ANNUAL LANDFARM OPERATIONS REPORT – 2020
ARCTIC VILLAGE, ALASKA

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TABLE OF CONTENTS

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
DEC/DEC	Alaska Department of Environmental Conservation
AEI	Ahtna Environmental, Inc.
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, xylenes
COC	Contaminant of concern
CSM	Conceptual Site Model
cy	cubic yards
DEED	Department of Education and Early Development
DL	detection limit
DRO	diesel range organics
EPA	Environmental Protection Agency
eV	electron volt
FSG	Field Sampling Guidance
ft	feet
GRO	gasoline range organics
HQ	hazard quotient
LCS	laboratory control sample
LDRC	laboratory data review checklist
LF	linear feet
LOQ	limit of quantitation
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NVVTG	Native Village of Venetie Tribal Government
PAH	polycyclic aromatic hydrocarbons
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
RPD	relative percent difference
RRO	residual range organics
SERRC	Southeast Regional Resources Center
SPCC	Spill Prevention Control and Countermeasures
SPLP	Synthetic Precipitate Leachate Procedure
SWPPP	Stormwater Pollution Prevention Plan
TPC	Third Party Consultant
VOC	volatile organic compound
YFSD	Yukon Flats School District

1.0 EXECUTIVE SUMMARY

The Arctic Village landfarm was constructed in 2017 to remediate the petroleum contaminated soil excavated in 2017 from the former YFSD School Site lease lot remediation project in Arctic Village. The primary contaminant of concern (COC) is diesel range organics (DRO) at concentrations above the site-specific cleanup level of 4,000 mg/kg. A total of 6,200 cubic yards (cy) of contaminated soil were excavated and placed in the landfarm for remediation.

The landfarm is constructed on top of a former municipal waste dumpsite that is covered with a compacted 12-inch thick gravel interim closure cap. Interim dump closure was completed in the summer of 2017 as part of the preparation for landfarm construction. The landfarm is surrounded by a permanent chain-link fence and locking gate to prevent unauthorized access and a berm to eliminate runoff from the landfarm. Once remediated, the landfarm soil will be graded to create a 24 to 36-inch-deep permanent cap for the former dumpsite.

Ahtna Environmental, Inc. (AEI) has tilled the landfarm once each year since construction in 2017. Tilling utilizes a custom-fabricated rake that mounts to the bulldozer available in Arctic Village. This process has been modified each season to improve the aeration and treatment at the bottom of the landfarm. AEI also added fertilizer in 2018 and 2019 to stimulate biological activity and increase the treatment rate of the petroleum contaminants. Landfarm tilling was completed in mid-July 2020 by AEI's local crew. For 2021, ***NORTECH*** recommends completing the tilling as early in the season as possible and creating windrows with the top six inches of soil to provide maximum aeration to the bottom of the landfarm.

NORTECH completed landfarm screening and sampling in late July 2020 using the sampling methods and grid employed in previous years. Headspace field screening with a PID was completed at 238 locations, with results ranging from 3 ppm to 1071 ppm. The overall average PID result and averages results for the different depths are significantly lower than the results in 2017 and 2018. Approximately 50% of the PID results are below 100 ppm and 90% are below 400 ppm, which is nearly the opposite of the 2017 percentages. This indicates the contaminant mass in the landfarm has decreased significantly since 2017. The PID results show an increase in concentration with depth, indicating the contaminant mass is being treated more quickly at the top of the landfarm. Future sampling should use the same grid and methods to generate comparable data. The 2021 sampling should be completed as late as possible in the season to allow maximum treatment prior to sampling.

Laboratory samples were collected from 15 locations that had a bias toward the highest field screening results and previous high DRO results. Samples had DRO concentrations ranging from 1,030 mg/kg to 29,300 mg/kg, with 7 of the 17 samples having DRO above the 4,000 mg/kg cleanup level. Locations with PID results less than 400 ppm consistently had DRO concentrations below 4,000 mg/kg. The highest DRO results are in the same range as the highest results from previous biased sampling events.

Using the PID and laboratory results together, the data indicates that at least 50% (and possibly up to 90%) of the landfarm is likely to have DRO concentrations below 4,000 mg/kg. While locations with DRO above 4,000 mg/kg remain present, the data suggests that the true mean DRO concentration is near or below 4,000 mg/kg. ***NORTECH*** recommends discussing the potential to use the true mean concentration as quantified using multi-increment MI sampling for closure of the landfarm with DEC, as well as developing a sampling plan for 2021 that includes MI sampling and biased sampling with the goal of completing closure in 2022.

2.0 SITE DESCRIPTION

The Project Site (Site) is located in Arctic Village, Alaska which is situated on the East Fork of the Chandalar River. The Site is located at N68°06'22.9166" latitude and W145°36'24.7161" longitude. The topography of Arctic Village is characterized by numerous lakes and sloughs scattered throughout the floodplain and separated by low projecting knolls of varying height. The Site is approximately 2.8 miles west of the Arctic Village School Site, which is located on the northwest side of the Village.

2.1 Surface Conditions

The surficial geology of the area consists of alluvial silts, sands, and gravels. Organic soil is found in and around local sloughs that connect to the Chandalar River. Rock types that have been mapped include schist, limestone, Kanayut Metaclastic and mafic to intermediate igneous rocks that occur east of the Chandalar River valley.

The former dumpsite and landfarm area consist of gently sloping, previously disturbed land. A layer of vegetation is present in areas where no solid waste has been deposited. Black spruce and tall willow dominate the local vegetation. Birch and alder plant communities are also found.

Khaali Lake is the nearest surface water body and is approximately 500 feet south of the landfarm. No surface water bodies are adjacent to or immediately downgradient of the landfarm.

2.2 Subsurface Conditions

Arctic Village, including the former dumpsite and landfarm location, is located within the "Arctic Zone" as defined in 18 AAC 75 and is underlain by permafrost. Permafrost in the surrounding area typically begins at depths ranging from three to eight feet below ground surface (bgs) and the seasonally active layer is typically only thawed for a few months per year. The landfarm is expected to completely thaw each year, while the former dumpsite material is expected to slowly refreeze from the bottom up. Material beneath the waste is expected to be permanently frozen.

3.0 BACKGROUND

The following summarizes the history of the former dumpsite and landfarm location, including past activities that resulted in current impacts at this location.

3.1 Site History

The Site is the former Arctic Village dumpsite with documented use dating back to at least April 1992 based on DEC Solid Waste Program inspection records. The Site was historically used as a non-permitted municipal waste collection area or Class III solid waste landfill. Waste disposal had historically consisted of surface disposal of household waste, hunting related wastes such as animal carcasses, and gravel fill. As waste accumulated, the dumpsite was periodically consolidated and leveled with a bulldozer with clean gravel fill placed on top of the new layers of waste. This process has been repeated for 25+ years, resulting in 30 – 40 feet of buried waste.

In 2015, Arctic Village completed the construction of a new lined and permitted Class III Municipal solid waste landfill adjacent to the former dumpsite. The dumpsite was placed into Interim Closure in July 2017 by constructing a 12-inch interim cover of compacted gravel over the compacted waste and installing a permanent chain-link fence with a locking gate.

The Site is currently being leased to the YFSD by the Village for use as a contaminated soil landfarm to treat contaminated soil from the former school location. The YFSD is responsible for maintaining the Site and landfarm operations. Once landfarm remediation is completed, the YFSD will grade the treated material into a permanent cover for the former dump. Then the Village will resume primary responsibility for the dumpsite and complete all post-closure care and monitoring required by the DEC Solid Waste Program.

The landfarm treatment was contracted to continue for up to five years from the initial construction. Based on the construction schedule, 2021 is the final year of tilling included in the current contract. Following successful treatment, the contract requires Ahtna to use the treated landfarm material as a permanent cap for the former dumpsite. Based on the construction dates, this is scheduled to occur no later than 2022.

3.2 Landfarm Treatment and Previous Results

Approximately 6,200 cy of contaminated soil were excavated from the former school site and placed in the landfarm for treatment in 2017. The contaminated soil is spread 24 inches deep in the landfarm and remains uncovered throughout the year to maintain adequate soil moisture. The material has been tilled during a 7-day period each summer since 2017 to increase aeration and biological degradation of the petroleum contaminants in the landfarm. In addition, the landfarm was amended with fertilizer in 2018 and 2019 to increase the rate of biological degradation.

Baseline PID headspace field screening and laboratory sampling were conducted after the landfarm was constructed in 2017 to document the contaminant concentrations in the landfarm. Field screening and laboratory sampling has been completed on an annual basis following annual tilling. PID field screening is used to document the overall condition of the landfarm and identify sample locations for laboratory samples that are biased to quantifying the DRO concentration at the most contaminated locations, as well as several locations that are expected to be near 4,000 mg/kg. Previous field screening results are summarized by statistics in Table 2, while historical DRO concentrations are summarized in Table 3.

3.3 Known Nearby Concerns and Environmental Receptors

Other than the solid waste located beneath the active landfarm, this location does not have any known environmental concerns. Inspection and surface water testing was completed during the first two years of landfarm operation and no concerns were noted outside the permitted landfarm area.

The community's new permitted Class III landfill is located 200 feet to the west of the landfarm location. Most local traffic near the landfarm location is related to the new landfill.

The landfarm was constructed three miles away, more than the minimum 200 feet, from the nearest water source that serves as a public water system as defined in 18AAC80.

No other environmental concerns are known to exist near the landfarm location.

4.0 ORGANIZATION AND RESPONSIBILITIES

The following provides the contact information for organizations and personnel directly involved with this project:

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5.0 OBJECTIVES AND SCOPE OF WORK

The objective and rationale for the landfarm are described in the design documents and work plans for the Arctic Village School Site Remediation Project. The goal of the landfarm was to provide a lower cost, a local method for remediating DRO contaminated soil from the school site. In addition, the landfarm development and final treated soil will provide a resource for the closure of the former dumpsite.

The project documents required operation and maintenance of the landfarm during active treatment. This included annual inspection of the landfarm perimeter and surrounding area, tilling of the landfarm material, and addition of nutrients to the landfarm. This annual work is performed and reported by Ahtna.

Project documents also require annual field screening and laboratory sampling of the landfarm to evaluate remediation progress, starting with baseline sampling in 2017. This includes a visual inspection of the landfarm and surrounding area, observation and evaluation of the annual tilling, field screening of the entire landfarm, and a soil sampling program to collect analytical samples to evaluate current conditions and remediation progress. This annual work is performed and reported by ***NORTECH***.

6.0 METHODOLOGY

Landfarm tilling and sampling were completed in general accordance with the Landfarm Construction and Operations Work Plan, the 2017 DEC FSG, 18AAC78 (Contaminated Sites), and 18AAC60.025(b) (Solid Waste) and the DEC technical memorandum for Landfarming at Sites in Alaska dated January 2018.

6.1 Tilling Methods and Equipment

Landfarm tilling equipment consists of a bulldozer and custom fabricated rake attachment with 24-inch-long tines. The bulldozer blade can be used to move/mix the surface soils into windrows and then the rake is used to loosen and fluff the soil to allow air and other nutrients to penetrate to the bottom of the landfarm. The bulldozer pulls the rake across the landfarm in multiple directions for several days to loosen soil deeper with each successive pass until the full depth of the landfarm had been tilled at least once.

6.2 Contaminants of Potential Concern and Associated Cleanup Levels

Contaminants of Concern
The 2017 baseline assessment of the landfarm included a wide variety of petroleum related analyses, including DRO, RRO, GRO, VOCs, and PAHs. The GRO, VOC, and PAH results from the landfarm confirmed that these potential contaminants are not present at a regulated level in the landfarm. Based upon these results and the recommendations of the 2017 Landfarm Characterization event, the following laboratory analyses were performed:

- Diesel Range Organics (DRO) by Alaska Method AK102
- Residual Range Organics (RRO) by Alaska Method AK103

Site Cleanup Levels Demonstration (18AAC60)
The cleanup goal for the landfarm is for the remediated soil to demonstrate that it is protective of human health and that residual contaminants will not migrate off-site after the material is installed as the permanent cover for the former dumpsite. To satisfy these two criteria, soils in the landfarm are required to meet the following cleanup goals to achieve closure:

1. Human Health cleanup levels
   a. 18AAC75 Arctic Zone Human Health cleanup levels in Table B1
   b. Ingestion and Inhalation cleanup levels in Table B2
   c. 18AAC75 cumulative risk standards
2. Contaminants are not mobile
   a. Synthetic precipitate leachate procedure (SPLP)
   b. DEC Table C Groundwater Cleanup levels.

The landfarm cumulative risk evaluation (Item 1c) and SPLP analysis (Item 2) will be completed once the Human Health cleanup levels (Items 1a and 1b) have been achieved. The target cleanup levels are listed in the following table.

Table 1. Numeric Cleanup Levels

Analyte	Human Health- Based Cleanup Level in mg/kg*	Table C Groundwater Cleanup Levels for Comparison to SPLP Results (mg/L)
GRO	1400	2.2
RRO	13,700	1.1
DRO	4,000 ¥	1.5
Benzene	16	0.0046
Toluene	200	1.1
Ethylbenzene	72	0.015
Total Xylenes	57	0.19
PAHs	By compound	By compound
VOCs	By compound	By compound

* Arctic Zone Method 2 Cleanup Levels, Tables B1 and B2, 18AAC75.340;
¥ DRO Site specific cleanup level

6.3 Field Screening Equipment and Methods

NORTECH has developed standardized field screening methodologies for soil which are provided in Appendix 3. The following site-specific methods were used during this effort to generate a semi-qualitative real time result for petroleum concentration in the soil and to evaluate the tiling method being used.

- Headspace sample locations were the same grid coordinate and depth as the previous years' events to allow a comparative year-over-year analysis
- Evaluation of the effectiveness of the tilling method during sampling through hand excavation and observations

The landfarm has been sampled using a systematic grid with discrete sampling points established in 2017. The purpose of this sampling design was to utilize randomly identified coordinates to develop repeatable sample locations that could be used to generate statistically defensible data. The 2017 sampling grid included 72 36-foot (ft) by 36-ft major grid units. Each major grid unit contained nine 12-ft by 12-ft squares and one was chosen randomly for field screening. The field screening depth is one of four pre-determined depth intervals. Sample depth intervals were 6 inches, with an assigned number of 1 (0-6 inches) through 4 (18-24 inches). Depths were randomly assigned in each grid location. The random locations/depths established during baseline sampling in 2017 have been utilized in each successive sampling event.

A MiniRae™ 3000 PID is the instrument used to complete field screening at the landfarm. The PID was outfitted with a 10.6 eV lamp and calibrated daily to 0.0 ppm fresh air and 100 ppm isobutylene standard gas. The ***NORTECH*** standard methodology for headspace field screening was followed during landfarm sampling. Headspace sampling was the field screening method used to characterize the landfarm and the soil stockpile prior to collecting laboratory samples. A second field screening sample was collected at the time of laboratory sampling at each landfarm grid laboratory sample location for comparison to the laboratory results.

6.4 Laboratory Sample Collection

NORTECH has developed standardized laboratory sample collection methodologies for soil, based on the 2017 DEC FSG, 18AAC78, and laboratory guidance, which can be found in Appendix 3. This section includes additional considerations during the laboratory sampling collection activities.

The landfarm laboratory sampling program evaluates a selected range of field screening results expected within the landfarm. This typically includes a few areas expected to be clean, several locations with the highest field screening results, and the greatest number of samples in a range that expected to be near the target level. However, this program is not intended to provide the "true mean" DRO concentration of the landfarm. Instead, this program has two specific goals: evaluate the highest field screening results in the landfarm and evaluate the expected site-specific DRO cleanup level. This sampling program, due to the small number of samples and explicit bias towards higher concentrations, provides DRO results that cannot be used to calculate an average or perform other statistical analysis. In fact, the average of these results should be expected to be well above the true mean DRO concentration in the landfarm.

The 2020 laboratory sampling locations were selected based on the criteria below:

- High petroleum concentrations – PID results >400 ppm
    - Three (3) locations with the highest DRO results from the previous year (2019)
    - Five (5) of the highest current year PID results (2020)
- Likely contaminated – screening results between 100-399 ppm
    - Up to seven (7) locations within this range
    - Intended evaluate clean cutoff field screening criteria

6.5 Data Quality Objectives

Data generated for this project was either definitive data or screening data. Screening data was generated using a portable photoionization detector (PID) that produced rapid semi-quantitative results. While the PID measurements are generally repeatable, they lack the accuracy to provide direct correlation with the absolute values for concentrations of specific contaminants of concern.

Definitive data consisted of laboratory results that represent a precise quantitative analysis and support the field screening results. Definitive data is used to evaluate progress toward compliance with site cleanup and closure objectives.

The objective of this project is to collect data that can be used to evaluate site conditions relative to DEC cleanup criteria for the project. The DEC Laboratory Data Review Checklist (LDRC) is used to evaluate data quality relative to DEC standards and assess the quality of laboratory data collected during this project.

7.0 FIELD ACTIVITIES

The landfarm annual sampling event was completed during the week of July 27, 2020. This followed the tilling event, which was completed by the local Ahtna crew from July 10 – 17, 2020. The weather during field screening was variable, ranging from sunny and over 50°F to windy and rainy with low temperatures near 40°F. This section is organized in chronological order.

7.1 Mobilization and Daily Field Activities

Onsite activities began the week of July 27, 2020, after mobilization to Arctic Village from Fairbanks. ***NORTECH*** personnel Ron Pratt and Ty Hughes arrived in Arctic Village at approximately 10:00 am. The school principal (Mark Green) picked the field crew up and brought them to the teacher housing, where they were quarantined until rapid tests for Covid-19 were administered. The results were negative and the ***NORTECH*** crew met with the Ahtna and went to the landfarm to prepare for headspace screening. The Ahtna crew indicated tilling had been completed in the previous two weeks using the bulldozer and rake. They reported the weather had been wet since then, although not as rainy as the previous year.

Upon arrival at the landfarm, ***NORTECH*** personnel established the field screening grid on the landfarm based on the 2018 and 2019 sample location coordinates. After establishing the grid, the crew started field screening at the same depth and location as the 2019 event. Based on the field observations, the tilling depth appeared to be approximately 18 inches below the ground surface at the screening locations.

On July 28, 2018, ***NORTECH*** personnel completed field screening on the north side in the morning. Used disposable sampling supplies were discarded at the landfill located west of the landfarm. Field screening on the south side of the landfarm commenced after lunch and continued until approximately 7 pm. Tilling depth checks by hand digging to the top of the gravel landfill cover indicated soil was being tilled to a depth of approximately 18 inches in most locations with only a few locations reaching the bottom of the landfarm, mostly due to shallow spots in the landfarm.

On July 29, 2018, the ***NORTECH*** crews mobilized to the landfarm to continue screening and sampling operations. Field screening was completed in the morning and the PID data was analyzed to identify laboratory sample locations. Laboratory sampling was conducted in the afternoon. Laboratory samples were collected into laboratory supplied glassware using disposal sampling equipment and chilled until delivery to the SGS North America, Inc. sampling receiving facility in Fairbanks. ***NORTECH*** field crew returned to Fairbanks on July 30, 2020 and delivered the samples to the lab that afternoon.

7.2 Summary of Field Screening Results

Soil samples were collected by hand and field screened with a PID using the headspace method. The 2020 field screening results ranged from 3 ppm to 1071 ppm. Field screening results were variable within this range across the multiple screening depths. These results were consistent with the reduced odor observed in most areas across the landfarm compared to the first two screening and sampling events (2017 and 2018). The field screening locations and results are shown in Figure 3. A summary of the basic statistics of the PID results for 2020, as well as previous years, is in Attachment 2, Table 1.

A total of 16 laboratory sample locations were selected based on the PID results and the criteria described in Section 6.4. The sample locations and DRO results are shown in Figure 3 and the laboratory results are shown in Table 2. The lab sample locations included the three highest field screening locations from the previous year, the five highest field screening locations from this field work, and seven locations that might bracket the soil cleanup target concentration. New headspace field screening samples were collected from these locations. Results ranged from 89 ppm to 703 ppm and are shown in Table 2.

7.3 Summary of Tilling Observations

The surface of the landfarm was observed to be relatively flat and loose. This promotes aerobic conditions and moisture contact within the landfarm while also having a natural tendency to retain surface water. The landfarm was moist, but not as muddy as in previous years, consistent with the reduced level of precipitation compared to previous years. The material appeared to be relatively homogenous and had significantly fewer rocks and large pieces of debris than prior years.

The density of the soil generally increased with depth. Hand excavation of test pits indicated the soil was loosened to 18 inches below the surface. The soil at the bottom of the landfarm, deeper than 18 inches, was generally firmer and did not appear to be recently fluffed or aerated. This suggests that the tilling was effective to a depth of 18 inches, but may not have been successful at reaching the bottom of the landfarm at a depth of 24 inches in most areas.

8.0 SAMPLE RESULTS

The sample results are in the following tables and correlate to the figures listed below.

Table 2 Results Location Summary

Sampling Location	Appendix 1	Appendix 2
Landfarm Characterization	Figure 3	Table 2 and 3
Data Quality/Field Duplicates	--	Bottom of Table 2

Laboratory Results

The 2020 sample results are summarized in Table 2, Appendix 2. The DRO results are also shown with the headspace field screening results in Figure 3 in Appendix 1. The current DRO results are also compiled with the previous results in Table 3.

A total of 17 soil samples, including duplicates, were collected for laboratory analysis for DRO by Method AK102 and RRO by Method AK103. DRO was detected in all 17 samples submitted, with results ranging from 1,030 mg/kg to 29,300 mg/kg. DRO concentrations were below the 4000 mg/kg cleanup target in 10 of the 17 samples and above that level in seven of the 17 samples.

RRO was detected in 16 of the 17 samples, with reported results ranging from 121 mg/kg to 571 mg/kg. The non-detect sample had a detection limit of 109 mg/kg. The results are generally two orders of magnitude below the cleanup level.

Laboratory Data Quality Control Summary

The project's data quality objectives were to meet the project documents and the FSG. The project's goal was to produce adequate quality data for comparison to 18 AAC 75 Arctic Zone Human Health cleanup levels and the site-specific DRO target. The primary tool used to assess the quality of the data was the DEC LDRC. An LDRC was completed for the laboratory work order is included in Appendix 4.

Laboratory sampling of the landfarm was completed using discrete grab sampling at selected locations based on PID field screening results so the results would be representative of the conditions as described in the planning documents. Sampling was completed in accordance with the 2019 FSG, confirming the sampling methods were valid.

The blind field duplicate is the primary means to evaluate field quality control. The requirement is one blind duplicate for every ten samples. Two were collected for 15 primary samples, meeting the minimum requirement for field duplicates. Field duplicate results are presented at the bottom of Table 1 in Appendix 2. Relative percent differences (RPD) for primary duplicate pair analyses were within acceptable limits for soil samples (+/- 50%).

Other data quality observations, including evaluation of laboratory control samples and method blanks, are presented in detail in the LDRC in Appendix 4. No concerns were noted. The data is usable as presented in this report.

9.0 ANALYSIS AND DISCUSSION

The Arctic Village landfarm is located on the former Arctic Village dumpsite, which was historically used as a non-permitted municipal waste collection area or Class III solid waste landfill. Waste disposal had historically consisted of surface disposal of household waste that was periodically consolidated over approximately 25 years. In 2015, Arctic Village completed the construction of a new lined and permitted Class III Municipal solid waste landfill adjacent to the former dumpsite. The dumpsite was placed into Interim Closure in July 2017 by constructing a 12-inch interim cover of compacted gravel over the compacted waste and installing a permanent chain-link fence with a locking gate. The Site is currently leased to the YFSD for use as a contaminated soil landfarm to treat contaminated soil from the former school location.

A total of 6,200 cy of petroleum contaminated soil were excavated from the former school location and placed in the landfarm for remediation in 2017. Ahtna is contracted to continue landfarm inspection and tilling operations for up to five years from the initial construction. Based on the construction schedule, 2021 is the final year of tilling that is included in the existing contract. Following successful treatment, the treated material landfarm will be turned into a permanent cap for the former dumpsite. Based on the contract and construction dates, this is scheduled to occur no later than 2022.

NORTECH is contracted to provide annual field screening and laboratory sampling of the landfarm to evaluate remediation progress, starting with baseline sampling in 2017. This includes a visual inspection of the landfarm and surrounding area, observation/evaluation of the annual tilling, field screening of the entire landfarm, and a soil sampling program to collect analytical samples to evaluate current conditions and remediation progress. This work was completed in 2020 and is described below.

9.1 Landfarm Observations – 2020

The landfarm occupies approximately 69,000 square feet or 60-70% of the former dumpsite Interim Cover area. The soil surface is generally flat and the landfarm was observed to be 18-24 inches deep across the area. The landfarm soil is comprised primarily of silt, sand, and gravel.

The material was heterogeneous (not uniform) when excavated and moved to the landfarm so some areas of the landfarm had higher proportions of different materials. The landfarm is becoming more homogenous with each tilling event. Also, in 2017 the soil was not physically screened to remove larger rocks and debris before landfarm construction. This slowed the tilling speed during the annual events as the operator had to stop the equipment and remove larger rocks and debris from the rake. The quantity of larger items removed from the landfarm is decreasing each year, making the tilling and sampling more efficient.

In 2020, tilling operations were conducted in mid-July, approximately two weeks prior to ***NORTECH***'s arrival onsite. The tilling was reported to consist of raking the soil in two perpendicular directions, north to south and east to west. The observations and measurements of ***NORTECH***'s crew during hand excavation throughout the landfarm was that the tilling activity loosened the material down to approximately 18 inches below the surface, which was not deep enough to reach the bottom of the landfarm in all locations.

Since treatment of the bottom of the landfarm relies on tilling for aeration, ***NORTECH*** recommends that all future tilling must use windrows or other methods to ensure that the bottom of the landfarm is tilled as extensively as possible to maximize the aeration of the entire

landfarm. Since 2021 is the final contracted season of tilling, performing the tilling activities earlier in the summer is recommended to increase the potential for biological degradation of contaminants throughout the summer.

The 2020 sampling event took place in late July, shortly after the tilling event. In previous years, the sampling took place near the end of the tilling event. Since 2021 is scheduled to be the final season of annual field screening and sampling, ***NORTECH*** recommends the sampling be conducted as late in the summer as possible. This will allow the maximum treatment during the summer season to occur before sampling. Sampling should be completed before the beginning of freeze-up because seasonal frost penetrates the landfarm material quickly and will significantly slow sampling efforts.

9.2 Headspace Field Screening and DRO Evaluation

The annual field screening and sampling work is intended to provide semi-quantitative data about the average conditions in the landfarm with a PID and then laboratory sampling is completed to confirm the conditions. The goal of the field screening is to assess the conditions across the landfarm as a whole and identify specific locations for laboratory testing. The laboratory sampling is intended to provide DRO results of the remaining highest areas and confirm that the headspace field screening method is reasonably representative of the conditions across the landfarm.

The 2017 baseline data showed that the nine lab samples with PID results below 100 ppm had DRO of less than 4,000 mg/kg. In addition (and with one exception), all locations with field screening results above 400 ppm had DRO results above 4,000 mg/kg. The 2017 report recommended that 100 ppm be used as the initial field screening concentration to be indicative of results below the target regulatory level.

Evaluation of PID Data Statistics
In order to evaluate the overall progress of treatment, ***NORTECH*** has completed a limited evaluation of the PID results for the four years of available data (2017, 2018, 2019, and 2020). The events have over 230 results, indicating that evaluating the basic statistics is reasonable as shown in Table 1 of Appendix 2. Based on this information, PID results in 2020 have a significantly lower maximum, average, and median than in 2017 and 2018. However, the 2020 results show a slight increase from the 2019 results. Since no new contamination is suspected at the landfarm, this is considered part of the variability observed with field screening instruments.

While the PID results from 2020 and 2019 may not be directly comparable on a numeric basis, they support the same trends. Specifically, they show an overall increasing trend in the percentage of test locations below 100 ppm from the single digits when the landfarm was constructed to above 50% in 2020. Similarly, the percentage of locations that are above 400 ppm has dropped from over 50% at the time of landfarm construction to about 10% in 2020. This suggests that the total mass of petroleum (or overall average contaminant concentration) in the landfarm is significantly lower than it was at the time of landfarm construction.

In addition to the overall average of the PID results, the PID data was also analyzed to determine the average PID result by depth. Depth intervals have between 45 and 75 locations, indicating that the average calculation for the depth intervals is statistically reasonable. Each depth shows a significant decrease from the 2017/2018 results to the 2019/2020 results. The

2017/2018 data shows no trend with depth, while the 2019/2020 indicates the average result increases with depth. This suggests that treatment is more effective at the top than at the bottom of the landfarm. This increasing trend also shows that tilling activities must reach the full depth of the landfarm to successfully treat this soil.

The number of sample locations (~450) selected in 2017 was based on the DEC requirements for characterizing an untreated stockpile. For the last three years, the number of locations has been approximately half of that (~230 locations) to maintain a statistically significant data set, while also reducing the cost of the screening event. The representativeness of this sampling frequency should be discussed with the DEC during the development of the closure sampling work plan for the landfarm. Unless a different frequency is specifically approved by the DEC for sampling in 2021, ***NORTECH*** recommends utilizing the 2020 sample locations to assess the conditions of the landfarm and identify laboratory sample locations for the annual sampling event.

Evaluation of DRO Data

The PID variation from 2019 to 2020 demonstrates why DEC requires laboratory confirmation of field screening results. ***NORTECH*** has completed a biased field sampling program for each of the field screening events. The sampling program has been biased to identify the highest DRO concentrations in the landfarm, as well as evaluate PID results near the expected DRO target clean up concentration of 4,000 mg/kg. Table 2 shows the 2020 results, including the rationale for selecting each sample location. The biases incorporated into the sample selection are such that statistical analysis of the DRO results is not appropriate.

Table 2 shows the sample locations, field screening results, and laboratory results sorted from lowest DRO concentration to highest DRO concentration. These locations were based on the initial field screening results and then a new field screening sample was collected for each location at the time of the laboratory sample. In general, the field screening results increase with the DRO concentration so that the group of highest laboratory results is associated with the group of highest field screening results. Similarly, the lowest group of laboratory results is associated with the lowest group of field screening results. This indicates that the PID headspace field screening method is a reasonable approach to understanding petroleum concentrations in the landfarm.

The rationale for each sample location is provided in Table 2. The sample selection criteria show the biases in the laboratory sampling and provide the documentation that the highest DRO concentrations are from material that had a high PID result this year or had a high DRO result in the previous year. In addition, only one location with a PID result below 100 ppm was sampled because previous sampling events have indicated that this material is nearly always below 4,000 mg/kg. This location confirmed that the 100 ppm is still valid.

In addition, the 2020 DRO results also show that each sample that was considered “likely contaminated” with a PID result in the 100-399 ppm range had a DRO concentration below 4,000 mg/kg. While this was not necessarily true in previous years, this was true for each of the nine samples that met this criteria in 2020. Using this information with the PID statistics discussed above, these DRO results suggest that up to 90% of the PID headspace locations (PID <400 ppm) may be below the target cleanup concentration of 4,000 mg/kg. These results suggest that the “true mean” DRO concentration in the landfarm may be below 4,000 mg/kg. Based on this, ***NORTECH*** recommends developing a multi-increment (MI) sampling program for 2021 designed to quantify the true mean DRO concentration in the landfarm.

Table 3 shows a summary of the DRO results and the PID results sorted by increasing DRO concentration for each year of treatment. While the PID results for 2020 show an increase from 2019, the number of locations with DRO results exceeding the cleanup level has decreased from 11 in 2019 to five in 2020. The highest concentration in 2020 is about 29,000 mg/kg, which is similar to previous years. The two highest locations are above 12,500 mg/kg (the DEC Method 2 Arctic Zone Cleanup Level), which is also similar to previous years. When combined with the PID results, these confirm that the >400 ppm PID results represent DRO concentrations that are above the target cleanup concentration of 4,000 mg/kg. However, due to the biased sampling program, this may only represent 10%-15% of the landfarm, instead of the 30% (or more in previous years) of the laboratory results.

Proposed Sampling Plan for 2021

NORTECH's interpretation of the PID and DRO data indicates the contaminant mass in the landfarm has significantly decreased since treatment began in 2017. These results indicate that the highest concentrations in the landfarm remain above 12,500 mg/kg, but the number of locations (and volume of soil) at or above this concentration is significantly lower. The current data suggests that soils above this level may now represent hot spots (less than 10% of the landfarm) instead of up to 50% of the landfarm as indicated in 2017. Additionally, the true mean concentration in the landfarm may be below the target concentration of 4,000 mg/kg. In order to assess this, ***NORTECH*** recommends modifying the biased sampling program for 2021 to include an assessment of the true mean DRO concentration in the stockpile instead of evaluating the likely contaminated (PID results of 100-399 ppm).

NORTECH recommends discussing the approach of landfarm closure with DEC and developing the closure sampling work plan prior to the 2021 sampling event. This will allow DEC, ***NORTECH***, and the other involved parties to understand the path to closure of the landfarm, including the reasonableness of remaining hot spots if the true mean is below the target cleanup level. In addition, having this work plan approved prior to the 2021 sampling may allow the 2021 event to be the closure event if the scope and results are determined acceptable.

Conceptual Site Model and Exposure Management

NORTECH has reviewed the conceptual site model (CSM) each year as part of the annual landfarm evaluation. This has been done to determine if the conditions at the landfarm have changed in a way that impacts the potential exposure to residents of Arctic Village. In general, this evaluation has remained unchanged as the physical conditions of the landfarm have not changed. While the overall mass of petroleum contaminants in the landfarm (and average concentration) has decreased, the CSM is currently focused on the highest concentrations, which remains about the same. The DEC Conceptual Site Model human health scoping form and the CSM graphic form were completed previously for this project and remain unchanged from the previous report. This section provides a summary of those conditions.

The Site consists of a 6,200-cy petroleum contaminated soil landfarm located on the former unpermitted municipal waste dumpsite outside of Arctic Village. The Site and adjoining property are non-residential and located 2.8 miles west of the Arctic Village community. The landfarm is constructed on top of a 12-inch gravel cap that was installed as the Interim Cover of the former unpermitted dumpsite. The landfarm also has a gravel berm built around the perimeter except at the entrance/exit point. The entire landfarm site is protected with a permanent chain-link fence with a locking gate on the north side of the Site. The YFSD installed signage on the permanent

fence indicating “No Dumping” and directing residents to dispose of household wastes in the new permitted landfill.

The contaminant of concern detected above cleanup levels in the landfarm is DRO. Other volatile and semi-volatile fuel related contaminants are present in the soil but at concentrations below cleanup levels. The primary exposure methods to the DRO contamination are incidental ingestion, dermal contact, and outdoor inhalation.

The fencing and signage remain intact and have reduced the potential exposure for trespassers to the Site. These will be maintained for the remainder of the landfarm operation and are expected to remain as a as part of the permanent closure of the former dumpsite. Recommended actions for site workers to minimize human exposure risk include wearing PPE, such as gloves and sturdy petroleum-resistant footwear, during tilling and sampling events that are appropriate for petroleum-related compounds like DRO.

Potential exposure pathways related to surface water are not considered complete because surface water is being managed within the landfarm to prevent off site migration. Similarly, groundwater exposure pathways are not considered complete because the permafrost precludes subsurface water migration. Previous off-site surface water sampling have documented that contaminant migration to surface water has not occurred. Visual inspection is expected to continue as part of the permanent closure of the landfill to document these exposure pathways are not complete.

10.0 CONCLUSIONS AND RECOMMENDATIONS

The Arctic Village landfarm was constructed in 2017 to remediate the petroleum contaminated soil excavated from the former YFSD School site in Arctic Village. A total of 6,200 cy of DRO contaminated soil was excavated and placed in the landfarm. The landfarm baseline characterization sampling event was completed in September 2017 and included both field screening and laboratory sampling. The majority of the landfarm soil (>80%) was contaminated above the DRO target cleanup level of 4,000 mg/kg. Annual field screening and sampling have been completed each summer since construction. Based on the field observations and laboratory results from the 2020 activities, ***NORTECH*** has developed the following conclusions and recommendations regarding the landfarm:

Landfarm Tilling Operations

- Tilling is completed using a custom-fabricated rake that is attached to the blade of a bulldozer and pulled through the soil
    - Observations in 2017 and 2018 indicating that this rake was effective for the top 18 inches of soil
    - In 2019, the top six inches of soil was bladed into windrows to allow tilling to the full depth of the landfarm in all locations
    - In 2020, the material 18+ inches deep was more compacted than expected a few weeks after tilling
- ***NORTECH*** has the following recommendations for tilling during the 2021 season
    - Creating windrows with the top six inches of soil during tilling to provide maximum aeration to the bottom portion of the landfarm
    - Complete the work as early in 2021 as possible to provide as much treatment as possible during the summer season

Headspace Field Screening

- The sampling grid was re-established for year-to-year comparison of data
    - 238 field screening samples were collected from the same grid as previous years
    - PID results ranged from 3 ppm to 1071 ppm
- These results are significantly lower than 2017 and 2018
    - Over 50% of the results are below 100 ppm
    - Nearly 90% of the results are below 400 ppm
    - Results show a slight increase in result with depth
- ***NORTECH*** recommends the following for the 2021 annual sampling event:
    - Utilize the same sampling grid layout to generate comparable data
    - Complete the event as late in the season as possible to allow as much treatment as possible during the summer following the early season tilling event

Laboratory Sample Results

- Laboratory samples were collected from 15 locations (17 samples, including two field duplicates) were biased toward the most contaminated soil remaining in the landfarm
- Samples had DRO concentrations ranging from 1,030 mg/kg to 29,300 mg/kg
- Seven of the 17 samples had DRO above the 4,000 mg/kg target concentration
    - The highest DRO results were at the highest PID locations and consistent with the highest results from previous years
    - Two locations exceeded the Arctic Zone cleanup level of 12,500 mg/kg
    - These results appear to represent less than 10% of the landfarm
    - The PID and biased sampling is effective for identifying remaining hotspots within the landfarm
- Ten of the 17 samples had DRO results below the 4,000 mg/kg target concentration
    - Locations with PID results less than 400 ppm met this criteria
    - This indicates that 50%-90% of the landfarm may be near or below 4,000 mg/kg
    - This could be assessed using a statistically valid sampling program, such as MI sampling, to assess the true mean DRO concentration in the landfarm
- ***NORTECH*** recommends developing a sampling plan for the 2021 season that addresses the following:
    - MI sampling to evaluate the true mean concentration of DRO in the landfarm
    - Any needed biased sampling to identify remaining hot spots
    - DEC approval for a landfarm closure sampling program
    - Recognizes the goal of completing close of the landfarm in 2022

11.0 RECOMMENDATIONS FOR 2021

The 2020 observations and results indicate a reduction in contaminant mass. Additional annual tilling and sampling is necessary in 2021 and should be pursued aggressively to try to achieve the remediation objectives and be able to close the landfarm in 2022. This should include tilling early in the season and using windrows to maximize tilling depth. Sampling should be completed as late in the season as possible to allow maximum time for remediation during the 2021 summer season. Continued contract expectations should include the following activities by the following entities:

YSSD/SERRC Activities

YFSD and SERRC will provide contract management, construction administration, and overall project management. SERRC will provide coordination with the project stakeholders, including AEI, ***NORTECH***, the Village/Tribe and other parties as appropriate.

AEI Activities:

- A visual inspection of the landfarm and landfarm base material after spring breakup in accordance with Ahtna SWPPP
    - Inspect for settling and erosion related to spring thaw
    - Document continued revegetation on side slopes
    - Complete necessary repairs to all site features as necessary
- Complete tilling and grading of landfarm for remediation as considered necessary to achieve cleanup goals
- Document all activities in an annual landfarm operations and management report
- Provide village liaison coordination and funding to:
    - Complete visual inspection with AEI of the landfarm and landfarm base material after spring breakup
    - Document inspection and any corrective actions
    - Provide documentation to Village/Tribe

***NORTECH** Activities*:

- Utilize 2017-2020 data to develop draft landfarm closure sampling plan for review and approval by DEC
- Complete annual sampling as approved by DEC and YFSD/SERRC
- Review AEI documents
- Provide a summary report of 2021 observations and activities

12.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

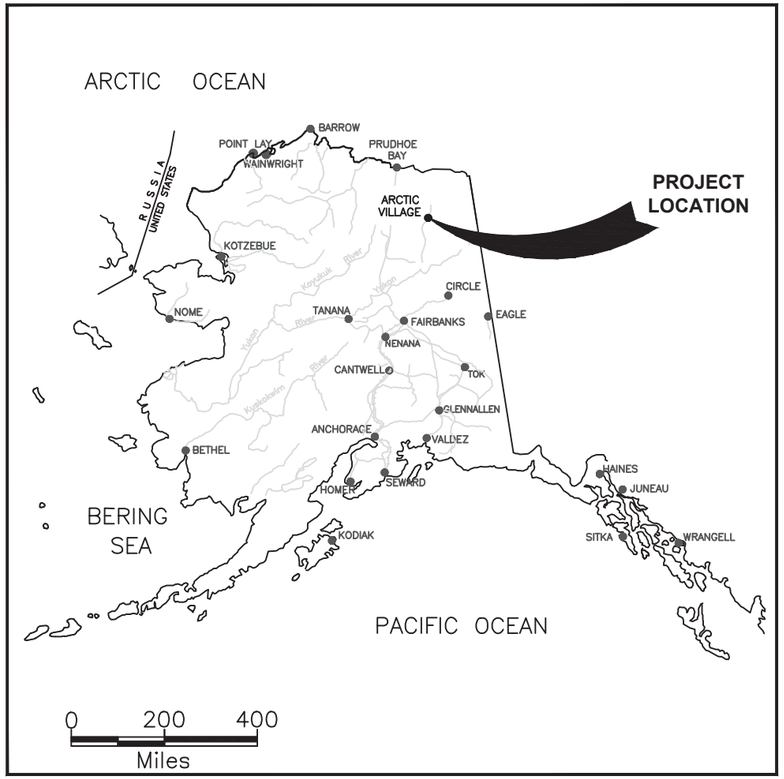
Peter Beardsley, PE, Environmental Engineer of ***NORTECH*** is the Contract Manager and has contractual responsibility for the landfarm project. Following construction, he has been in responsible charge of the project including administrative management, quality control, technical content, schedule, and budget. Peter has over 23 years of experience in environmental engineering design, data analysis, and fieldwork. Peter has designed and/or administered a wide range of environmental projects, including onsite and off-site remediation projects across the state. He also has experience conducting asbestos, lead-based paint, and hazardous materials investigations, spill prevention countermeasures and control (SPCC) and storm water pollution prevention plan (SWPPP) compliance audits, and occupational safety audits. He has extensive project management and field experience in urban and rural Alaska, including multiple projects in the Fairbanks/North Pole area, Marshall, Kaktovik, Coldfoot, and other villages.

Douglas S. Dusek is an Environmental Specialist at ***NORTECH***. He is an DEC Qualified Sampler, HAZWOPER certified, and an AHERA Certified Inspector. He has over twenty years of experience in the environmental field. Mr. Dusek has performed emergency spill response, designed and built catch basins, settling ponds, underflow dams, and contoured land to minimize spill impacts. He has experience with groundwater and soil remediation system maintenance, monitoring, and assessment. He has designed various remediation systems including dual phase extraction systems, AS/SVE, and free product collection devices. He has collected groundwater samples, air samples, and performed groundwater pump tests. Other project management experience includes tank removals, corrective action excavations, and site characterizations with long-term monitoring.

Douglas Dusek
Environmental Specialist

Peter Beardsley, PE
President and CEO

Appendix 1

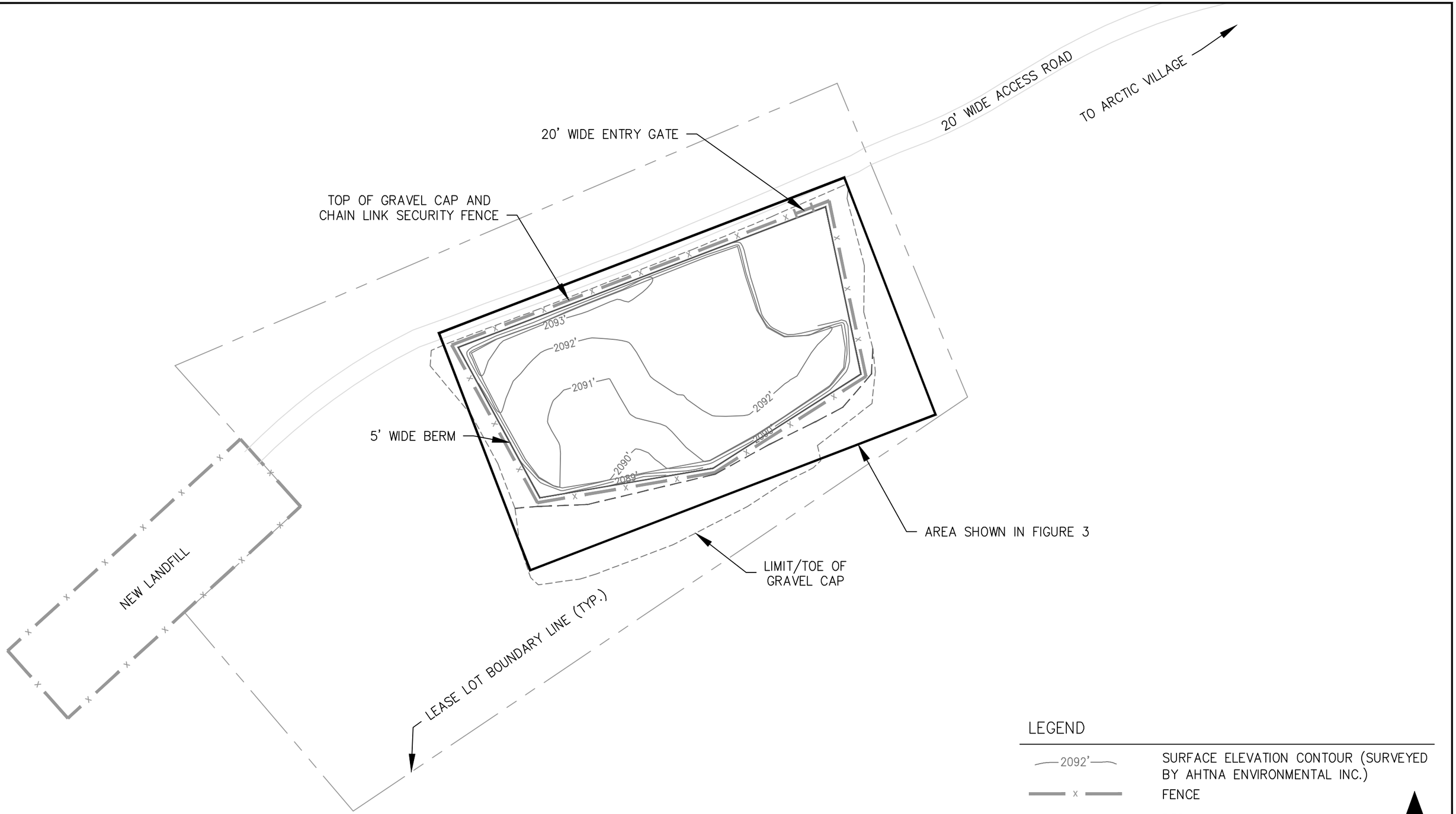


NORTECH
ENVIRONMENT, ENERGY, HEALTH & SAFETY CONSULTANTS
2400 College Road, Fairbanks, AK. 99709, 907-452-5688
3105 Lakeshore Dr., Anchorage, AK. 99517 907-222-2445
5438 Shaune Dr., Juneau, AK. 99801 907-586-6813

Project Location Map
Arctic Village Landfarm
Arctic Village, Alaska

DATE: 02/03/2021	SCALE: 1" = 900'
PROJ MGR: PLB	PROJECT: 16-1086
DRAWN: SPH	DWG. NO.: 161086h(LF)

FIGURE 1



NORTECH
ENVIRONMENT, ENERGY, HEALTH & SAFETY CONSULTANTS
2400 College Road, Fairbanks, AK. 99709, 907-452-5688
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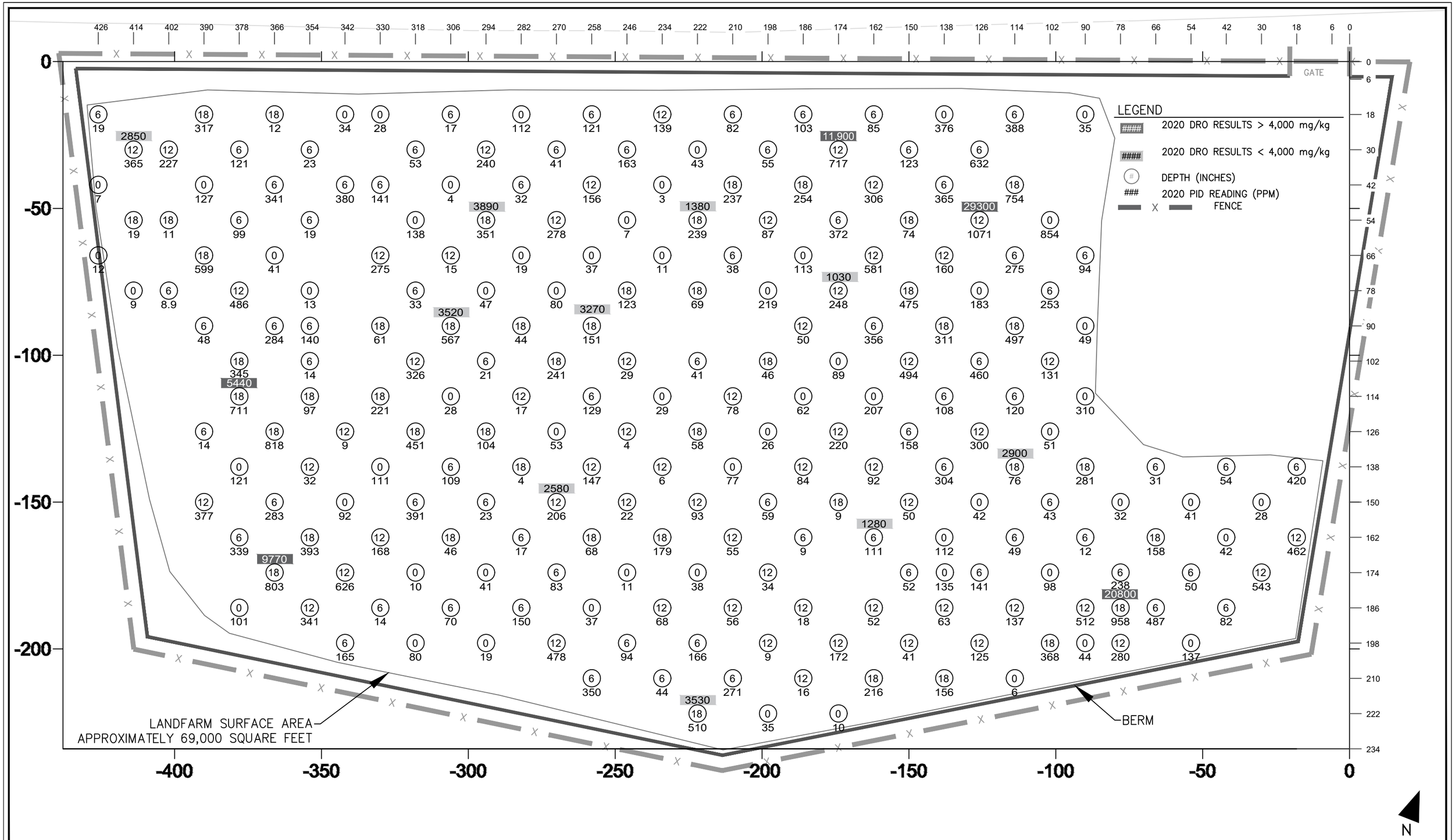
5438 Shaune Dr., Juneau, AK. 99801 907-586-6813

Landfarm Site Plan
Arctic Village Landfarm
Arctic Village, Alaska

DATE: 02/03/2021	SCALE: 1" = 100'
PROJ MGR: PLB	PROJECT: 16-1086
DRAWN: SPH	DWG. NO.: 161086h(LF)

FIGURE 2



NORTECH	ENVIRONMENT, ENERGY, HEALTH & SAFETY CONSULTANTS 2400 College Road, Fairbanks, AK. 99709, 907-452-5688 3105 Lakeshore Dr., Anchorage, AK. 99517 907-222-2445 5438 Shaune Dr., Juneau, AK. 99801 907-586-6813	Landfarm Sampling Grid – 2020 PID Field Screening and Laboratory DRO Analysis Results Arctic Village Landfarm Arctic Village, Alaska	DATE: 02/03/2021 | SCALE: 1" = 30' PROJ MGR: PLB | PROJECT: 16-1086 DRAWN: SPH | DWG. NO.: 161086h(LF)	FIGURE 3

Appendix 2

Table 1
PID Results Basic Statistics - 2017 to 2020

Year	2020	2019	2018	2017
Locations Tested	238	233	232	459
Maximum Result (ppm)	1071	627	2570	16675
Minimum Result (ppm)	3	1	1	2.1
Median Result (ppm)	95.5	48	515	687
Average Statistics				
Average Result - Overall (ppm)	172	92	602	2323
Average Result - 0-6" (ppm)	83	44	497	2517
Average Result - 6-12" (ppm)	148	93	652	2262
Average Result - 12-18" (ppm)	213	98	659	2289
Average Result - 18-24" (ppm)	277	139	573	2241
Number/Percent of Field Screening Locations				
Number of Locations Below 100 ppm	122	171	14	35
% of Total	51%	73%	6%	8%
Number of Locations Between 100 and 199 ppm	43	30	27	54
% of Total	18%	13%	12%	12%
Number of Locations Between 200 and 399 ppm	47	26	58	123
% of Total	20%	11%	25%	27%
Number of Locations 400 ppm and Higher	26	6	133	247
	11%	3%	57%	54%

Table 2
2020 Land Farm Soil Sampling Analytical Results Summary - DRO and RRO

Sample ID (X,Y coord)	Depth inches	PID (ppm) Initial FS	PID (ppm) Sample FS	DRO mg/kg	RRO mg/kg	Sample Selection Criteria/Rationale
Soil Cleanup Level				**4,000**	**13,700**	
174, 78	6 to 12	248	148	1030	109U	likely contaminated (100-399 ppm)
162, 162	0 to 6	111	53.7	1280	136	likely contaminated (100-399 ppm)
222, 54	12 to 18	239	183	1380	215	likely contaminated (100-399 ppm)
270, 150	6 to 12	206	137	2580	289	likely contaminated (100-399 ppm)
414, 30	6 to 12	365	285	2850	198	likely contaminated (100-399 ppm)
114, 138	12 to 18	76	89.3	2900	141	Highest DRO from 2019
258, 90	18 to 24	151	269	3270	571	likely contaminated (100-399 ppm)
306, 90	12 to 18	567	387	3520	121	contaminated (>400 ppm)
222, 222	12 to 18	510	293	3530	478	contaminated (>400 ppm)
294, 54	12 to 18	351	281	3890	155	likely contaminated (100-399 ppm)
378, 114 Dup1	18 to 24	711	554	**5,440**	148	4th highest DRO from 2019
101, 101 Dup1	18 to 24	711	554	**5,860**	145	Duplicate of 378,114
366, 174	12 to 18	803	703	**9,770**	124	contaminated (>400 ppm)
174, 30	6 to 12	717	497	**11,900**	220	contaminated (>400 ppm)
78, 186 Dup2	12 to 18	958	682	**20,800**	217	2nd highest DRO from 2019
201, 101 Dup2	12 to 18	958	682	**23,800**	214	Duplicate of 78,186
126, 54	6 to 12	1071	637	**29,300**	327	Highest PID from 2020

Notes

#,# Dup#	Duplicate pair samples
#.#U	Reported quantitation is an estimate
shade	Analyte detected in concentration below site cleanup level
Bold	Analyte detected in concentration above site cleanup level
FS	Field screening sample

2020 DRO/RRO Duplicate Pairs RPDs

Sample ID	DRO	RPD	RRO	RPD
Unit	**mg/kg**	**%**	**mg/kg**	**%**
378, 114 Dup1	5,440	-7%	148	2%
101, 101 Dup1	5,860		145	
78, 186 Dup2	20,800	-13%	217	1%
201, 101 Dup2	23,800		214	

Table 3
DRO and PID Results Summary - 2017 to 2020

2020	PID	DRO
(X,Y coord)	ppm	mg/kg
Soil Cleanup Level		4,000
174, 78	148	1030
162, 162	54	1280
222, 54	183	1380
270, 150	137	2580
414, 30	285	2850
114, 138	89	2900
258, 90	269	3270
306, 90	387	3520
222, 222	293	3530
294, 54	281	3890
378, 114 [D1]	554	**5,440**
101, 101 [D1]	554	**5,860**
366, 174	703	**9,770**
174, 30	497	**11,900**
78, 186 [D2]	682	**20,800**
201, 101 [D2]	682	**23,800**
126, 54	637	**29,300**

2019	PID	DRO
(X,Y coord)	ppm	mg/kg
Soil Cleanup Leve		4,000
402, 78	10	1,330
186, 42	107	1,470
258, 162	62	1,970
150, 30	246	2,300
Dup-151, 30	246	2,300
354, 162	298	**4,910**
222, 222	150	**5,400**
294, 30	193	**5,070**
390, 66	372	**5,930**
126, 102	627	**6,080**
270, 102	326	**7,890**
18, 138	250	**8,680**
378, 114	273	**9,640**
30, 174	469	**14,100**
78, 186	301	**14,700**
Dup-79, 186	301	**20,500**
114, 138	407	**21,900**

2018	PID	DRO
(X,Y coord)	ppm	mg/kg
Soil Cleanup Level		4,000
378, 54	52	75
210, 42	36	231
354, 126	379	1,940
294, 78	669	2,020
126, 102	683	2,030
294, 78A	669	2,300
330, 18	750	2,480
138, 174	519	3,110
378, 114	208	3,910
342, 150	794	**4,240**
354, 30	820	**5,590**
342, 150A	794	**6,990**
306, 138	573	**10,400**
138, 114	1243	**10,900**
162, 18	1230	**10,900**
78,198	929	**12,800**
402, 78	1917	**16,400**
150, 30	1398	**17,000**

2017	PID	DRO
(X,Y coord)	ppm	mg/kg
Soil Cleanup Level		4,000
174, 86	28.9	209
378, 54	16.3	242
78, 162	32.5	939
246, 210	70.8	1,010
426, 54	16.3	1,340
426, 54A [D1]	16.3	1,470
66, 162	56.3	1,720
258, 150	164	2,440
162, 114	294	2,580
234, 42	214	2,660
246, 102	82.3	2,680
210, 126	126	2,860
246,	82.3	2,860
126, 78	666	2,870
426, 42	128	2,900
162, 90	336	2,910
366, 78	140	2,980
354, 30	235	3,040
54, 162	110	3,060
234, 186	357	3,180
222, 54	288	3,460
246, 162	109	3,590
198, 114	262	3,870
210, 138	271	**4,280**
198, 138	211	**4,300**
270, 138	290	**5,210**
246, 114	344	**5,470**
306, 150	359	**5,850**
306, 78	180	**6,080**
306, 54	259	**6,450**
150, 138	1,210	**6,720**
426, 18	186	**8,700**
306, 186	394	**8,990**
366, 138	127	**10,000**
306,	394	**10,100**
330, 198	282	**10,100**
378, 114	332	**11,900**
138, 174	108	**14,500**
354, 126	810	**16,600**
126, 150	161	**21,600**

Appendix 3

PID Field Screening
STANDARIZED METHODOLOGY
(Version 1)
March 2017

Field Screening Equipment Description

A Hand Held Air Monitor/Photoionization Detector (PID, PhotoVac 2020, MiniRAE, or similar) will be the instrument used to field screen the soils for total volatile organic contaminants. The PID is the field-screening instrument of choice as field screening with a PID allows for semi-quantitative real time (< 10 minutes) analysis as compared to some of the other field screening methods that either use qualitative analysis or are more sensitive to temperature, humidity and hydrocarbon concentration variations.

Additionally, the MiniRAE 3000 (and other PIDs) is intrinsically safe and approved for use in Class 1, Division 2, Groups A, B, C, & D Hazardous Locations and is rugged in construction. Headspace field screening by a PID involves measuring the concentration of vapors generated by the POL contaminants in soil. The PID yields semi-quantitative concentrations for soil gas in reference to a certified isobutylene gas standard. Important specifications of the MiniRAE PID are as follows:

Instrument:	MiniRAE -3000 PID
Detection Limit:	0.1 ppm
Response Time:	Less than 5 seconds
Calibration:	Certified Isobutylene Standard (nominal 100 ppm)
Operating Temperature Range:	32 to 105^{o}F (0 to 40^{o}C)

Field Screening Methodology

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

The headspace method of field screening will be used in general accordance with the ADEC Field Sampling Guidance, March 2016. Headspace screening consists of partially (33%-50%) filling a clean re-sealable bag with freshly uncovered soils to be field screened. The total capacity of the bag will not be less than 8 ounces (app. 250 ml).

The bag is closed, sealed and headspace vapors are allowed to develop for at least 10 minutes and not more than one hour. The bag will be agitated for approximately 15 seconds at the beginning and end of the headspace development period. The soil and headspace will be tested at a temperature of at least 40° F (5° C). A small opening will be made in the top of the bag and the PID probe will be inserted into the bag. Headspace vapors will be drawn from the center of the space above the soils and analyzed by the PID for total volatile organic compounds. The highest PID reading from each sample will be recorded in the project field notes for inclusion in the final report.

Calibration will be performed in accordance with the manufacturer's specifications. In the event that background air contamination is encountered, it will be zeroed out by performing the calibration in an alternate location without contamination, or by utilizing uncontaminated calibration air. The calibration of the PID will be checked at the beginning and end of each day

and at least every four hours during continuous use. Calibration and calibration checks will also be recorded in the field log.

Site Specific Contamination Level Classification

Headspace field screening is a method of quickly assessing total volatile organic contaminant concentrations in the field without the need for laboratory results. However, a correlation between PID field screening results and laboratory results is generally site specific. ***NORTECH***'s experience with recent heating oil releases is that results generally show a good relationship between PID and laboratory results. PID results at this site more than 20 ppm almost always exceeding the ADEC cleanup level for one or more heating oil COCs.

It should be noted that a PID may yield different responses based on various factors including: the soil matrix being tested, soil moisture content, and the volatility of contaminants that may be present. Based on the available data and past experience, for the purpose of this investigation the following contamination level classifications will be used:

- Excavated soils will be segregated and stockpiled based upon field screening results and the following segregation criteria:
    - Clean: <10 ppm and no odor; correlates to 200 mg/kg or less in laboratory result
    - Warm: <250 ppm; 4,000 mg/kg or less in laboratory result
    - Hot: >250 ppm; 4,000 mg/kg or greater in analytical result
    - field screening criteria to be revised as necessary based upon Correlation Analysis completed during the Preliminary Assessment effort.

Site-specific Field Screening and Sampling Objectives

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

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

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

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

Laboratory Sampling Plan
STANDARIZED METHODOLOGY
(Version 4)
November 2017

Laboratory Sampling Plan

The site-specific laboratory sampling plan for this project is attached and provides site specific details regarding sampling. *If there are discrepancies between the site specific document and this standard methodology, the site specific sampling plan takes precedence*. This document provides the standard methodology used to obtain and analyze the site samples. In general, laboratory sampling will be conducted for the following four primary purposes:

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

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

- Surface soil sampling of suspect areas
- Surface and sub-surface soil sampling of the impacted area to define the horizontal and vertical extent of contamination.
- Groundwater sampling of the source area, an upgradient location, and a downgradient location.

NORTECH will collect all laboratory soil and groundwater samples in general accordance with the ADEC 2017 Field Sampling Guidance document (adopted by reference for sampling guidance, 18 AAC 78 regulations) and the approved work plan. All project soil and groundwater samples will be collected directly into clean glassware provided by the laboratory and immediately placed in a cooler with ice prior to transportation under chain-of-custody to the laboratory. A minimum of one duplicate sample will be collected for each ten samples submitted to the laboratory. If multiple days of sampling are required, a minimum of one duplicate sample will be collected each day. A minimum of one trip blank will accompany each set of volatile samples submitted to the lab.

The contaminants of concern (COCs) for the project are listed in the work plan. Typical fuel contaminants are: gasoline range organics (GRO), diesel range organics (DRO), and benzene, toluene, ethylbenzene, and xylenes (BTEX).

Specific laboratory analyses for these types of contaminants are:

- GRO by method AK 101
- DRO by method AK102
- RRO by method AK 103
- VOC by Method 8260

- Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270SIM

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

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

Soil Sampling

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

Groundwater sampling

If groundwater sampling is included in the project scope of work, existing groundwater wells and the temporary sampling points will be purged and sampled using low-flow techniques. Purging will consist of three to five well volumes and/or until the suspended silt is minimized and field parameters, including dissolved oxygen, pH, ORP, and conductivity, have stabilized. One sample will be collected from each groundwater sampling well/point. At least one field duplicate will be collected for every ten samples submitted.

Soil Cleanup Limits

Laboratory analyses collected during this investigation will include GRO, DRO, RRO, PAH, and volatile contaminants using the methodologies described above. All project soil sample results will be compared to the cleanup levels provided as follows:

Site Cleanup Levels

Contaminant of Concern	Human Health Based Cleanup Level in mg/kg*	Table C Groundwater Cleanup Levels for Comparison to SPLP Results (mg/L)
GRO	1,400	2.2
DRO	4,000*	1.5
RRO	13,700	1.1
Benzene	16	0.0046
Toluene	200	200
Ethylbenzene	72	0.015
Total Xylenes	57	0.19
PAHs	18AAC75.340 Table B1, Arctic Zone	Table C Groundwater Cleanup Levels
VOCs**	18AAC75.340 Table B1, Arctic Zone	Table C Groundwater Cleanup Levels

Appendix 4

Laboratory Report of Analysis

To: Nortech
5438 Shaune Drive, Suite B
Juneau, AK 99801
(360)359-8865

Report Number: **1209536**

Client Project: **Arctic Village 2020 Landfarm**

Dear Ron Pratt,

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 Jennifer 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.

Stephen C. Ede 2020.08.31 09:20:44 -08'00'

Jennifer Dawkins Date
Project Manager
Jennifer.Dawkins@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: **Nortech**
SGS Project: **1209536**
Project Name/Site: **Arctic Village 2020 Landfarm**
Project Contact: **Ron Pratt**

Refer to sample receipt form for information on sample condition.

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

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Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. The results apply to the samples as received. 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) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020B, 7470A, 7471B, 8015C, 8021B, 8082A, 8260D, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). SGS is only certified for the analytes listed on our Drinking Water Certification (DW methods: 200.8, 2130B, 2320B, 2510B, 300.0, 4500-CN-C,E, 4500-H-B, 4500-NO3-F, 4500-P-E and 524.2) and only those analytes will be reported to the State of Alaska for compliance. Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
TNTC	Too Numerous To Count
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
414-30	1209536001	07/29/2020	07/31/2020	Soil/Solid (dry weight)
378-114	1209536002	07/29/2020	07/31/2020	Soil/Solid (dry weight)
101-101	1209536003	07/29/2020	07/31/2020	Soil/Solid (dry weight)
366-174	1209536004	07/29/2020	07/31/2020	Soil/Solid (dry weight)
306-90	1209536005	07/29/2020	07/31/2020	Soil/Solid (dry weight)
294-54	1209536006	07/29/2020	07/31/2020	Soil/Solid (dry weight)
270-150	1209536007	07/29/2020	07/31/2020	Soil/Solid (dry weight)
258-90	1209536008	07/29/2020	07/31/2020	Soil/Solid (dry weight)
222-54	1209536009	07/29/2020	07/31/2020	Soil/Solid (dry weight)
222-222	1209536010	07/29/2020	07/31/2020	Soil/Solid (dry weight)
174-30	1209536011	07/29/2020	07/31/2020	Soil/Solid (dry weight)
174-78	1209536012	07/29/2020	07/31/2020	Soil/Solid (dry weight)
126-54	1209536013	07/29/2020	07/31/2020	Soil/Solid (dry weight)
162-162	1209536014	07/29/2020	07/31/2020	Soil/Solid (dry weight)
78-186	1209536015	07/29/2020	07/31/2020	Soil/Solid (dry weight)
201-101	1209536016	07/29/2020	07/31/2020	Soil/Solid (dry weight)
114-138	1209536017	07/29/2020	07/31/2020	Soil/Solid (dry weight)

Method	Method Description
AK102	Diesel/Residual Range Organics
AK103	Diesel/Residual Range Organics
SM21 2540G	Percent Solids SM2540G

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Detectable Results Summary

Client Sample ID: **414-30**
Lab Sample ID: 1209536001
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	2850	mg/Kg
Residual Range Organics	198	mg/Kg

Client Sample ID: **378-114**
Lab Sample ID: 1209536002
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	5440	mg/Kg
Residual Range Organics	148	mg/Kg

Client Sample ID: **101-101**
Lab Sample ID: 1209536003
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	5860	mg/Kg
Residual Range Organics	145	mg/Kg

Client Sample ID: **366-174**
Lab Sample ID: 1209536004
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	9770	mg/Kg
Residual Range Organics	124	mg/Kg

Client Sample ID: **306-90**
Lab Sample ID: 1209536005
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	3520	mg/Kg
Residual Range Organics	121	mg/Kg

Client Sample ID: **294-54**
Lab Sample ID: 1209536006
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	3890	mg/Kg
Residual Range Organics	155	mg/Kg

Client Sample ID: **270-150**
Lab Sample ID: 1209536007
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	2580	mg/Kg
Residual Range Organics	289	mg/Kg

Client Sample ID: **258-90**
Lab Sample ID: 1209536008
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	3270	mg/Kg
Residual Range Organics	571	mg/Kg

Client Sample ID: **222-54**
Lab Sample ID: 1209536009
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	1380	mg/Kg
Residual Range Organics	215	mg/Kg

Client Sample ID: **222-222**
Lab Sample ID: 1209536010
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	3530	mg/Kg
Residual Range Organics	478	mg/Kg

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Detectable Results Summary

Client Sample ID: **174-30**
Lab Sample ID: 1209536011
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	11900	mg/Kg
Residual Range Organics	220	mg/Kg

Client Sample ID: **174-78**
Lab Sample ID: 1209536012
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	1030	mg/Kg

Client Sample ID: **126-54**
Lab Sample ID: 1209536013
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	29300	mg/Kg
Residual Range Organics	327	mg/Kg

Client Sample ID: **162-162**
Lab Sample ID: 1209536014
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	1280	mg/Kg
Residual Range Organics	136	mg/Kg

Client Sample ID: **78-186**
Lab Sample ID: 1209536015
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	20800	mg/Kg
Residual Range Organics	217	mg/Kg

Client Sample ID: **201-101**
Lab Sample ID: 1209536016
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	23800	mg/Kg
Residual Range Organics	214	mg/Kg

Client Sample ID: **114-138**
Lab Sample ID: 1209536017
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	2900	mg/Kg
Residual Range Organics	141	mg/Kg

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Results of **414-30**

Client Sample ID: **414-30**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536001
Lab Project ID: 1209536

Collection Date: 07/29/20 14:50
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):88.1
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	2850		22.4	6.93	mg/Kg	1		08/14/20 19:18
Surrogates								
5a Androstane (surr)	92.8		50-150		%	1		08/14/20 19:18

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/14/20 19:18
Container ID: 1209536001-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.474 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	198		112	48.1	mg/Kg	1		08/14/20 19:18
Surrogates								
n-Triacontane-d62 (surr)	82.1		50-150		%	1		08/14/20 19:18

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 19:18
Container ID: 1209536001-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.474 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **378-114**

Client Sample ID: **378-114**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536002
Lab Project ID: 1209536

Collection Date: 07/29/20 14:52
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):87.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	5440		91.4	28.3	mg/Kg	4		08/17/20 18:37
Surrogates								
5a Androstane (surr)	97		50-150		%	4		08/17/20 18:37

Batch Information

Analytical Batch: XFC15690
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/17/20 18:37
Container ID: 1209536002-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.064 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	148		114	49.1	mg/Kg	1		08/14/20 19:28
Surrogates								
n-Triacontane-d62 (surr)	83.3		50-150		%	1		08/14/20 19:28

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 19:28
Container ID: 1209536002-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.064 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **101-101**

Client Sample ID: **101-101**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536003
Lab Project ID: 1209536

Collection Date: 07/29/20 14:55
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):87.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	5860		90.2	28.0	mg/Kg	4		08/17/20 18:47
Surrogates								
5a Androstane (surr)	90		50-150		%	4		08/17/20 18:47

Batch Information

Analytical Batch: XFC15690
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/17/20 18:47
Container ID: 1209536003-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.433 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	145		113	48.5	mg/Kg	1		08/14/20 19:39
Surrogates								
n-Triacontane-d62 (surr)	79.2		50-150		%	1		08/14/20 19:39

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 19:39
Container ID: 1209536003-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.433 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **366-174**

Client Sample ID: **366-174**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536004
Lab Project ID: 1209536

Collection Date: 07/29/20 14:57
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):82.3
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	9770		95.8	29.7	mg/Kg	4		08/17/20 18:57
Surrogates								
5a Androstane (surr)	85.3		50-150		%	4		08/17/20 18:57

Batch Information

Analytical Batch: XFC15690
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/17/20 18:57
Container ID: 1209536004-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.439 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	124		120	51.5	mg/Kg	1		08/14/20 19:49
Surrogates								
n-Triacontane-d62 (surr)	74.9		50-150		%	1		08/14/20 19:49

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 19:49
Container ID: 1209536004-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.439 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **306-90**

Client Sample ID: **306-90**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536005
Lab Project ID: 1209536

Collection Date: 07/29/20 15:07
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):84.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	3520		23.7	7.34	mg/Kg	1		08/14/20 19:59
Surrogates								
5a Androstane (surr)	87.4		50-150		%	1		08/14/20 19:59

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/14/20 19:59
Container ID: 1209536005-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.023 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	121		118	50.9	mg/Kg	1		08/14/20 19:59
Surrogates								
n-Triacontane-d62 (surr)	74.6		50-150		%	1		08/14/20 19:59

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 19:59
Container ID: 1209536005-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.023 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **294-54**

Client Sample ID: **294-54**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536006
Lab Project ID: 1209536

Collection Date: 07/29/20 15:08
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):82.8
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	3890		23.8	7.38	mg/Kg	1		08/14/20 20:09
Surrogates								
5a Androstane (surr)	83.7		50-150		%	1		08/14/20 20:09

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/14/20 20:09
Container ID: 1209536006-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.44 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	155		119	51.2	mg/Kg	1		08/14/20 20:09
Surrogates								
n-Triacontane-d62 (surr)	72.6		50-150		%	1		08/14/20 20:09

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 20:09
Container ID: 1209536006-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.44 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **270-150**

Client Sample ID: **270-150**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536007
Lab Project ID: 1209536

Collection Date: 07/29/20 15:10
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):86.1
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	2580		23.1	7.16	mg/Kg	1		08/14/20 20:19
Surrogates								
5a Androstane (surr)	92.3		50-150		%	1		08/14/20 20:19

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/14/20 20:19
Container ID: 1209536007-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.17 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	289		116	49.7	mg/Kg	1		08/14/20 20:19
Surrogates								
n-Triacontane-d62 (surr)	80.1		50-150		%	1		08/14/20 20:19

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 20:19
Container ID: 1209536007-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.17 g
Prep Extract Vol: 5 mL

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Results of **258-90**

Client Sample ID: **258-90**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536008
Lab Project ID: 1209536

Collection Date: 07/29/20 15:14
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):83.7
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	3270		23.6	7.33	mg/Kg	1		08/14/20 20:29
Surrogates								
5a Androstane (surr)	93.5		50-150		%	1		08/14/20 20:29

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/14/20 20:29
Container ID: 1209536008-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.326 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	571		118	50.8	mg/Kg	1		08/14/20 20:29
Surrogates								
n-Triacontane-d62 (surr)	81.8		50-150		%	1		08/14/20 20:29

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 20:29
Container ID: 1209536008-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.326 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **222-54**

Client Sample ID: **222-54**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536009
Lab Project ID: 1209536

Collection Date: 07/29/20 15:15
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):87.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	1380		22.7	7.02	mg/Kg	1		08/14/20 20:39
Surrogates								
5a Androstane (surr)	94.1		50-150		%	1		08/14/20 20:39

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/14/20 20:39
Container ID: 1209536009-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.3 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	215		113	48.7	mg/Kg	1		08/14/20 20:39
Surrogates								
n-Triacontane-d62 (surr)	82		50-150		%	1		08/14/20 20:39

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 20:39
Container ID: 1209536009-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.3 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **222-222**

Client Sample ID: **222-222**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536010
Lab Project ID: 1209536

Collection Date: 07/29/20 15:19
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):92.6
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	3530		21.6	6.70	mg/Kg	1		08/14/20 20:49
Surrogates								
5a Androstane (surr)	95.2		50-150		%	1		08/14/20 20:49

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/14/20 20:49
Container ID: 1209536010-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.005 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	478		108	46.4	mg/Kg	1		08/14/20 20:49
Surrogates								
n-Triacontane-d62 (surr)	85.7		50-150		%	1		08/14/20 20:49

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 20:49
Container ID: 1209536010-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.005 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **174-30**

Client Sample ID: **174-30**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536011
Lab Project ID: 1209536

Collection Date: 07/29/20 15:24
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):77.8
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	11900		254	78.7	mg/Kg	10		08/21/20 23:34
Surrogates								
5a Androstane (surr)	77.7		50-150		%	10		08/21/20 23:34

Batch Information

Analytical Batch: XFC15706
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/21/20 23:34
Container ID: 1209536011-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.355 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	220		127	54.6	mg/Kg	1		08/14/20 20:59
Surrogates								
n-Triacontane-d62 (surr)	78.4		50-150		%	1		08/14/20 20:59

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 20:59
Container ID: 1209536011-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.355 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **174-78**

Client Sample ID: **174-78**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536012
Lab Project ID: 1209536

Collection Date: 07/29/20 15:26
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):90.8
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	1030		21.7	6.74	mg/Kg	1		08/14/20 21:09
Surrogates								
5a Androstane (surr)	91.8		50-150		%	1		08/14/20 21:09

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/14/20 21:09
Container ID: 1209536012-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.376 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	109 U		109	46.8	mg/Kg	1		08/14/20 21:09
Surrogates								
n-Triacontane-d62 (surr)	80.2		50-150		%	1		08/14/20 21:09

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 21:09
Container ID: 1209536012-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.376 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **126-54**

Client Sample ID: **126-54**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536013
Lab Project ID: 1209536

Collection Date: 07/29/20 15:30
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):78.6
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	29300		253	78.3	mg/Kg	10		08/17/20 19:17
Surrogates								
5a Androstane (surr)	93.3		50-150		%	10		08/17/20 19:17

Batch Information

Analytical Batch: XFC15690
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/17/20 19:17
Container ID: 1209536013-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.198 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	327		126	54.3	mg/Kg	1		08/14/20 21:19
Surrogates								
n-Triacontane-d62 (surr)	84.5		50-150		%	1		08/14/20 21:19

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 21:19
Container ID: 1209536013-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.198 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **162-162**

Client Sample ID: **162-162**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536014
Lab Project ID: 1209536

Collection Date: 07/29/20 15:31
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):85.9
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	1280		23.1	7.16	mg/Kg	1		08/14/20 21:29
Surrogates								
5a Androstane (surr)	87.2		50-150		%	1		08/14/20 21:29

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/14/20 21:29
Container ID: 1209536014-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.259 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	136		115	49.6	mg/Kg	1		08/14/20 21:29
Surrogates								
n-Triacontane-d62 (surr)	75.1		50-150		%	1		08/14/20 21:29

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 21:29
Container ID: 1209536014-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.259 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **78-186**

Client Sample ID: **78-186**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536015
Lab Project ID: 1209536

Collection Date: 07/29/20 15:37
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):82.2
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	20800		242	75.0	mg/Kg	10		08/17/20 19:27
Surrogates								
5a Androstane (surr)	96.1		50-150		%	10		08/17/20 19:27

Batch Information

Analytical Batch: XFC15690
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/17/20 19:27
Container ID: 1209536015-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.178 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	217		121	52.0	mg/Kg	1		08/14/20 21:39
Surrogates								
n-Triacontane-d62 (surr)	84.2		50-150		%	1		08/14/20 21:39

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 21:39
Container ID: 1209536015-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.178 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **201-101**

Client Sample ID: **201-101**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536016
Lab Project ID: 1209536

Collection Date: 07/29/20 15:40
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):79.1
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	23800		252	78.0	mg/Kg	10		08/17/20 19:37
Surrogates								
5a Androstane (surr)	94.2		50-150		%	10		08/17/20 19:37

Batch Information

Analytical Batch: XFC15690
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/17/20 19:37
Container ID: 1209536016-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.159 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	214		126	54.1	mg/Kg	1		08/14/20 21:49
Surrogates								
n-Triacontane-d62 (surr)	83.2		50-150		%	1		08/14/20 21:49

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 21:49
Container ID: 1209536016-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.159 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Results of **114-138**

Client Sample ID: **114-138**
Client Project ID: **Arctic Village 2020 Landfarm**
Lab Sample ID: 1209536017
Lab Project ID: 1209536

Collection Date: 07/29/20 15:41
Received Date: 07/31/20 08:33
Matrix: Soil/Solid (dry weight)
Solids (%):87.7
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	2900		22.6	7.01	mg/Kg	1		08/14/20 21:59
Surrogates								
5a Androstane (surr)	93		50-150		%	1		08/14/20 21:59

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK102
Analyst: CDM
Analytical Date/Time: 08/14/20 21:59
Container ID: 1209536017-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.232 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	141		113	48.7	mg/Kg	1		08/14/20 21:59
Surrogates								
n-Triacontane-d62 (surr)	81.3		50-150		%	1		08/14/20 21:59

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK103
Analyst: CDM
Analytical Date/Time: 08/14/20 21:59
Container ID: 1209536017-A

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 08/10/20 13:26
Prep Initial Wt./Vol.: 30.232 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:06:59AM

Method Blank

Blank ID: MB for HBN 1810016 [SPT/11100]
Blank Lab ID: 1573572

Matrix: Soil/Solid (dry weight)

QC for Samples:
1209536001, 1209536002, 1209536003, 1209536004, 1209536005, 1209536006, 1209536007, 1209536008, 1209536009, 1209536010, 1209536011, 1209536012, 1209536013, 1209536014, 1209536015, 1209536016, 1209536017

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT11100
Analytical Method: SM21 2540G
Instrument:
Analyst: HM
Analytical Date/Time: 8/7/2020 6:20:00PM

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Duplicate Sample Summary

Original Sample ID: 1203815005
Duplicate Sample ID: 1573574
QC for Samples:

Analysis Date: 08/07/2020 18:20
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	96.3	96.4	%	0.03	(< 15)

Batch Information

Analytical Batch: SPT11100
Analytical Method: SM21 2540G
Instrument:
Analyst: HM

Print Date: 08/31/2020 9:07:04AM

Duplicate Sample Summary

Original Sample ID: 1203815006
Duplicate Sample ID: 1573575

Analysis Date: 08/07/2020 18:20
Matrix: Soil/Solid (dry weight)

QC for Samples:

1209536001, 1209536002, 1209536003, 1209536004, 1209536005, 1209536006, 1209536007, 1209536008, 1209536009, 1209536010, 1209536011, 1209536012, 1209536013, 1209536014, 1209536015, 1209536016,

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	95.9	96.2	%	0.28	(< 15)

Batch Information

Analytical Batch: SPT11100
Analytical Method: SM21 2540G
Instrument:
Analyst: HM

Print Date: 08/31/2020 9:07:04AM

Method Blank

Blank ID: MB for HBN 1810060 [XXX/43610]
Blank Lab ID: 1573673

Matrix: Soil/Solid (dry weight)

QC for Samples:
1209536001, 1209536002, 1209536003, 1209536004, 1209536005, 1209536006, 1209536007, 1209536008, 1209536009, 1209536010, 1209536011, 1209536012, 1209536013, 1209536014, 1209536015, 1209536016, 1209536017

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
5a Androstane (surr)	107	60-120		%

Batch Information

Analytical Batch: XFC15686
Analytical Method: AK102
Instrument: Agilent 7890B F
Analyst: CDM
Analytical Date/Time: 8/14/2020 6:48:00PM

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/Time: 8/10/2020 1:26:57PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1209536 [XXX43610]
Blank Spike Lab ID: 1573674
Date Analyzed: 08/14/2020 18:58

Spike Duplicate ID: LCSD for HBN 1209536 [XXX43610]
Spike Duplicate Lab ID: 1573675
Matrix: Soil/Solid (dry weight)

QC for Samples: 1209536001, 1209536002, 1209536003, 1209536004, 1209536005, 1209536006, 1209536007, 1209536008, 1209536009, 1209536010, 1209536011, 1209536012, 1209536013, 1209536014, 1209536015, 1209536016, 1209536017

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	833	739	89	833	744	89	(75-125)	0.68	(< 20)
Surrogates									
5a Androstane (surr)	16.7	117	117	16.7	116	116	(60-120)	0.71	

Batch Information

Analytical Batch: **XFC15686**
Analytical Method: **AK102**
Instrument: **Agilent 7890B F**
Analyst: **CDM**

Prep Batch: **XXX43610**
Prep Method: **SW3550C**
Prep Date/Time: **08/10/2020 13:26**
Spike Init Wt./Vol.: 833 mg/Kg Extract Vol: 5 mL
Dupe Init Wt./Vol.: 833 mg/Kg Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1810060 [XXX/43610]
Blank Lab ID: 1573673

Matrix: Soil/Solid (dry weight)

QC for Samples:
1209536001, 1209536002, 1209536003, 1209536004, 1209536005, 1209536006, 1209536007, 1209536008, 1209536009, 1209536010, 1209536011, 1209536012, 1209536013, 1209536014, 1209536015, 1209536016, 1209536017

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	50K0U	100	43K0	mg/. g
Surrogates				
nA riacontaneAd62 (surr)	94K8	60A120		%

Batch Information

Fnalytical Batch: XTC15686
Fnalytical Method: F. 103
Instrument: Fgilent 7890B T
Fnalyst: CDM
Fnalytical Date/- ime: 8/14/2020 6:48:00PM

Prep Batch: XXX43610
Prep Method: SW3550C
Prep Date/- ime: 8/10/2020 1:26:57PM
Prep Initial WtkVolK. 30 g
Prep Extract Vol: 5 mL

Print Date: 08/31/2020 9:07:14FM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1209536 [XXX43610]
Blank Spike Lab ID: 1573674
Date Analyzed: 08/14/2020 18:58

Spike Duplicate ID: LCSD for HBN 1209536 [XXX43610]
Spike Duplicate Lab ID: 1573675
Matrix: Soil/Solid (dry weight)

QC for Samples: 1209536001, 1209536002, 1209536003, 1209536004, 1209536005, 1209536006, 1209536007, 1209536008, 1209536009, 1209536010, 1209536011, 1209536012, 1209536013, 1209536014, 1209536015, 1209536016, 1209536017

Results by **AK102**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Organics	833	710	85	833	720	86	(60-120)	1.40	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	16.7	97.7	98	16.7	92.1	92	(60-120)	5.90	

Batch Information

Analytical Batch: **XFC15686**
Analytical Method: **AK102**
Instrument: **Agilent 7890B F**
Analyst: **CDM**

Prep Batch: **XXX42610**
Prep Method: **S3 2550C**
Prep Date/Time: **08W0W0/ 0 12:/ 6**
Spike Init Wt./Vol.: 833 mg/Kg Extract Vol: 5 mL
Dupe Init Wt./Vol.: 833 mg/Kg Extract Vol: 5 mL

Print Date: 08/31/2020 9:07:17AM

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1209536

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Page 1 of 2

Section 1

CLIENT: NORTECH

CONTACT: Ron Pratt — PHONE #: 907 586 6813

PROJECT NAME: Arctic Village 2020 Landfarm — PROJECT/PWSID/PERMIT#:

REPORTS TO: NORTECH — E-MAIL: rpratt@nortechengr.com — Profile #:

INVOICE TO: NORTECH — QUOTE #: — P.O. #: 16-1086

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Comp Grab MI (Multi-incremental)	Analysis* AK102 DRO	Analysis* AK103 RRO	REMARKS/LOC ID
1A	414-30	7/29/20	1450	Soil	1	G	X	X	
2A	378-114		1452		1	G	X	X	
3A	101-101		1455		1	G	X	X	
4A	366-174		1457		1	G	X	X	
5A	306-90		1507		1	G	X	X	
6A	294-54		1508		1	G	X	X	
7A	270-150		1510		1	G	X	X	
8A	258-90		1514		1	G	X	X	
9A	222-54	V V	1515	V	1	G	X	X	
10A	222-222	7/29/20	1519	Soil	1	G	X	X	

NOTE: *The following analyses require specific method and/or compound list: BTEX, Metals, PFAS

Section 3 — Preservative

Section 4 — DOD Project? Yes / No — Data Deliverable Requirements:

Cooler ID:

Requested Turnaround Time and/or Special Instructions:

Section 5

	Date	Time	
Relinquished By: (1)	7/30/20	1500	Received By:
Relinquished By: (2)	7/30/20	1530	Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	7/31/20	8:33	Received For Laboratory By: RJC

Temp Blank °C: 5.3 or Ambient [ ]

Chain of Custody Seal: (Circle) EACH ID — INTACT BROKEN ABSENT

Delivery Method: Hand Delivery [X] Commerical Delivery [ ]

Profile: 341853

http://www.sgs.com/terms-and-conditions

3.1 PJO

F083-Blank_COC_20181228

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1209536

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Page 2 of 2

Section 1

CLIENT: NORTECH

CONTACT: Ron Pratt PHONE #: 907 586 6813

PROJECT NAME: Arctic Village 2020 Landfarm PROJECT/ PWSID/ PERMIT#:

REPORTS TO: NORTECH E-MAIL: rpratt@nortechengr.com Profile #:

INVOICE TO: NORTECH QUOTE #: P.O. #: 16 1086

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Comp Grab MI (Multi-incremental)	Analysis* AK102 DRO	Analysis* AK103 RRO
11A	174-30	7/29/20	1524	Soil	1	G	x	x
12A	174-78		1526		1	G	x	x
13A	126-54		1530		1	G	x	x
14A	162-162		1531		1	G	x	x
15A	78-186		1537		1	G	x	x
16A	201-101		1540		1	G	x	x
17A	114-138	7/29/20	1541	Soil	1	G	x	x

NOTE: *The following analyses require specific method and/or compound list: BTEX, Metals, PFAS

REMARKS/LOC ID

Section 5

	Date	Time	
Relinquished By: (1)	7/30/20	1500	Received By:
Relinquished By: (2)	7/30/20	1535	Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	7/31/20	8:33	Received For Laboratory By: RJC

Section 4

DOD Project? Yes (No)

Cooler ID:

Data Deliverable Requirements:

Requested Turnaround Time and/or Special Instructions:

Temp Blank °C: 5.3 or Ambient [ ]

Chain of Custody Seal: (Circle) ANC IF IB INTACT BROKEN ABSENT

Delivery Method: Hand Delivery [X] Commerical Delivery [ ]

http://www.sgs.com/terms-and-conditions

3.1 D30

F083-Blank_COC_20181228

Page 32 of 35

e-Sample Receipt Form

SGS Workorder #: **1209536** | 1209536

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		N/A Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Yes	1F, 1B
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 3.1 °C Therm. ID: D30
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
		N/A ***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	N/A	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	

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

Additional notes (if applicable):

e-Sample Receipt Form FBK

SGS Workorder #:	1209536	1209536

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements	Yes	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
**Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 5.3 °C Therm. ID: D62
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?		
If <0°C, were sample containers ice free?		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	N/C	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were samples in good condition (no leaks/cracks/breakage)?	Yes	
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	N/A	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	
For Rush/Short Hold Time, was RUSH/Short HT email sent?	N/A	

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

Additional notes (if applicable):

SGS Profile #	341853	341853

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1209536001-A	No Preservative Required	OK			
1209536002-A	No Preservative Required	OK			
1209536003-A	No Preservative Required	OK			
1209536004-A	No Preservative Required	OK			
1209536005-A	No Preservative Required	OK			
1209536006-A	No Preservative Required	OK			
1209536007-A	No Preservative Required	OK			
1209536008-A	No Preservative Required	OK			
1209536009-A	No Preservative Required	OK			
1209536010-A	No Preservative Required	OK			
1209536011-A	No Preservative Required	OK			
1209536012-A	No Preservative Required	OK			
1209536013-A	No Preservative Required	OK			
1209536014-A	No Preservative Required	OK			
1209536015-A	No Preservative Required	OK			
1209536016-A	No Preservative Required	OK			
1209536017-A	No Preservative Required	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM - The container was received damaged.
FR - The container was received frozen and not usable for Bacteria or BOD analyses.
IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.
NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.
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.
QN - Insufficient sample quantity provided.

Laboratory Data Review Checklist

Completed By:

Doug Dusek

Title:

Environmental Specialist

Date:

January 22, 2021

Consultant Firm:

NORTECH

Laboratory Name:

SGS North America Inc.

Laboratory Report Number:

1209536

Laboratory Report Date:

August 31, 2020

CS Site Name:

700.38.001/ 700.57.001

ADEC File Number:

700.38.001/ 700.57.001

Hazard Identification Number:

4021 (School contaminated site)

1209536

Laboratory Report Date:

August 31, 2020

CS Site Name:

700.38.001/ 700.57.001

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   Yes☒ No☐ N/A☐ 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☐ N/A☒ Comments:

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   Yes☒ No☐ N/A☐ Comments:

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   Yes☒ No☐ N/A☐ Comments:

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   Yes☒ No☐ N/A☐ Comments:

1209536

Laboratory Report Date:

August 31, 2020

CS Site Name:

700.38.001/ 700.57.001

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

Yes☒ No☐ N/A☐ Comments:

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☒ N/A☐ Comments:

No discrepancies

e. Data quality or usability affected?

Comments:

no

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

Yes☐ No☒ N/A☐ Comments:

c. Were all corrective actions documented?

Yes☐ No☐ N/A☒ Comments:

d. What is the effect on data quality/usability according to the case narrative?

Comments:

NA

1209536

Laboratory Report Date:

August 31, 2020

CS Site Name:

700.38.001/ 700.57.001

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☒ No☐ N/A☐ Comments:

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

NA

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

1209536

Laboratory Report Date:

August 31, 2020

CS Site Name:

700.38.001/ 700.57.001

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

na

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

v. Data quality or usability affected?

Comments:

NA

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☐ N/A☐ Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

1209536

Laboratory Report Date:

August 31, 2020

CS Site Name:

700.38.001/ 700.57.001

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

Comments:

NA

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

No

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

1209536

Laboratory Report Date:

August 31, 2020

CS Site Name:

700.38.001/ 700.57.001

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

Comments:

na

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

no

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

iv. Data quality or usability affected?

Comments:

no

1209536

Laboratory Report Date:

August 31, 2020

CS Site Name:

700.38.001/ 700.57.001

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes☐ No☐ N/A☒ Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

na

v. Data quality or usability affected?

Comments:

na

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

1209536

Laboratory Report Date:

August 31, 2020

CS Site Name:

700.38.001/ 700.57.001

iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

usable

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes☐ No☐ N/A☒ Comments:

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

na

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

na

iii. Data quality or usability affected?

Comments:

Na

1209536

Laboratory Report Date:

August 31, 2020

CS Site Name:

700.38.001/ 700.57.001

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

   a. Defined and appropriate?

      Yes☐ No☒ N/A☐ Comments:

No data qualifiers or flags