA 600/R-93/116 by Polarized Light Microscopy, (ELAP 198.1 where applicable)

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: M. Mirza

Date: 9/30/2015

IATL **International Asbestos Testing Laboratories**

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CERTIFICATE OF ANALYSIS

Client: EHS Alaska Incorporated
11901 Business Blvd., Ste 208
Eagle River AK 99577-7701

Report Date: 9/30/2015
Report No.: 375228
Project: Arctic Village Former Power
Project No.: 7398-01

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5749689 **Description / Location:** Brown Cove Base; 4"
Client No.: AV0915-A24 Base Of S Wall In Bathroom Area B1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 5749689 **Description / Location:** Brown Mastic **Layer No.:** 2
Client No.: AV0915-A24 Base Of S Wall In Bathroom Area B1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 5749690 **Description / Location:** Brown Cove Base; 4"; Base Of
Client No.: AV0915-A25 Center PartitionWall In Bathroom Area B2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 5749690 **Description / Location:** Brown Mastic **Layer No.:** 2
Client No.: AV0915-A25 Center PartitionWall In Bathroom Area B2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: US EPA 600/R-93/116 by Polarized Light Microscopy, (ELAP 198.1 where applicable)

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: M. Mirza

Date: 9/30/2015

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CERTIFICATE OF ANALYSIS

Client: EHS Alaska Incorporated
11901 Business Blvd., Ste 208
Eagle River AK 99577-7701

Report Date: 9/30/2015
Report No.: 375228
Project: Arctic Village Former Power
Project No.: 7398-01

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5749691 **Description / Location:** Black Roof Material
Client No.: AV0915-A26 Damaged Roof Area Above Area S2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	40	Cellulose	60

Lab No.: 5749692 **Description / Location:** Black Tar Paper
Client No.: AV0915-A27 Damaged Roof Area Above Area S2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Cellulose	10

Lab No.: 5749693 **Description / Location:** Black Tar; Seam Of Rolled Roofing
Client No.: AV0915-A28 At Damaged Roof Area Above Area S2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.6	Chrysotile	None Detected	None Detected	PC 98.4

Lab No.: 5749694 **Description / Location:** Black Tar; Edge Of Roof FlashingOn
Client No.: AV0915-A29 GranulatedRolledRoofingOverMechanicalRm

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.4	Chrysotile	None Detected	None Detected	PC 98.6

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: US EPA 600/R-93/116 by Polarized Light Microscopy, (ELAP 198.1 where applicable)

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: M. Mirza

Date: 9/30/2015

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CERTIFICATE OF ANALYSIS

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Report Date: 9/30/2015
Report No.: 375228
Project: Arctic Village Former Power
Project No.: 7398-01

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5749695 **Description / Location:** Black Roof Material/Tar
Client No.: AV0915-A30 Damaged Roof Area Above Mechanical Rm

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC Trace	Chrysotile	30	Cellulose	70

Lab No.: 5749696 **Description / Location:** Black Tar Paper
Client No.: AV0915-A31 Damaged Roof Area Above Mechanical Rm

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Cellulose	10

Lab No.: 5749697 **Description / Location:** Black Tar; Rolled Roofing
Client No.: AV0915-A32 Seam Near Peak Of Roof Above Tank Rm

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 0.5	Chrysotile	Trace	Cellulose	PC 99.5

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

Analytical Method: US EPA 600/R-93/116 by Polarized Light Microscopy, (ELAP 198.1 where applicable)

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: M. Mirza

Date: 9/30/2015

APPENDIX B

Bulk Product PCB Sample
Field Survey Data Sheets
and
Laboratory Reports

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Environmental Chemistry Chain of Custody

EMSL Order Number (*Lab Use Only*): 011505829

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

OrderID: 011505829

Report To Contact Name: Travis Juliussen			**Bill To Company:** EHS-Alaska, INC.		
Company Name: EHS-Alaska, INC.			**Attention To:** Travis Juliussen		
Street: 11901 Business Blvd., Suite 208			**Street:** 11901 Business Blvd., Suite 208		
City: Eagle River	**State/Province:** AK	**Zip/Postal Code:** 99577	**City:** Eagle River	**State/Province:** AK	**Zip:** 99577
Phone : 907-694-1383	**Fax :** 907-694-1382		**Phone:** 907-694-1383	**Fax:** 907-694-1382	
Project Name: 7398 Arctic Village Former Power Plant Assessment	**Email Results To:** tjuliussen@ehs-alaska.com		**U.S. State where Samples Collected:** Alaska		
Number of Samples in Shipment: 2	**Date of Shipment:** 9/28/2015	**Purchase Order:** 7398-01	**Sampled By (Signature):**		
Standard Turnaround Time: ☒ 2 Weeks	**The following TAT's are subject to lab approval:** ☐1 Week ☐4 Days ☐3 Days ☐2 Days ☐1 Day				

Failure to complete will hinder processing of				Matrix	Preservative	List Test(s)	
Client Sample ID	**Comp**	**Grab**	**Date/Time**	**W=Water S=Soil A=Air SL=Sludge O= Other**	**1=HCL 2=HNO3 3=H2SO4 4=ICE 5=Other**		**Comments**
AV0915-P01		Y	09/22/15, 16:17	O	4	EPA SW846 Method 8082	Approx. 12 inches from NE edge of transformer: Photo 259
AV0915-P02		Y	09/22/15, 16:29	O	4	EPA SW846 Method 8082	Approx. 4 feet from NE edge of transformer: Photo 261
END	END	END	END	END	END	END	END

Released By (Signature)	Date & Time	Received By	Date & Time
	9/28/15 10:20am	Fedex 7745 8129 8404	9-28-15 11:30am
			10/1/15 0820

Please indicate reporting requirements: ☐Results Only ☒Results and QC ☐Reduced Deliverables ☐Disk Deliverable ☐Other

Instructions or Comments:

rcolon 9-30-15 9pm
9-30-15

4°

Page 1 Of 1

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone: (856) 303-2500 Fax: (856) 858-4571 Email: EnvChemistry2@emsl.com

Attn: **Travis Juliussen**
Environmental Health Sciences-Alaska
11901 Business Blvd.
Suite 208
Eagle River, AK 99577-7701
Phone: (907) 694-1383
Fax: (907) 694-1382

10/8/2015

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 10/1/2015. The results are tabulated on the attached data pages for the following client designated project:

7398 Arctic Village Former Power Plant Assessment

The reference number for these samples is EMSL Order #011505829. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (856) 303-2500.

Reviewed and Approved By:

Julie Smith - Laboratory Director

The test results contained within this report meet the requirements of NELAP and/or the specific certification program that is applicable, unless otherwise noted.
NELAP Certifications: NJ 03036, NY 10872, PA 68-00367

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (856) 303-2500 / (856) 858-4571
http://www.EMSL.com EnvChemistry2@emsl.com

EMSL Order:	011505829
CustomerID:	ENVI04
CustomerPO:	7398-01
ProjectID:	

Attn: **Travis Juliussen**
Environmental Health Sciences-Alaska
11901 Business Blvd.
Suite 208
Eagle River, AK 99577-7701

Phone: (907) 694-1383
Fax: (907) 694-1382
Received: 10/01/15 9:20 AM

Project: **7398 Arctic Village Former Power Plant Assessment**

Analytical Results

Client Sample Description AV0915-P01
Approx 12 in from NE edge of transformer:Photo 259

Collected: 9/22/2015 ***Lab ID:*** *0001*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
3540C/8082A	Aroclor-1016	ND	0.94	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1221	ND	0.94	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1232	ND	0.94	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1242	ND	0.94	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1248	ND	0.94	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1254	ND	0.94	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1260	ND	0.94	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1262	ND	0.94	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1268	ND	0.94	mg/Kg	10/6/2015	AB	10/7/2015	EA

Client Sample Description AV0915-P02
Approx 4 ft from NE edge of transformer:Photo 261

Collected: 9/22/2015 ***Lab ID:*** *0002*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
3540C/8082A	Aroclor-1016	ND	0.93	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1221	ND	0.93	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1232	ND	0.93	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1242	ND	0.93	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1248	ND	0.93	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1254	ND	0.93	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1260	ND	0.93	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1262	ND	0.93	mg/Kg	10/6/2015	AB	10/7/2015	EA
3540C/8082A	Aroclor-1268	ND	0.93	mg/Kg	10/6/2015	AB	10/7/2015	EA

Definitions:
ND - indicates that the analyte was not detected at the reporting limit
RL - Reporting Limit

APPENDIX C

Lead Analyzer Test Results

LEAD BASED PAINT SCREENING SUMMARY

NITON XLp-300A, Serial No. 81530

NO.	SITE	INSPECTOR	ROOM	COMPONENT	SUBSTRATE	CONDITION	COLOR	DURATION	TIME	DEPTH INDEX	RESULTS		
											LBP	mg/cm^2	+/- ERROR
1	POWER PLANT	JULIUSSEN	-	SHUTTER CAL	-	-	-	48.24	9/22/2015 15:24	-	-	6.86	0
2	**POWER PLANT**	**JULIUSSEN**	**-**	**CALIBRATION**	**-**	**-**	**RED**	**21.51**	**9/22/2015 15:26**	**1.13**	**Positive**	**1.1**	**0.1**
3	**POWER PLANT**	**JULIUSSEN**	**-**	**CALIBRATION**	**-**	**-**	**RED**	**22.14**	**9/22/2015 15:27**	**2.52**	**Positive**	**1.1**	**0.1**
4	**POWER PLANT**	**JULIUSSEN**	**-**	**CALIBRATION**	**-**	**-**	**RED**	**21.48**	**9/22/2015 15:27**	**1.11**	**Positive**	**1.1**	**0.1**
5	POWER PLANT	JULIUSSEN	SHOP 2 (S2)	GENERATOR	METAL	FAIR	YELLOW	6.01	9/22/2015 15:31	1	Negative	0	0.02
6	POWER PLANT	JULIUSSEN	SHOP 2 (S2)	SUPPORT POST	WOOD	PEELING	GRAY	3.59	9/22/2015 15:33	1.09	Negative	0.02	0.03
7	POWER PLANT	JULIUSSEN	SHOP 2 (S2)	WALL	WOOD	PEELING	GRAY	3.02	9/22/2015 15:33	1	Negative	0.01	0.03
8	POWER PLANT	JULIUSSEN	SHOP 2 (S2)	WALL	DRYWALL	PEELING	GRAY	3	9/22/2015 15:34	1	Negative	0.01	0.02
9	POWER PLANT	JULIUSSEN	LAUNDRY	DOOR FRAME	WOOD	FAIR	OFF WHITE	2.99	9/22/2015 15:36	1	Negative	0	0.02
10	POWER PLANT	JULIUSSEN	LAUNDRY	WALL	WOOD	PEELING	OFF WHITE	2.39	9/22/2015 15:36	1	Negative	0	0.02
11	POWER PLANT	JULIUSSEN	LAUNDRY	WINDOW FRAME	WOOD	FAIR	OFF WHITE	2.4	9/22/2015 15:37	1	Negative	0	0.02
12	POWER PLANT	JULIUSSEN	LAUNDRY	DOOR	METAL	PEELING	RED	3	9/22/2015 15:38	1.71	Negative	0.01	0.02
13	POWER PLANT	JULIUSSEN	BATHROOM (B2)	WALL	WOOD	PEELING	WHITE	2.41	9/22/2015 15:39	1	Negative	0	0.02
14	POWER PLANT	JULIUSSEN	TANK ROOM	WALL	WOOD	PEELING	WHITE	2.99	9/22/2015 15:40	1.54	Negative	0.01	0.03
15	POWER PLANT	JULIUSSEN	TANK ROOM	WATER TANK	WOOD	FAIR	RED	2.98	9/22/2015 15:40	1	Negative	0	0.02
16	POWER PLANT	JULIUSSEN	TANK ROOM	EXPANSION TANK	METAL	FAIR	BLUE	3.61	9/22/2015 15:41	1	Negative	0	0.02
17	POWER PLANT	JULIUSSEN	TANK ROOM	COUNTERTOP	WOOD	PEELING	WHITE	2.99	9/22/2015 15:42	1	Negative	0	0.02
18	POWER PLANT	JULIUSSEN	TANK ROOM	LADDER	WOOD	PEELING	WHITE	3.01	9/22/2015 15:42	1	Negative	0.01	0.02
19	POWER PLANT	JULIUSSEN	SHOP 1 (S1)	WALL	WOOD	POOR	BLACK	3.59	9/22/2015 15:44	1	Negative	0	0.02
20	POWER PLANT	JULIUSSEN	SHOP 1 (S1)	DOOR	METAL	FAIR	GRAY	5.94	9/22/2015 15:45	1.92	Negative	0.04	0.03
21	POWER PLANT	JULIUSSEN	EXTERIOR	WALL	METAL	FAIR	GRAY	2.96	9/22/2015 15:47	1	Negative	0.02	0.03
22	POWER PLANT	JULIUSSEN	EXTERIOR	VOID	VOID	VOID	VOID	VOID	9/22/2015 15:48	VOID	VOID	VOID	VOID
23	POWER PLANT	JULIUSSEN	EXTERIOR	WINDOW SILL	WOOD	PEELING	WHITE	3.61	9/22/2015 15:48	1	Negative	0	0.02
24	POWER PLANT	JULIUSSEN	EXTERIOR	DOOR FRAME	WOOD	PEELING	WHITE	2.97	9/22/2015 15:50	1	Negative	0	0.02
25	POWER PLANT	JULIUSSEN	EXTERIOR	DOOR	METAL	POOR	WHITE	6.01	9/22/2015 15:52	3.52	Negative	0.03	0.05
26	**POWER PLANT**	**JULIUSSEN**	**-**	**CALIBRATION**	**-**	**-**	**RED**	**20.98**	**9/22/2015 15:58**	**1.06**	**Positive**	**1**	**0.1**
27	**POWER PLANT**	**JULIUSSEN**	**-**	**CALIBRATION**	**-**	**-**	**RED**	**20.94**	**9/22/2015 15:58**	**2.68**	**Positive**	**1.2**	**0.1**
28	**POWER PLANT**	**JULIUSSEN**	**-**	**CALIBRATION**	**-**	**-**	**RED**	**21.58**	**9/22/2015 15:59**	**1.12**	**Positive**	**1.1**	**0.1**
29	POWER PLANT	JULIUSSEN	-	SHUTTER CAL	-	-	-	48.23	9/23/2015 8:06	-	-	6.06	0
30	**PUMP BLDG**	**JULIUSSEN**	**-**	**CALIBRATION**	**-**	**-**	**RED**	**20.89**	**9/23/2015 8:09**	**1.1**	**Positive**	**1.1**	**0.1**
31	**PUMP BLDG**	**JULIUSSEN**	**-**	**CALIBRATION**	**-**	**-**	**RED**	**20.88**	**9/23/2015 8:09**	**2.63**	**Positive**	**1.1**	**0.1**
32	**PUMP BLDG**	**JULIUSSEN**	**-**	**CALIBRATION**	**-**	**-**	**RED**	**21.51**	**9/23/2015 8:09**	**1.09**	**Positive**	**1.1**	**0.1**
33	**PUMP BLDG**	**JULIUSSEN**	**EXTERIOR**	**WALL**	**METAL**	**PEELING**	**YELLOW**	**5.97**	**9/23/2015 8:14**	**1.06**	**Positive**	**1.60**	**0.10**
34	PUMP BLDG	JULIUSSEN	INTERIOR	FLOOR	METAL	PEELING	RED	4.18	9/23/2015 8:15	1.00	Negative	0.01	0.02
35	**PUMP BLDG**	**JULIUSSEN**	**-**	**CALIBRATION**	**-**	**-**	**RED**	**18.51**	**9/23/2015 8:19**	**1.08**	**Positive**	**1.10**	**0.10**
36	**PUMP BLDG**	**JULIUSSEN**	**-**	**CALIBRATION**	**-**	**-**	**RED**	**20.89**	**9/23/2015 8:19**	**1.12**	**Positive**	**1.10**	**0.10**
37	**PUMP BLDG**	**JULIUSSEN**	**-**	**CALIBRATION**	**-**	**-**	**RED**	**20.96**	**9/23/2015 8:20**	**2.73**	**Positive**	**1.20**	**0.10**
38	**PUMP BLDG**	**JULIUSSEN**	**-**	**CALIBRATION**	**-**	**-**	**RED**	**21.52**	**9/23/2015 8:20**	**1.07**	**Positive**	**1.10**	**0.10**

Table Heading Descriptions:

Duration: This is the nominal time in seconds that each sample was analyzed.

Depth Index: Indicates the relative depth of the lead. A Depth Index (DI) of less than 1.5 indicates lead very near the surface layer of paint. A DI between 1.5 and 4.0 indicates moderately covered lead. A DI greater than 4.0 indicates the lead paint is deeply buried beneath multiple layers of paint.

LBP: Results are shown as positive (POS $\geq$ 1.0 mg/cm2), inconclusive (INC) or negative (NEG <1.0 mg/cm2). The results are based on the combined results of the K and L shell readings. L shell and K shell readings are not provided, but are available. Positive results are shown in bold print.

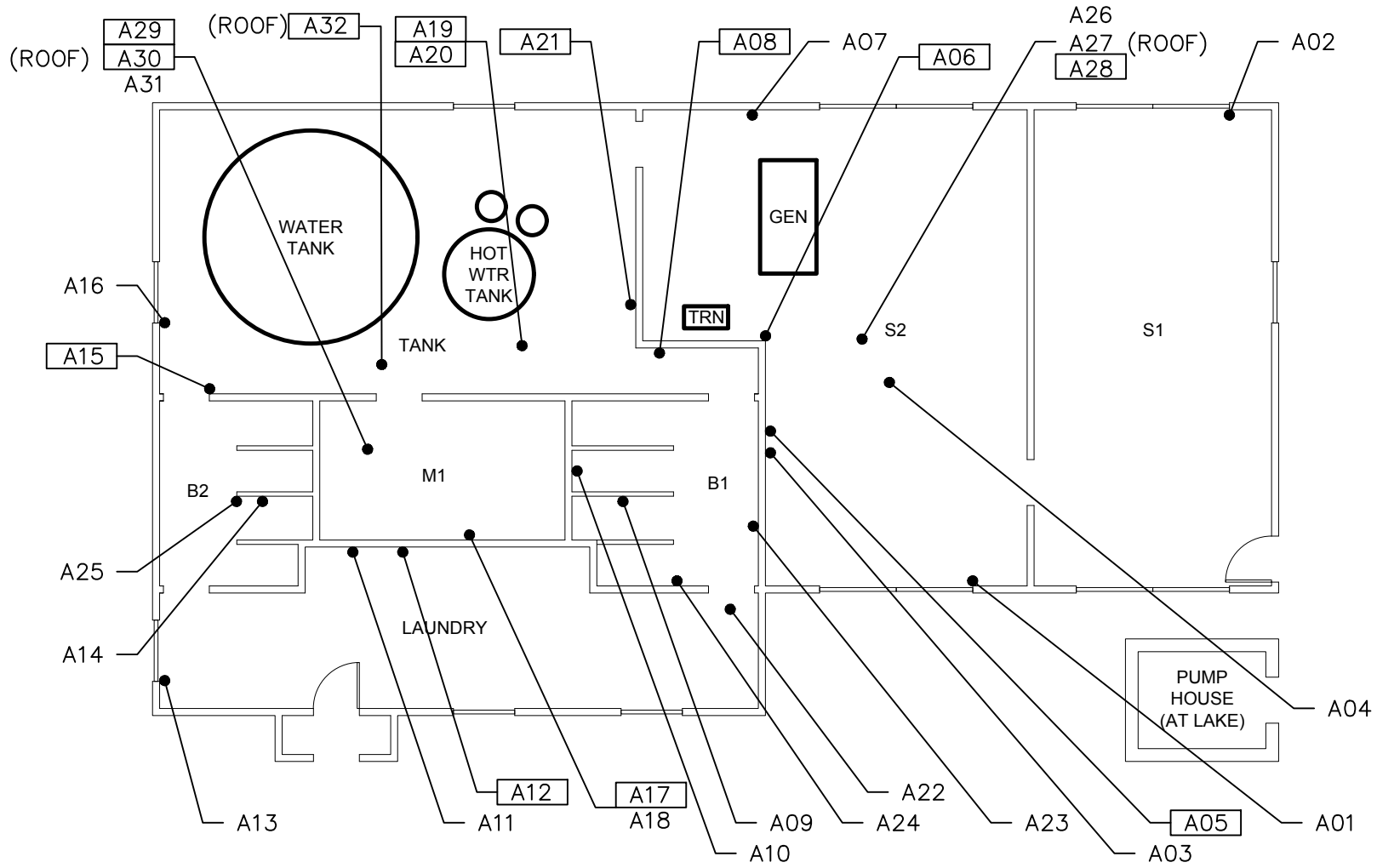
mg/cm2: This is the testing results produced by the NITON XLp-300A instrument in milligrams of lead per square centimeter (mg/cm2). The EPA defines lead based paint as paint containing lead at 1.0 mg/cm2 or greater. A negative number is a result of an internal computation made by the instrument and should be interpreted as zero. Even though paint may be termed negative (less than 1.0 mg/cm2) by EPA definition, disturbance of the paint may still be regulated by OSHA under 29 CFR 1926.62. Where lead is present at any level, appropriate engineering controls, work practices and personal protective equipment should be used until a negative exposure assessment can be determined. <LOD indicates that the lead present was less than the limits of detection of the instrument (very little or no lead present).

VOID: This indicates that the test was intentionally terminated by the operator due to operator error (e.g., operator moved analyzer while testing).

Substrate: Where ceramic is shown as a substrate, lead content is typically from the glazing on the tile unless the tile is painted.

APPENDIX D

Drawings of Sample Locations



1
C-1
LAYOUT
NTS

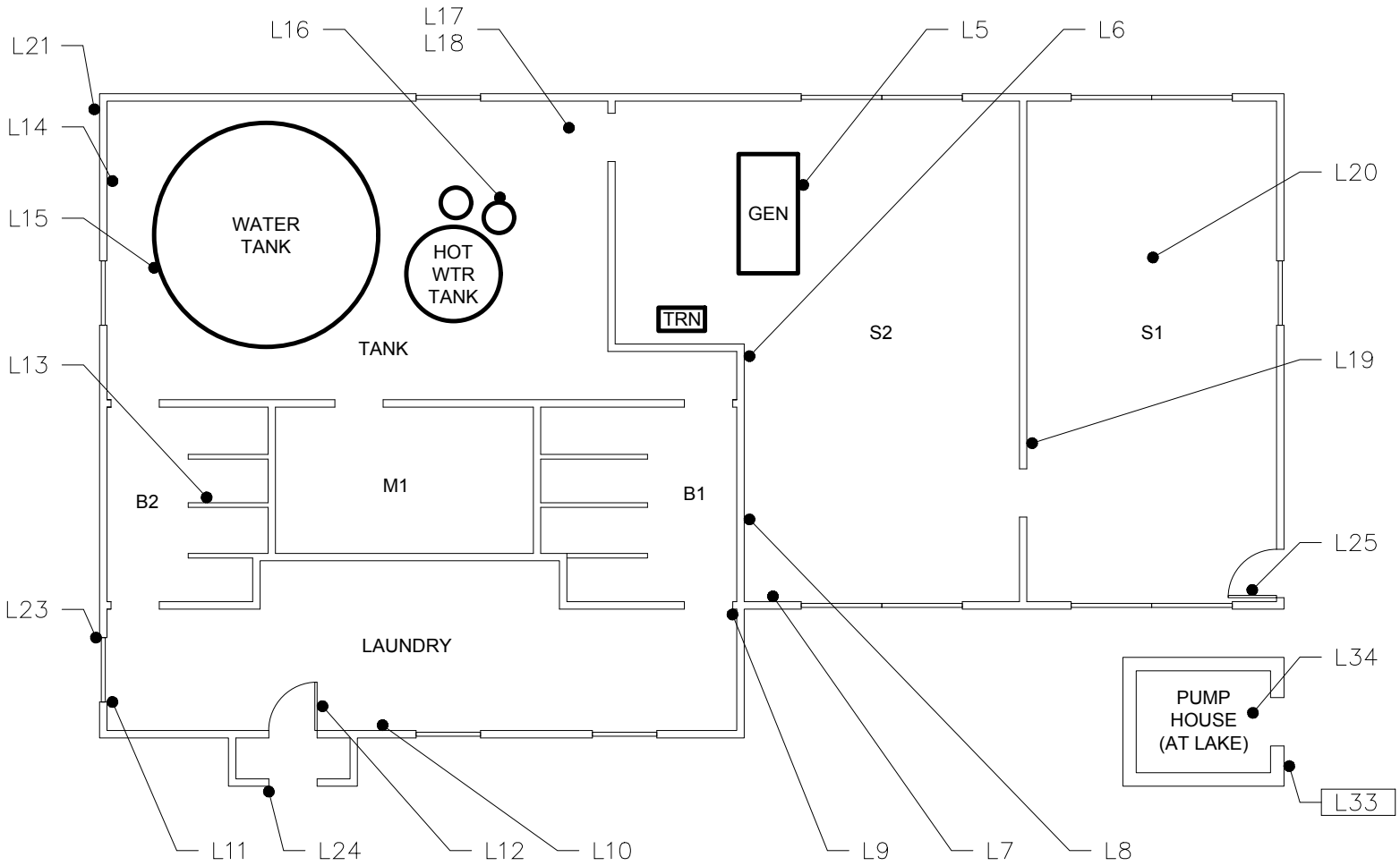
N

LEGEND

- AXX — ASBESTOS TEST LOCATION
- AXX — LAB TEST RESULTS POSITIVE FOR ASBESTOS

REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS. ALL SAMPLES HAVE AV0915– PREFIX.

ARCTIC VILLAGE FORMER POWER PLANT BUILDING	FORMER POWER PLANT ARCTIC VILLAGE, ALASKA ASBESTOS SAMPLE LOCATIONS	EHS ALASKA INCORPORATED ENGINEERING, HEALTH & SAFETY CONSULTANTS	DRAWN: TGJ CHECK: RAF	DATE: 09/22/2015
			FILE #: 7398-SL	DWG.NO: C-1



LEGEND

● LXX LEAD TEST LOCATION

● [LXX] LEAD TEST CLASSIFIED AS LEAD BASED PAINT

REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

1 / C-2 LAYOUT NTS

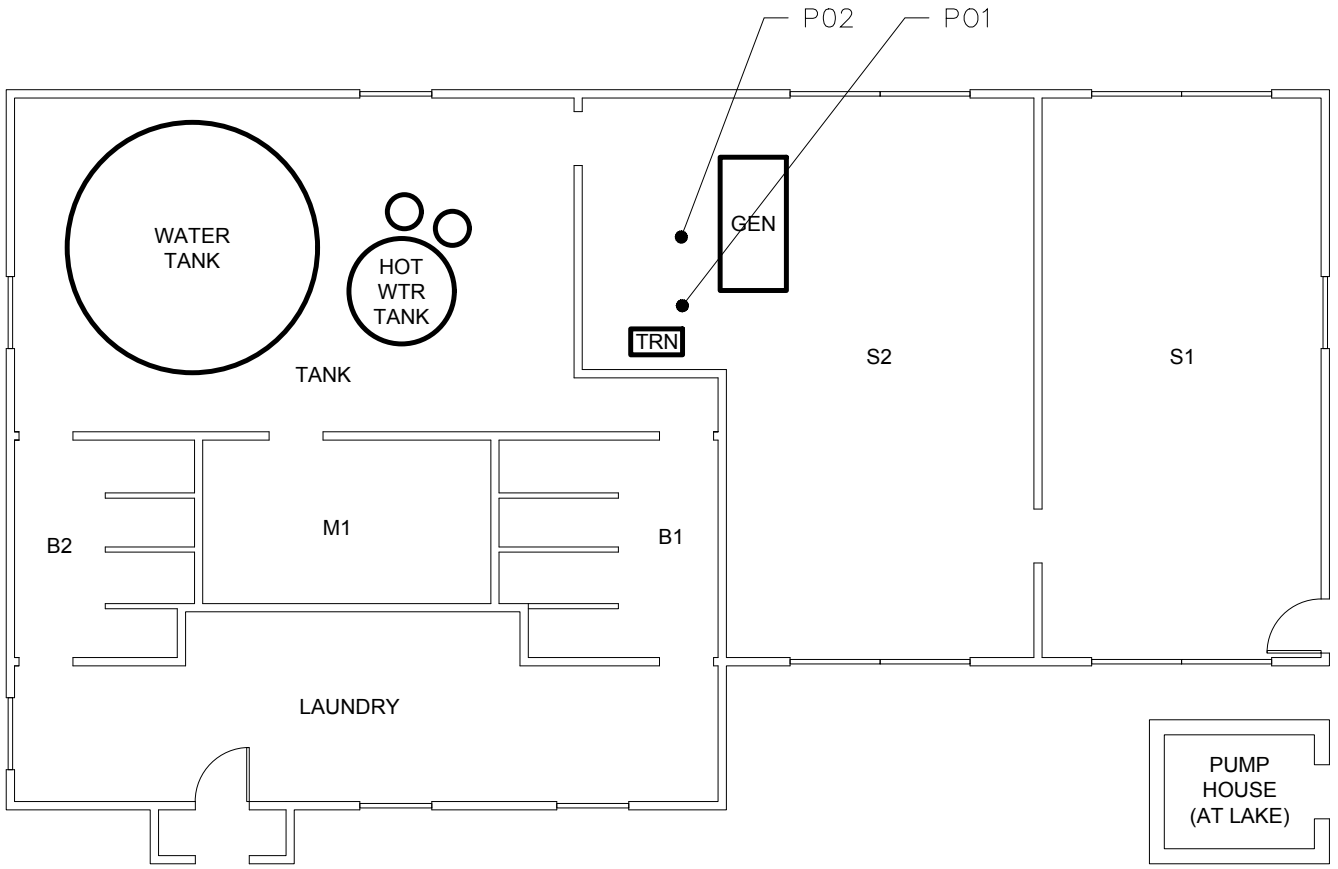
N

ARCTIC VILLAGE FORMER POWER PLANT BUILDING

FORMER POWER PLANT ARCTIC VILLAGE, ALASKA LEAD SAMPLE LOCATIONS

EHS ALASKA INCORPORATED
ENGINEERING, HEALTH & SAFETY CONSULTANTS

DRAWN: TGJ CHECK: RAF	DATE: 09/22/2015
FILE #: 7398-SL	DWG.NO: C-2



1
C-3
LAYOUT
NTS

N

LEGEND

PXX PCB TEST LOCATION

PXX PCB TEST THAT CONTAINED PCB'S, NOTE CONCENTRATIONS

REFER TO TESTING SUMMARY IN REPORT FOR FULL DETAILS.

ARCTIC VILLAGE FORMER POWER PLANT BUILDING	FORMER POWER PLANT ARCTIC VILLAGE, ALASKA PCB SAMPLE LOCATIONS	EHS ALASKA INCORPORATED ENGINEERING, HEALTH & SAFETY CONSULTANTS	DRAWN: TGJ CHECK: RAF	DATE: 09/22/2015
			FILE #: 7398-SL	DWG.NO: C-3

APPENDIX E

Suspect Fungal Growth
Key Photos

7398 – SUSPECT FUNGAL GROWTH KEY PHOTOS

Figure 1 – The former Arctic Village Power Plant, in Arctic Village, Alaska.

Figure 2 – The wall separating the laundry room and mechanical room. Note the hole in the roof above the mechanical room.

Figure 3 – Black soot on wall in Tank room.

Figure 4 – Black soot on walls and ceiling of shop area S1.

Figure 5 – Suspect fungal growth between the paint layer and gypsum wall board in the mechanical room.

Figure 6 – Suspect fungal growth on wood members in the ceiling of the mechanical room.

Figure 7 – Suspect fungal growth on gypsum wall board ceiling of the mechanical room.

Figure 8 – Suspect fungal growth on gypsum wall board debris on the floor of the mechanical room.

Figure 9 – Missing roof flashing directly above the mechanical room.

APPENDIX E

ADEC CONCEPTUAL SITE MODEL

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Former Arctic Village Power Plan, Arctic Village, Alaska

Completed By: Jake Tracy

Date Completed: March 2016

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1)

Check the media that could be directly affected by the release.

(2)

For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.

(3)

Check all exposure media identified in (2).

(4)

*Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5)

Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.

Current & Future Receptors

Media	Transport Mechanisms	Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ Surface Soil (0-2 ft bgs)	☑ Direct release to surface soil — check soil	☑ soil	☑ Incidental Soil Ingestion	C/F	F	C/F	F			
	☑ Migration to subsurface — check soil		☐ Dermal Absorption of Contaminants from Soil							
	☐ Migration to groundwater — check groundwater		☐ Inhalation of Fugitive Dust							
	☑ Volatilization — check air									
	☑ Runoff or erosion — check surface water									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☑ Subsurface Soil (2-15 ft bgs)	☑ Direct release to subsurface soil — check soil	☐ groundwater	☐ Ingestion of Groundwater							
	☐ Migration to groundwater — check groundwater		☐ Dermal Absorption of Contaminants in Groundwater							
	☑ Volatilization — check air		☐ Inhalation of Volatile Compounds in Tap Water							
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Ground-water	☐ Direct release to groundwater — check groundwater	☑ air	☑ Inhalation of Outdoor Air	C/F	F	C/F	F			
	☐ Volatilization — check air		☐ Inhalation of Indoor Air							
	☐ Flow to surface water body — check surface water		☐ Inhalation of Fugitive Dust							
	☐ Flow to sediment — check sediment									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☑ Surface Water	☑ Direct release to surface water — check surface water	☑ surface water	☑ Ingestion of Surface Water	C/F	C/F	C/F	C/F			
	☐ Volatilization — check air		☐ Dermal Absorption of Contaminants in Surface Water							
	☐ Sedimentation — check sediment		☐ Inhalation of Volatile Compounds in Tap Water							
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Sediment	☐ Direct release to sediment — check sediment	☐ sediment	☐ Direct Contact with Sediment							
	☐ Resuspension, runoff, or erosion — check surface water									
	☐ Uptake by plants or animals — check biota	☐ biota	☐ Ingestion of Wild or Farmed Foods							
	☐ Other (list):									

Revised, 10/01/2010

Print Form

Human Health Conceptual Site Model
Scoping Form

Site Name: Former Arctic Village Power Plant, Arctic Village, Alaska

File Number: 700.38.002

Completed by: Jake Tracy

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☐ USTs
- ☒ ASTs
- ☐ Dispensers/fuel loading racks
- ☒ Drums
- ☐ Vehicles
- ☐ Landfills
- ☒ Transformers
- ☐ Other:

Release Mechanisms *(check potential release mechanisms at the site)*

- ☒ Spills
- ☒ Leaks
- ☐ Direct discharge
- ☐ Burning
- ☐ Other:

Impacted Media *(check potentially-impacted media at the site)*

- ☒ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☒ Air
- ☒ Sediment
- ☐ Groundwater
- ☒ Surface water
- ☐ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☒ Residents (adult or child)
- ☒ Commercial or industrial worker
- ☒ Construction worker
- ☐ Subsistence harvester (i.e. gathers wild foods)
- ☐ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☒ Recreational user
- ☐ Farmer
- ☐ Other:

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

Petroleum hydrocarbons and metals have been documented at the site.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Arsenic has been documented at the site. Although, the arsenic levels exceed the ADEC cleanup levels it is our opinion that arsenic is within naturally occurring levels and is not considered a COC and the pathways is incomplete.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☐

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

Contaminants are not expected to migrate to the groundwater due to the presence of permafrost beneath the site.

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☒

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

During breakup, residents have noted a sheen on surface water.

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☐

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☒

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☒

If all of the boxes are checked, label this pathway complete: Incomplete

Comments:

Concentrations of arsenic, which has the potential to bioaccumulate were detected in surface soil samples.

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

It is assumed that DRO exceeding the ADEC Arctic Zone inhalation cleanup level is present at the site.

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☒

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Although DRO-impacted soil has been identified at the site, ADEC does not require evaluation of DRO for the indoor inhalation pathway.

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.
- Chromium is present in soil that can be dispersed as dust particles of any size.

Generally, DEC direct contact soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because it is assumed most dust particles are incidentally ingested instead of inhaled to the lower lungs. The inhalation pathway only needs to be evaluated when very small dust particles are present (e.g., along a dirt roadway or where dusts are a nuisance). This is not true in the case of chromium. Site specific cleanup levels will need to be calculated in the event that inhalation of dust containing chromium is a complete pathway at a site.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

APPENDIX A

BIOACCUMULATIVE COMPOUNDS OF POTENTIAL CONCERN

Organic compounds are identified as bioaccumulative if they have a BCF equal to or greater than 1,000 or a log K_{ow} greater than 3.5. Inorganic compounds are identified as bioaccumulative if they are listed as such by EPA (2000). Those compounds in Table B-1 of 18 AAC 75.341 that are bioaccumulative, based on the definition above, are listed below.

Aldrin	DDT	Lead
Arsenic	Dibenzo(a,h)anthracene	Mercury
Benzo(a)anthracene	Dieldrin	Methoxychlor
Benzo(a)pyrene	Dioxin	Nickel
Benzo(b)fluoranthene	Endrin	PCBs
Benzo(k)fluoranthene	Fluoranthene	
Cadmium	Heptachlor	Pyrene
Chlordane	Heptachlor epoxide	Selenium
Chrysene	Hexachlorobenzene	Silver
Copper	Hexachlorocyclopentadiene	Toxaphene
DDD	Indeno(1,2,3-c,d)pyrene	Zinc
DDE		

Because BCF values can relatively easily be measured or estimated, the BCF is frequently used to determine the potential for a chemical to bioaccumulate. A compound with a BCF greather than 1,000 is considered to bioaccumulate in tissue (EPA 2004b).

For inorganic compounds, the BCF approach has not been shown to be effective in estimating the compound's ability to bioaccumulate. Information available, either through scientific literature or site-specific data, regarding the bioaccumulative potential of an inorganic site contaminant should be used to determine if the pathway is complete.

The list was developed by including organic compounds that either have a BCF equal to or greater than 1,000 or a log K_{ow} greater than 3.5 and inorganic compounds that are listed by the United States Environmental Protection Agency (EPA) as being bioaccumulative (EPA 2000).

The list was developed by including organic compounds that either have a BCF equal to or greater than 1,000 or a log K_{ow} greater than 3.5 and inorganic compounds that are listed by the United States Environmental Protection Agency (EPA) as being bioaccumulative (EPA 2000). The BCF can also be estimated from a chemical's physical and chemical properties. A chemical's octanol-water partitioning coefficient (K_{ow}) along with defined regression equations can be used to estimate the BCF. EPA's Persistent, Bioaccumulative, and Toxic (PBT) Profiler (EPA 2004) can be used to estimate the BCF using the K_{ow} and linear regressions presented by Meylan et al. (1996). The PBT Profiler is located at http://www.pbtprofiler.net/. For compounds not found in the PBT Profiler, DEC recommends using a log K_{ow} greater than 3.5 to determine if a compound is bioaccumulative.

APPENDIX B

VOLATILE COMPOUNDS OF POTENTIAL CONCERN

A chemical is identified here as sufficiently volatile and toxic for further evaluation if the Henry's Law constant is 1 x 10^{-5} atm-m^3/mol or greater, the molecular weight is less than 200 g/mole (EPA 2004a), and the vapor concentration of the pure component posed an incremental lifetime cancer risk greater than 10^{-6} or a non-cancer hazard quotient of 0.1, or other available scientific data indicates the chemical should be considered a volatile. Chemicals that are solid at typical soil temperatures and do not sublime are generally not considered volatile.

Acetone	Mercury (elemental)
Benzene	Methyl bromide (Bromomethane)
Bis(2-chloroethyl)ether	Methyl chloride (Chloromethane)
Bromodichloromethane	Methyl ethyl ketone (MEK)
Bromoform	Methyl isobutyl ketone (MIBK)
n-Butylbenzene	Methylene bromide
sec-Butylbenzene	Methylene chloride
tert-Buytlbenzene	**1-Methylnaphthalene**
Carbon disulfide	**2-Methylnaphthalene**
Carbon tetrachloride	Methyl *tert*-butyl ether (MTBE)
Chlorobenzene	**Naphthalene**
Chlorodibromomethane (Dibromochloromethane)	Nitrobenzene
Chloroethane	n-Nitrosodimethylamine
Chloroform	**n-Propylbenzene**
2-Chlorophenol	**Styrene**
1,2-Dichlorobenzene	1,1,2,2-Tetrachlorethane
1,3-Dichlorobenzene	Tetrachloroethylene (PCE)
1,4-Dichlorobenzene	**Toluene**

Dichlorodifluoromethane	1,2,4-Trichlorobenzene
1,1-Dichloroethane	1,1,1-Trichloroethane
1,2-Dichloroethane	1,1,2-Trichloroethane
1,1-Dichloroethylene	Trichloroethane
cis-1,2-Dichloroethylene	2,4,6-Trichlorophenol
trans-1,2-Dichloroethylene	1,2,3-Trichloropropane
1,2-Dichloropropane	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)
1,3-Dichloropropane	Trichlorofluoromethane (Freon-11)
Ethylbenzene	**1,2,4-Trimethylbenzene**
Ethylene dibromide (1,2-Dibromoethane)	**1,3,5-Trimethylbenzene**
Hexachlorobenzene	Vinyl acetate
Hexachloro-1,3-butadiene	Vinyl chloride (Chloroethene)
Hexachlorocyclopentadiene	**Xylenes (total)**
Hexachloroethane	GRO (see note 3 below)
Hydrazine	DRO (see note 3 below)
Isopropylbenzene (Cumene)	RRO (see note 3 below)

Notes:

1. Bolded chemicals should be investigated as volatile compounds when petroleum is present. If fuel containing additives (e.g., 1,2-dichloroethane, ethylene dibromide, methyl *tert*-butyl ether) were spilled, these chemicals should also be investigated.
2. If a chemical is not on this list, and not in Tables B of 18 AAC 75.345, the chemical has not been evaluated for volatility. Contact the ADEC risk assessor to determine if the chemical is volatile.
3. At this time, ADEC does not require evaluation of petroleum ranges GRO, DRO, or RRO for the indoor air inhalation (vapor intrusion) pathway.

APPENDIX F

ADEC LETTER DATED

SEPTEMBER 12, 2016

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Environmental Conservation

DIVISION OF ENVIRONMENTAL HEALTH
Solid Waste Program

610 University Avenue
Fairbanks, Alaska 99709-3643
Main: 907.451.2108
Fax: 907.451.2188
www.dec.alaska.gov

9/12/16
File Number: 700.15.002

Sent via Electronic Mail

Lance Whitwell
P.O. Box 22069
Arctic Village, AK 99722

Re: Arctic Village Power Plant Facility Demolition and Remediation Project

Dear Mr. Whitwell:

The Alaska Department of Environmental Conservation, Solid Waste Program has reviewed the *Arctic Village Former Power Plant Hazardous Materials Assessment* and has the following comments.

The remediation of the power plant facility will result is asbestos-containing material, and so the material from this demolition project will require disposal in an asbestos landfill. The asbestos analytical testing deviated from the prescribed methods recommended by EPA, so the final report must also be evaluated by John Pavitt, with the EPA. Mr. Pavitt will have to determine the extent of regulated asbestos-containing material that will require special disposal.

Mr. Pavitt reviewed a draft version of the report and determined that all the materials except the green mastic from the plywood panels are non-friable and would be suitable for local disposal. Mr. Pavitt's preliminary determination was that he would need to contact the lab who completed the analytical sampling for more information and then complete some research regarding the mastic materials because the application to plywood was atypical. This will need to be reassessed prior to the next phase of this project.

Regarding the demolition of the structure, Arctic Village will be required to notify EPA 10 business days prior to the demolition and the notice will be reviewed by Mr. Pavitt. Arctic Village must also comply with OSHA requirements, which includes a written safety plan and may require an air monitoring program. As the individuals in Arctic Village have only recently been certified in asbestos abatement, it may be prudent to hire a project manager contractor to direct the work and have the certified local individuals complete the work.

Lead-based paint must also be properly managed. If it is securely attached to a substrate (i.e. no flaking or peeling) then EPA has determined that a composite sample would pass TCLP and it does not require special handling. If it is flaking or peeling, removal of the loose paint by a certified worker is required. A project manager contractor could provide assistance with ensuring that the required steps for EPA and OSHA are followed and all of the required paperwork has been completed and submitted. As all of these requirements are to ensure the safety of the workers and the public, it is critical that the project is implemented following EPA and OSHA requirements.

If you are interested in doing the work as a consultant, I would recommend familiarizing yourself with the general health and safety requirements for construction: 29 CFR 1926, subpart C. Regulations specific to asbestos are found in 29 CFR 1926.1101. I would also recommend contacting the AKOSH Consulting arm – 1-800-656-4972 – to discuss what the requirements are for a safety plan.

Regarding local disposal options, due to the small amount of material that will be generated during this project, it is acceptable to dispose of the material in a single monofill. The permit that you would be required to complete is the One-Time Disposal of Asbestos Waste authorization. You should include the stipulation that some clean construction and demolition waste will be disposed of with the asbestos material because the overall amount of clean construction waste and asbestos waste is expected to be minimal.

The community will need to decide where the monofill will be located before the permitting process is started. As you currently have multiple options available for disposal, the community should evaluate constructing the monofill within the current landfill; opening a new monofill adjacent to the new landfill; or choosing an alternative site. The site must be controlled and not accessible to the public, so that should be evaluated during the community decision making process. I am available to provide technical assistance with the permitting process once the decision has been made.

If you have any questions, I am available at trisha.bower@alaska.gov, or at 451-2174.

Sincerely,

Trisha Bower

Trisha Bower
Environmental Program Specialist
Solid Waste Program

Enclosure: Email Memo from John Pavitt
cc: Janice Wiegers, ADEC

29 CFR §1926.1101 Asbestos.

(c) *Permissible exposure limits (PELS)*
(d) *Multi-employer worksites.*
(e) *Regulated areas.* (1) All Class I, II and III asbestos work shall be conducted within regulated areas.
(f) *Exposure assessments and monitoring*
(g) *Methods of compliance.* (1) Engineering controls and work practices for all operations covered by this section.
(h) *Respiratory protection*
(i) *Protective clothing*—(1) *General.*
(j) *Hygiene facilities and practices for employees.*
(k) *Communication of hazards*—(1) *Hazard communication.*
(l) *Housekeeping*
(m) *Medical surveillance.*
(n) Recordkeeping
(o) *Competent person*—(1) *General.* On all construction worksites covered by this standard, the employer shall designate a competent person, having the qualifications and authorities for ensuring worker safety and health required by subpart C, **General Safety and Health Provisions for Construction (29 CFR 1926.20 through 1926.32).**
(p) *Appendices.*

Bower, Trisha M (DEC)

From: Pavitt, John <Pavitt.John@epa.gov>
Sent: Monday, April 04, 2016 4:07 PM
To: Bower, Trisha M (DEC)
Subject: FW: Follow up question on Arctic Village Asbestos Sampling

Hi Trish. After today's conference call to discuss the upcoming demolition of the Arctic Village former power plant, I contacted EHS Alaska, the consulting firm that collected asbestos samples.

Joint Compound ACM
Based on what they're telling me (below) I believe the gypsum wallboard (GWB) with joint compound would appropriately be classified as non-ACM. This is because, when the composite sample results are less than 1%, the material no longer meets the definition of "friable asbestos material" in the asbestos NESHAP regulations, and is no longer regulated. (40 CFR, 61.141-Definitions)

However, I'll have to give some further thought to the plywood wall panels with joint compound. Although that seems similar in concept to GWB with joint compound, that is not included as an example of a wall system that can be analyzed with a composite sample in EPA's guidance. What that means is, the joint compound on plywood panels might still meet the definition of friable asbestos material and have to be handled and disposed of as such.

I'll keep you posted.

John Pavitt
US EPA Region 10, Alaska Operations Office
(907) 271-3688

From: Robert French [mailto:RFrench@ehs-alaska.com]
Sent: Monday, April 04, 2016 3:27 PM
To: Pavitt, John <Pavitt.John@epa.gov>
Cc: Ellen Cloudy <ECloudy@ehs-alaska.com>; Travis Juliussen <TJuliussen@ehs-alaska.com>; Chris Ottosen <COttosen@ehs-alaska.com>
Subject: RE: Follow up question on Arctic Village Asbestos Sampling

Hello John,
We typically do not do composite bulk sampling, because of how multi-layered systems are handled by EPA and OSHA. The labs are required to report the individual layers separately, and we try to be very careful in describing the system that we are sampling. For example GWB with a skim coat or a texture coat that covers the whole surface is called out as a skim coat or texture.

For the Arctic Village Power plant, there was no indication that there was a skim coat or texture, and the joint compound samples contained from 1.4% to 2.3% chrysotile. There was no asbestos detected in the gypsum wall board itself. Because the joint compound is typically only 1/8 inch thick or less, I feel confident that a composite sample of the whole wall thickness would contain less than 1 percent asbestos. Where the composite wall system could be disposed of would be a different question.

The joint compound was also used on plywood walls, and that could likely be considered similarly, although it would likely be easier to separate the joint compound from the plywood.

Hopefully this helps answer your question. Let me know if you want to discuss further.

Bob
Robert French, P.E.
EHS-Alaska, Inc.
11901 Business Blvd., Suite 208
Eagle River, AK 99577
www.ehs-alaska.com
(907) 694-1383 ph (907) 694-1382 fax
1-800-340-3022

From: Pavitt, John [mailto:Pavitt.John@epa.gov]
Sent: Monday, April 04, 2016 2:14 PM
To: Robert French
Subject: Follow up question on Arctic Village Asbestos Sampling

Hi Bob. I'm reviewing asbestos sampling results from EHS's work at the Arctic Village former power plant in Sept. 2015. I'm hoping you or someone there can help me with a question.

For joint compound samples, testing at more than 1%, did you do composite sampling? In other words, was the joint compound analyzed along with the GWB it was connected to? I ask because EPA policy allows that, and makes the difference between a material be classified as RACM or not.

Thanks,

John Pavitt
US EPA Region 10, Alaska Operations Office
(907) 271-3688

APPENDIX G

IMPORTANT INFORMATION ABOUT

YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

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