

CORRECTIVE ACTION SUMMARY REPORT
TYONEK NORTH FORELANDS FACILITY
TYONEK, ALASKA
ADEC Spill No. 2337.38.042
October 2018

Submitted To:
Alaska Department of Environmental Conservation
Contaminated Sites Program
555 Cordova Street
Anchorage, AK 99501
By:



52785 Birch Tree Avenue
Kenai, AK 99611



FIGURES

- 1 Site Location in the Cook Inlet Region & Proximity to Tyonek Village
- 2 Site location in the Cook Inlet region & proximity to Tyonek Village.
- 3 The constructed landfarm site relative to the excavation site.

Tables

- 1 Lab results reported in mg/Kg. PetroFlag & PID reported in PPM.



ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AK	Alaska Method
ASR	Alaska Soil Recycling
AST	Aboveground Storage Tank
bgs	Below Ground Surface
BTEX	Aromatic Hydrocarbons – benzene, toluene, ethylbenzene, xylene
° C	Degrees Celsius
CAP	Corrective Action Plan
CSM	Conceptual Site Model
CY/cy	Cubic Yard
DL	Detection Limit
DOT	U.S. Department of Transportation
DQO	Data Quality Objective
DRO	Diesel Range Organics
EPA	Environmental Protection Agency
GPS	Global Positioning System
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
LOD	Limit of Detection
LOQ	Limit of Quantitation
mg/Kg	Milligram Per Kilogram
MS/MSD	Matrix Spike/Matrix Spike Duplicate
PID	Photoionization Detector
ppm	Parts Per Million
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percent Difference
RRO	Residual Range Organics
SGS	SGS Environmental Laboratories North America, Inc.
SOPs	Standard Operating Procedures
SSHSP	Site Specific Health and Safety Plan
TPH	Total Petroleum Hydrocarbons
VOC	Volatile Organic Compound



CORRECTIVE ACTION PLAN

Tyonek North Forelands Facility

Tyonek, ALASKA

1.0 INTRODUCTION

This Corrective Action Summary Report has been prepared for the excavation of soil impacted by a release of diesel fuel from an above ground storage tank located near the village of Tyonek in 1997. At the time of the spill, the released fuel volume was estimated at 500-800 gallons. A Phase II Environmental Site Assessment (ESA) was performed in 1998 whose purpose was to delineate the vertical and horizontal extent of impacted soil.

Authorization to proceed with the Corrective Action Workplan and corrective action work was provided from Tyonek Native Corporation by Connie Downing, Director of Lands and Operations on April 14, 2015.

2.0 SITE AND PROJECT DESCRIPTION

2.1 Site Location

The project site is located near the old Tyonek airstrip about 2 ½ miles southwest of Tyonek, Alaska. The site is located in the northwest corner of Section 14; Township 11N; Range 11W in the Seward Meridian. The site and facility where the release occurred is owned by the Tyonek Native Corporation. A vicinity map showing the property and surrounding area is included as Figure 1 below.

The elevation of the excavation site is approximately 162 feet from sea level and approximately 1100 feet from the bluff that drops down to cook inlet. The location of the landfarm is presented in Figure 3. The elevation of the landfarm site is 128 feet above sea level and located approximately 500 feet from a bluff that drops down to the shores of Cook Inlet.

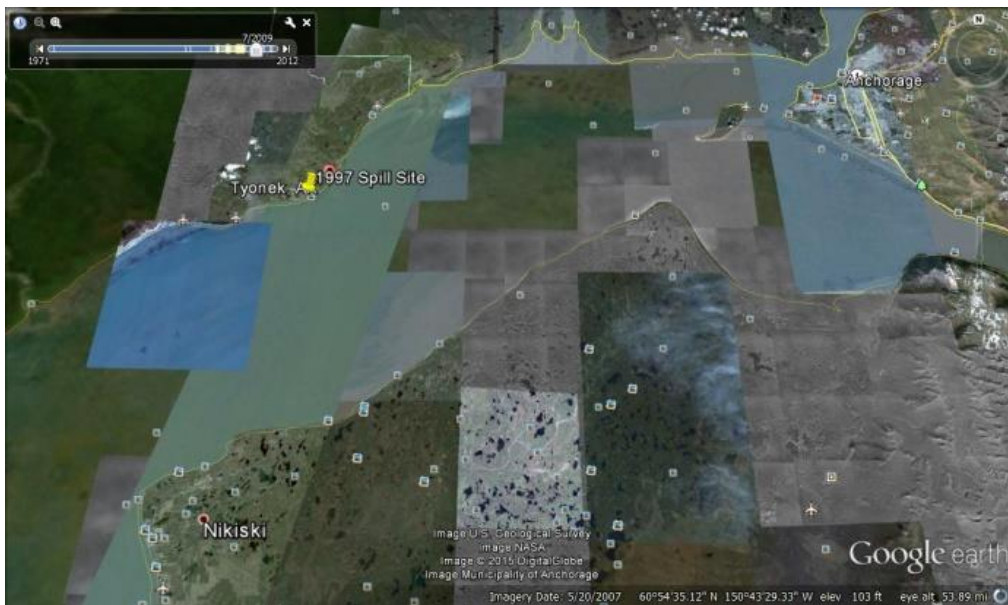


Figure 1 – Location of the site in the Cook Inlet region.

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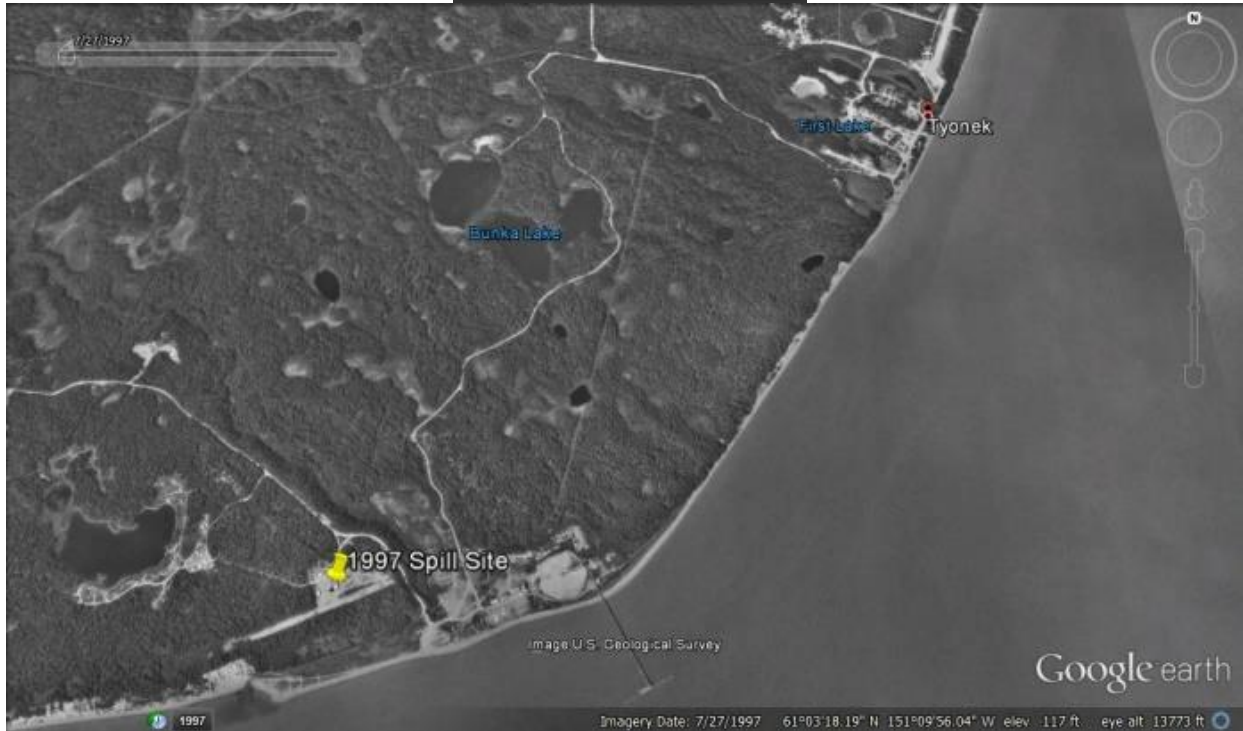


Figure 2 - Site location in the Cook Inlet region & proximity to Tyonek Village.

2.2 Background

A Phase II ESA was performed in May of 1998. Nine laboratory analytical samples were collected from 5 (5 of 7) soil borings drilled during the May 1998 ESA that confirmed the presence of released fuel in concentrations exceeding ADEC action levels applicable at that time. Soil samples were collected from impacted soil near the southwest corner of the maintenance building where the AST was located.

As described in the 1998 report, there were a total of seven borings advanced around the AST. Two borings, designated B-1 and B-5 were identified that contained contaminant concentrations that exceeded the proposed ADEC Method 1 cleanup level that was applicable for this site at that time. The deepest boring in the 1998 ESA was advanced to just over 50 feet below ground surface.

No Ground water was observed in the boring at that depth. There are no serviceable drinking water wells within two miles of where the spill occurred. There is a small lake 2,500 feet to the west-northwest of the excavation site. Cook Inlet is located approximately 1,100 feet south of the excavation site.

Based on the 1998 analytical soil sample and field screening results, the horizontal extent of contamination appeared to be approximately 25' wide by 75' long and localized to the southwest side of the maintenance building. Impacted soil appeared to extend beneath the western footprint of the maintenance building. Within the inferred horizontal extents of contamination, analytical soil samples collected at 5' bgs contained DRO concentrations exceeding the ADEC cleanup



levels. PID readings (from the 1998 ESA) from soil collected at 30 feet bgs were at 155 PPM. Below that point PID readings dropped sharply.

A Corrective Action Plan was drafted based on data reported in the 1998 site assessment that was submitted for ADEC approval entitled: Corrective Action Workplan Tyonek North Forelands Facility dated May 2015. The corrective action work plan was submitted to Joshua Barsis who is the ADEC point of contact for this site in the Contaminated Sites Program on May 27, 2015 and Mr. Barsis provided conditional approval of the corrective action work plan in a letter addressed to Connie Downing with Tyonek Native Corporation dated May 29, 2015.

2.3 Project Description and Objective

The overall project objective is to obtain a Cleanup Complete or No Further Action decision with no institutional controls being required by the Alaska Department of Environmental Conservation. The objective of corrective action work performed by EHX June 21-23, 2015 was to eliminate the potential to complete an exposure pathway associated with impacted soil from this site by excavating the impacted soil and treating the impacted soil in a landfarm located near the project site. In 2018 our project objectives were to determine the effectiveness of the landfarming work and to better understand the amount of impacted soil remaining under the structure.

The close proximity of the AST (no longer in place) to the maintenance building and the vertical migration pathway of released fuel did impact soil supporting the structure foundation. In 2018 we re-excavated soil alongside the structure foundation and augered into impacted soil supporting the structure to collect soil samples from under the structure.

2.4 Project Organization and Responsibilities

Tyonek Native Corporation is the Responsible Party for this contaminated site. Tyonek Native Corporation is a significant landowner in this area of the west side of Cook Inlet and has no neighbors in proximity to this site.

Drafting of the Work Plans, directing the excavation, performing field screening, collecting analytical samples, drafting summary reports, and landfarm preparation and maintenance is being conducted by EHX under contract to Tyonek Native Corporation.

2.4.1 Owner

Contacts, phone, fax, and e-mail for Tyonek Native Corporation, are listed below.

Tyonek Native Corporation
Attn: Connie Downing
1689 C Street, Suite 219
Anchorage, Alaska 99501
Phone: (907) 272-0707
Email: cdowning@tyonek.com



2.4.2 Environmental Consultant

Tyonek Native Corporation has retained EHX to implement the Corrective Action Workplan. EHX tasks include subcontractor coordination, collecting environmental samples, conducting field screening, coordinating sample transport to the project laboratory, and reporting of field activities and analytical results.

Key EHX personnel include Eric Henry, who managed the project; David Nussbaum who provided quality assurance review and was an environmental technician; and Ben Carpenter who was an environmental technician. Contacts, phone, and e-mail for EHX are listed below.

EHX

Attn: Eric Henry

PO Box 209

Kenai, AK 99611

Phone (907)350-9008

ehxalaska@hotmail.com

2.4.3 Subcontractors

Our primary subcontractor for this project is: SGS North America, Inc. (SGS). SGS is an ADEC approved fixed-laboratory providing chemical analyses.

SGS Environmental Services

200 West Potter Dr.

Anchorage, AK 99518

2.4.4 Regulatory Agency

The Alaska Department of Environmental Conservation is the lead regulator for this project, and is responsible for overall project oversight, and for making regulatory determinations under the ADEC Contaminated Sites program. The ADEC point of contact is:

Joshua Barsis

ADEC Contaminated Sites Program

555 Cordova St

Anchorage, AK 99501

Phone: (907) 269-7691

Email: joshua.barsis@alaska.gov

3.0 2018 FIELD ACTIVITIES

Field activities for this project included: landfarm field screening and analytical sampling; and directing the excavation alongside the building foundation, field screening, and analytical sample collection.



3.1 Landfarm Sampling

As we approached the landfarm area I could see that Tyonek Native Corporation had been “tilling” the impacted material with a grader. Evidence of small windrows left behind by the grader and tire tracks were visible.

Field screening of the landfarm was performed by collecting field screen samples every 10 feet—essentially establishing a 10 foot grid pattern. Ninety six field screen sample locations were dug down to 5-6 inches below the ground surface. Of those 96 locations 13 provided PID readings that were not zero. Those 13 locations were further assessed with the Dexil PetroFlag test method. PID Readings and the Dexil PetroFlag field screening test results are shown in Table 1 below. Of those 13 locations the highest 8 (LF-1 thru LF-8) were selected for laboratory analytical sampling.

3.2 Building Foundation Sampling

After excavation along the building was complete we began field screening visibly impacted material. Photos included with this report show the visibly impacted material. The depth under the building of impacted material was 13 feet bgs at the bottom. In the photos included there is a visible lens of impacted material at about 8’ below the ground surface. We augered into the impacted material at a downward 45 degree angle. Four such augerings were advanced into the impacted material. PID and Dexil PetroFlag test results are also shown in Table 1 below.



Figure 3 – The constructed landfarm site relative to the excavation site.



3.3 2018 Excavation Activities

In 2018 our excavation activities weren't for the purpose of removing petroleum impacted soil- that was completed in 2015. Our 2018 efforts were for the purpose of exposing the area beneath the building foundation so we could collect soil samples from that area to determine the extent of impacted soil that will remain in place in perpetuity.

3.4 Tilling Activities

Tilling of the landfarm material has been performed on an annual basis. TNC has mechanically tilled the landfarm soil with a motor grader. By monitoring precipitation we were able to determine that adding water to assist the attenuation process was not necessary. Soil moisture content should be sufficient to prevent fugitive dust and to promote the remedial process. Fertilization was not conducted.

4.0 SAMPLING PROCEDURES

Analytical and field screening soil samples were collected using decontaminated, stainless steel spoons. From the landfarm each location was dug down 5-6 inches. From the foundation excavation samples were collected from the stainless steel environmental auger at depths of 2 feet (of auger stem length) and 6 feet. Each auger hole was advanced at a 45 degree angle. The auger was cleaned with water and simple green.

4.1 Calibration and Maintenance of Field Instruments

To avoid and/or minimize breakdown of instruments in the field, the following procedures were followed:

- EHX personnel operating field screening equipment are trained in the operation of the equipment and will be required to read the operations manual prior to use on site.
- EHX personnel are trained in the routine maintenance of the field screening equipment.
- The operations and maintenance manual was on site for reference.
- The PID was calibrated with isobutylene gas prior to mobilization to the site (FAA restricts transport of compressed gasses on passenger flights). Otherwise, the field screening equipment was maintained and operated as recommended by the manufacturers' guidelines.
- The date and time of the field calibration was recorded in the field notes and included in the Field Activity Reports.

4.2 Field Screening

Field screening was conducted using a combination of a PID readings and Dexil PetroFLAG® samples. Field screening samples were collected on a 10 foot grid pattern. Each sample location was dug down 5-6 inches and field screened using the PID and headspace methods.

Soil was field screened for volatile organic compounds using a PID. The PID was calibrated each day by fresh air calibration. Prior to mobilization to the site the PID was calibrated with 100 parts per million (ppm) of isobutylene standard gas.

The PID was used to sample the total volatiles released from the soil using direct or headspace sampling methods. Headspace samples were collected in sealable plastic bags by filling them

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with freshly exposed soil to approximately one third to one half of their volumes and then sealing the top. The headspace samples were allowed to warm prior to headspace screening. Screening was accomplished by inserting the PID sampling probe into the air space above the soil in the bag. PID headspace readings were performed within one hour of the time the sample was collected.

To evaluate the correlation between PetroFLAG® screening data and laboratory analytical results, locations selected for analytical sample collection were field screened using PetroFLAG® field kit tests.

The PetroFLAG® test kit is a turbidimetric method which measures total petroleum hydrocarbons (TPH). The EPA testing procedure is: SW-846 Method 9074. According to manufacturer guidance, analytical results are frequently lower than the concentrations measured using PetroFLAG®, making PetroFLAG a conservative approach for determining excavation limits and increasing the probability of a complete cleanup of the excavated areas.

For this project, the intended purpose of the PetroFLAG® screening is to not rely on the PID screening alone but to improve on the performance of the PID in determining the presence or absence of weathered DRO concentrations greater than the applicable cleanup level for this site.

4.3 Analytical Sampling

The samples selected for analytical testing were documented in the project field notebook and a chain-of-custody sampling log. We attempted to “mark” analytical sample locations with GPS coordinates but the close proximity of the sample locations didn’t create a clear distinction between sample locations (landfarm) or the tiers (depth) where the samples were collected from. Instead of GPS we placed pin flags in the landfarm to record the locations where analytical samples were collected. The location of samples collected from under the building is understood by reference points measured from the building.

4.4 Labeling Sample Containers

Indelible waterproof ink was used to record information on the labels affixed to each sample container. Label information was recorded in the field logbook and chain-of-custody. Label information included the unique identifying number assigned to each sample, the date and time of collection, the name of sampler, and laboratory analysis requested.

4.5 Decontamination

Reusable sampling equipment was decontaminated prior to sampling and between sampling locations to prevent cross-contamination between samples. At a minimum, stainless steel spoons and other soil sampling tools, if re-used, were cleaned and decontaminated by the following procedure: tools were scrubbed with a brush in a solution of hot water and Alconox and rinsed with clean tap water. Clean disposable gloves and appropriate protective equipment were worn by individuals decontaminating tools and equipment. The excavator handling impacted soil underneath the structure were cleaned by Tyonek Contractors LLC personnel prior to demobilizing equipment from this site.



5.0 LABORATORY ANALYSES

All project soil samples were analyzed for DRO and RRO by AK 102 and AK 103. PAH analysis was performed for samples collected under the building footing. All the samples were submitted to SGS on a standard turnaround basis. Laboratory analytical results are included in Table 1 below.

Building Footing Samples 2018					
	DRO	RRO	PAH	PetroFlag	PID
BF-1	4920	552	ND	1103	437
BF-2	346	161	ND	249	79
BF-3*	313	136	ND	228	87
Landfarm Soil 2018					
LF-1	196	1010	Not Tested	542	6.3
LF-2	1020	7110		990	11.2
LF-3	52.4	124		76	3.2
LF-4	24.8	40.8		37	3.1
LF-5	74.9	119		48	3.4
LF-6	100	217		125	1.5
LF-7	130	279		222	2.3
LF-8	59	117		65	4.2

Table 1 – Lab results reported in mg/Kg. PetroFlag & PID reported in PPM.
* Field duplicate samples

Samples BF-1, BF-2, and BF-3 (BF-3 was a field duplicate) were collected from the soil supporting the structure.

6.0 SAMPLE TRANSPORT

Following sample collection, the labeled analytical samples from each site were placed in a cooler with frozen gel packs for storage and transport to SGS. Frozen gel packs were used to maintain the cooler temperature between 4 ± 2 degrees Celsius ($^{\circ}\text{C}$). A temperature blank was placed in the cooler to document the sample temperature. The temperature blank was at 3.0°C when the sample cooler arrived at the lab.

To prepare the cooler for transport, sufficient packing material was used to prevent breakage of sample containers. The laboratory provided chain-of-custody forms were placed in the cooler in a sealed plastic bag. The cooler was secured using at least two wraps of strapping or clear packing tape, applied at two locations on the cooler. The appropriate material declarations and shipping contact information was placed at conspicuous locations on the cooler's exterior prior to sending it to the laboratory.



The samples were transported via air freight from Tyonek to SGS in Anchorage. SGS' courier received the samples at the Anchorage International Airport. Analytical samples were shipped to the laboratory the day following completion of sampling work.

7.0 CHEMICAL DATA QUALITY CONTROL

Quality Control was evaluated using field and laboratory QC samples, data assessment, and implementation of internal laboratory procedures.

7.1 Data Types

The data to be collected for this project included the following:

- field observations
- photographs
- field screening results for soil samples, using PIDs and PetroFLAG®
- chemical testing data generated using analytical laboratory methods.

7.2 Data Uses and Objectives

Data generated during this project was used to inform real-time decisions in the field and to assess consistency with the project goals. The data was also used to support conclusions and recommendations later in this report regarding the site's regulatory status.

Field screening data was used to support field decisions such as:

- selecting soil samples for laboratory analysis
- determining excavation limits

Data quality objectives (DQOs) for the field-screening data were based on the proper calibration and functioning field screening equipment. This equipment included a miniRAE 2000 PID and PetroFLAG® analysis which were used to obtain semi-quantitative and quantitative concentrations of volatile and total petroleum hydrocarbon constituents in the soil samples. Calibration of the PID and the PetroFLAG® instrument were conducted in accordance with the manufacturer's recommendations except as noted in this report. Documentation of the equipment calibration was recorded in the field log book.

In comparison, data from samples collected for laboratory analysis was used to assess conformance with the project's data collection objectives. Laboratory data therefore should be of a higher level of quality, and subjected to a more rigorous laboratory QA/QC effort.

7.3 Precision

Precision, in the case of laboratory data, is the agreement of discrete measurements of the same property, under similar conditions. For this project, precision was assessed by calculating the relative percent difference (RPD) for duplicate analytical sample sets, and comparing the results to the numerical DQO listed in Table 2 above. Relative percent difference was calculated for DRO at 9.5% and 15.5% for RRO.

In addition to the field duplicate samples, this assessment included the LCS/laboratory control spike duplicate (LCSD), and MS/matrix spike duplicate (MSD) data.



7.4 Completeness

Eleven laboratory analytical samples returned results whose purpose was to confirm excavation of impacted material was complete and also to determine to what extent impacted material remains under the structure. Of the 11 analytical samples that returned results 11 were useable which is 100 percent complete. Per ADEC guidance, the project DQO for percent completeness is 85 percent of analytical data.

7.5 Data Assessment

This report includes a review of information recorded on the field notes. This information was checked for completeness; accuracy (transcription errors, internal consistency); unexpected results, with accompanying possible explanation; and adherence to the specified sampling procedures.

The project laboratory's sample analyst and the laboratory QA officer review their data before providing it to EHX. Non-conformances with DQOs, variations from SOPs, and other notes of interest are normally presented in a case narrative report to be completed for each data deliverables package. If a DQO is not met, the case narrative would include a statement assessing the potential impact to data quality and usability. SGS reported no errors or abnormalities in the analytical process that would impact the DQOs for this project.

Analytical data was reviewed for conformance with the project's precision, accuracy, representativeness, comparability, completeness, and sensitivity DQOs. The results of this review were documented using the standard ADEC Laboratory Data Review Checklist, with significant findings noted in the summary report. Non-conformances that potentially impact data usability will be discussed with the project laboratory and, if possible, corrective action will be taken to correct the deficiencies. Data usability is largely dependent on confirming proper COC procedures and conformance with numerical DQOs. There were no non-conformances that would potentially impact data usability.

8.0 DOCUMENTATION AND REPORTING

Documentation for this project consists primarily of the field notes, laboratory deliverables packages, site photographs, and final Summary Report. QA procedures for these elements consists of verifying that the appropriate information was recorded, as outlined in this section, and that documentation is complete and accurate.

8.1 Field Documentation

Field notes were used to document field activities and data collected on-site. EHX personnel submitted copies of their field notes at the end of the project and those notes or comments are included in this report where relevant.

8.2 Laboratory Reports

Laboratory data was provided to EHX in a data deliverables package. A copy of the laboratory data package is included as an attachment to this Summary Report.



8.3 Summary Report

This Summary Report includes a description of field observations and procedures, as-built survey, photographs taken during field activities, tabulated field screening results, and laboratory analytical results. In accordance with ADEC guidance, this report summarizes the data review presented in the completed ADEC's Laboratory Data Review Checklist form. The summary report also includes: a comparison of QC sample results to numerical DQOs; comment on the data's quality and usability; and identify non-conformances and corrective action taken. This report was submitted to Tyonek Native Corporation prior to submittal to the ADEC.

9.0 CLEANUP LEVEL

This site is located in a non-residential area. To the extent possible, we were able to verify there are no drinking water wells near the site. None of the equipment maintenance facilities around the project site have supplied water or restrooms. The nearest residential area with drinking water wells are in Tyonek Village over two miles to the northeast.

Groundwater at this site has been reported to be over 100 feet below ground surface. The borings from the 1998 ESA were advanced to over 50 feet below ground surface and no groundwater was observed in those borings. No groundwater was observed during the corrective action work performed at this site.

The project site is perched on a high bluff approximately 2500 feet from the nearest lake and almost 1100 feet from the shores of Cook Inlet. To the east of the site is a valley extending northwest where Tyonek Creek flows. When considering the site's topographical position the reported depth to groundwater is credible.

The excavation site is approximately 160 feet above tide water. All of the land in the area around the project site is owned by Tyonek Native Corporation who has indicated that for the foreseeable future there are no plans to develop land near this site for residential purposes.

From research performed before and since the corrective action work, including our observations during corrective action and subsequent sampling events, we continue to believe the risk of the diesel fuel released at this site having ever impacted groundwater is very low. The horizontal and vertical distance to the nearest surface water, Cook Inlet, makes impacting that water body even less likely. Additionally, because there are no drinking water wells near this site, there is no potential that humans may consume impacted groundwater if the migration to groundwater pathway were to be completed.

In the ADEC approved Corrective Action Workplan submitted for this site, we proposed eliminating the migration to groundwater pathway and instead use the ADEC cleanup levels for Direct Contact/Ingestion from 18 AAC 75.341 Method 2 Table B2 of 10,250 mg/Kg DRO for this site. None of our observations during the 2015 or 2018 field work conflicted with information supporting the approved cleanup level.



10.0 LIMITATIONS & EXCEPTIONS, RECOMMENDATIONS & CONCLUSIONS

10.1 Limitations and Exceptions

This report and the work it summarizes has been prepared in accordance with generally accepted environmental methodologies of environmental professionals who engage in characterization and remediation of sites impacted by the release of environmentally hazardous substances. The work this report summarizes was performed in a manner consistent with the regulatory statutes and professional guidance promulgated by the ADEC who is the regulator for this site. This report and the work it summarizes contains all of the limitations inherent in these methodologies.

- The information gathered and summarized in this report is accurate for the time and conditions when and where the data was collected.
- The conclusions and recommendations in this report are based, in part, on the information provided by others.
- The possibility remains that unexpected environmental conditions may be encountered at the property in locations not specifically investigated or where evidence of environmental impacts were concealed.
- No warranties are made pertaining to environmental conditions at the site after the date EHX provided the services summarized in this report.

10.2 Conclusions & Recommendations

In 2015 approximately 540 cubic yards of impacted soil material was excavated from an excavation measuring approximately 49 feet by 25 feet. Confirmation sampling performed in 2015 verified that the full extent of impacted material was removed; however, a small portion of the impacted material migrated under the building where it will remain indefinitely.

Contaminated soil from the excavation was placed into a landfarm constructed on an old airstrip near the excavation site that measures 90 feet by 325 feet with a perimeter berm. Soil in the landfarm was spread to approximately 6 inches deep.

The soil being landfarmed is reducing in DRO and RRO concentrations; however, it does not yet meet ADEC cleanup levels.

The sampling that was performed beneath the footing of the shop was done to better understand the quantity of impacted soil that will remain in place in perpetuity. As previously discussed, those samples were collected from a soil boring that was advanced to 3' and 6' into the ground at a 45 degree downward angle. Two samples were collected from the boring. BF-1 was collected at 3 feet (approximately 2.12' horizontal and vertical depth). BF-2 and BF-3 were collected at 6' or at approximately 4.25' horizontal distance and vertical depth.

Impacted soil was identified along the face of the excavation down to 13 feet bgs. That coincides with the total depth the relatively clean BF-2 & BF-3 samples were collected from (13.25' total depth). The length of impacted soil at that depth was approximately 11 feet long along the face of the excavation.



Worst case scenario, if the remaining impacted material was somewhat regular shaped as it advanced downward to 13' bgs X the 11' (length of that impacted material along the excavations face) X 4.25' (horizontal length of the boring) = 22.5 cubic yards. The more likely volume of impacted material remaining in place is less than that.

The environmental risks associated with the remaining impacted material beneath the building is very low. Groundwater will not be impacted by the small volume of impacted soil. Indoor air quality is not a concern because the 6 feet beneath the footing did not produce any PID readings- essentially no vapors coming from that soil.

Once we can clearly demonstrate a decreasing trend in the soil being treated in the landfarm this site will be eligible for No Further Action.

11.0 Signatures & Qualifications of Environmental Professional

To the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312 and 18 AAC 75. I have the specific qualifications based on education, training, and experience to assess environmental hazards of the nature, history, and setting of the subject property. I have performed the work this report summarizes and written this report in conformance with the standards commonly practiced by environmental professionals meeting these qualifications.

Prepared by:

A handwritten signature in blue ink, appearing to be 'Eric Henry', written over a light blue horizontal line.

Eric Henry – Qualified Environmental Professional
Proprietor EHX



Photo 1: Beginning sample collection beneath the building footer. There is a visible lense of impacted material at the technician's waist level



Photo 2: 6' auger depth (the auger extension had been added). About to collect samples BF-2 & BF-3.



Photo 3: visible impacted material.



Photo 4: View north over landfarm.



Photo 5: Landfarm sampling. View to the south.

Laboratory Report of Analysis

To: EHX Alaska
52785 Birch Tree Avenue
Kenai, AK 99611
(907)350-9008

Report Number: **1185779**

Client Project: **TNC Landfarm**

Dear Eric Henry,

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

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

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

Sincerely,
SGS North America Inc.

Jillian Vlahovich
Project Manager
Jillian.Vlahovich@sgs.com

Date

Case Narrative

SGS Client: **EHX Alaska**
SGS Project: **1185779**
Project Name/Site: **TNC Landfarm**
Project Contact: **Eric Henry**

Refer to sample receipt form for information on sample condition.

1185835007MS (1482110) MS

8270D SIM - PAH surrogate recovery for 2-Methylnaphthalene-d10 does not meet QC criteria due to sample dilution.
8270D SIM - PAH MS recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

1185835007MSD (1482111) MSD

8270D SIM - PAH surrogate recovery for 2-Methylnaphthalene-d10 does not meet QC criteria due to sample dilution.
8270D SIM - PAH MSD recovery for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

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

Print Date: 10/17/2018 3:23:55PM

Report of Manual Integrations

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Analytical Batch</u>	<u>Analyte</u>	<u>Reason</u>
8270D SIM (PAH)				
1482110	1185835007MS	XMS11156	Anthracene	SP
1482110	1185835007MS	XMS11156	Benzo[b]Fluoranthene	BLC
1482110	1185835007MS	XMS11156	Benzo[k]fluoranthene	RP
1482110	1185835007MS	XMS11156	Dibenzo[a,h]anthracene	RP
1482110	1185835007MS	XMS11156	Fluoranthene	SP
1482111	1185835007MSD	XMS11156	Anthracene	SP
1482111	1185835007MSD	XMS11156	Benzo[b]Fluoranthene	BLC
1482111	1185835007MSD	XMS11156	Benzo[g,h,i]perylene	RP
1482111	1185835007MSD	XMS11156	Benzo[k]fluoranthene	RP
1482111	1185835007MSD	XMS11156	Fluoranthene	SP
1483003	CVC for HBN 1787789 [XMS/11156	XMS11156	Benzo[b]Fluoranthene	BLC
1483003	CVC for HBN 1787789 [XMS/11156	XMS11156	Benzo[k]fluoranthene	RP

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Laboratory Qualifiers

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

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

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

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

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

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
LF-1	1185779001	10/05/2018	10/09/2018	Soil/Solid (dry weight)
LF-2	1185779002	10/05/2018	10/09/2018	Soil/Solid (dry weight)
LF-3	1185779003	10/05/2018	10/09/2018	Soil/Solid (dry weight)
LF-4	1185779004	10/05/2018	10/09/2018	Soil/Solid (dry weight)
LF-5	1185779005	10/05/2018	10/09/2018	Soil/Solid (dry weight)
LF-6	1185779006	10/05/2018	10/09/2018	Soil/Solid (dry weight)
LF-7	1185779007	10/05/2018	10/09/2018	Soil/Solid (dry weight)
LF-8	1185779008	10/05/2018	10/09/2018	Soil/Solid (dry weight)
BF-1	1185779009	10/05/2018	10/09/2018	Soil/Solid (dry weight)
BF-2	1185779010	10/05/2018	10/09/2018	Soil/Solid (dry weight)
BF-3	1185779011	10/05/2018	10/09/2018	Soil/Solid (dry weight)

<u>Method</u>	<u>Method Description</u>
8270D SIM (PAH)	8270 PAH SIM Semi-Volatiles GC/MS
AK102	Diesel/Residual Range Organics
AK103	Diesel/Residual Range Organics
SM21 2540G	Percent Solids SM2540G

Print Date: 10/17/2018 3:23:58PM

Detectable Results Summary

Client Sample ID: LF-1 Lab Sample ID: 1185779001 Semivolatile Organic Fuels	<u>Parameter</u> Diesel Range Organics Residual Range Organics	<u>Result</u> 196 1010	<u>Units</u> mg/Kg mg/Kg
Client Sample ID: LF-2 Lab Sample ID: 1185779002 Semivolatile Organic Fuels	<u>Parameter</u> Diesel Range Organics Residual Range Organics	<u>Result</u> 1020 7110	<u>Units</u> mg/Kg mg/Kg
Client Sample ID: LF-3 Lab Sample ID: 1185779003 Semivolatile Organic Fuels	<u>Parameter</u> Diesel Range Organics Residual Range Organics	<u>Result</u> 52.4 124	<u>Units</u> mg/Kg mg/Kg
Client Sample ID: LF-4 Lab Sample ID: 1185779004 Semivolatile Organic Fuels	<u>Parameter</u> Diesel Range Organics Residual Range Organics	<u>Result</u> 24.8 40.8	<u>Units</u> mg/Kg mg/Kg
Client Sample ID: LF-5 Lab Sample ID: 1185779005 Semivolatile Organic Fuels	<u>Parameter</u> Diesel Range Organics Residual Range Organics	<u>Result</u> 74.9 119	<u>Units</u> mg/Kg mg/Kg
Client Sample ID: LF-6 Lab Sample ID: 1185779006 Semivolatile Organic Fuels	<u>Parameter</u> Diesel Range Organics Residual Range Organics	<u>Result</u> 100 217	<u>Units</u> mg/Kg mg/Kg
Client Sample ID: LF-7 Lab Sample ID: 1185779007 Semivolatile Organic Fuels	<u>Parameter</u> Diesel Range Organics Residual Range Organics	<u>Result</u> 130 279	<u>Units</u> mg/Kg mg/Kg
Client Sample ID: LF-8 Lab Sample ID: 1185779008 Semivolatile Organic Fuels	<u>Parameter</u> Diesel Range Organics Residual Range Organics	<u>Result</u> 59.0 117	<u>Units</u> mg/Kg mg/Kg
Client Sample ID: BF-1 Lab Sample ID: 1185779009 Semivolatile Organic Fuels	<u>Parameter</u> Diesel Range Organics Residual Range Organics	<u>Result</u> 4920 552	<u>Units</u> mg/Kg mg/Kg
Client Sample ID: BF-2 Lab Sample ID: 1185779010 Semivolatile Organic Fuels	<u>Parameter</u> Diesel Range Organics Residual Range Organics	<u>Result</u> 346 161	<u>Units</u> mg/Kg mg/Kg

Print Date: 10/17/2018 3:23:59PM

Detectable Results Summary

Client Sample ID: **BF-3**
Lab Sample ID: 1185779011
Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	313	mg/Kg
Residual Range Organics	136	mg/Kg

Print Date: 10/17/2018 3:23:59PM

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Results of LF-1

Client Sample ID: LF-1
Client Project ID: TNC Landfarm
Lab Sample ID: 1185779001
Lab Project ID: 1185779

Collection Date: 10/05/18 11:05
Received Date: 10/09/18 08:09
Matrix: Soil/Solid (dry weight)
Solids (%):96.0
Location:

Results by Semivolatile Organic Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Diesel Range Organics, 196, 20.7, 6.42, mg/Kg, 1, 10/10/18 10:37

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 5a Androstane (surr), 96, 50-150, %, 1, 10/10/18 10:37

Batch Information

Analytical Batch: XFC14694
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/10/18 10:37
Container ID: 1185779001-A
Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.179 g
Prep Extract Vol: 5 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Residual Range Organics, 1010, 20.7, 6.42, mg/Kg, 1, 10/10/18 10:37

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: n-Triacontane-d62 (surr), 100, 50-150, %, 1, 10/10/18 10:37

Batch Information

Analytical Batch: XFC14694
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/10/18 10:37
Container ID: 1185779001-A
Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.179 g
Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:00PM



Results of LF-2

Client Sample ID: LF-2
Client Project ID: TNC Landfarm
Lab Sample ID: 1185779002
Lab Project ID: 1185779

Collection Date: 10/05/18 11:11
Received Date: 10/09/18 08:09
Matrix: Soil/Solid (dry weight)
Solids (%):95.2
Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	1020	21.0	6.51	mg/Kg	1		10/10/18 10:47

Surrogates

5a Androstane (surr)	98.9	50-150		%	1		10/10/18 10:47
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Batch Information

Analytical Batch: XFC14694
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/10/18 10:47
Container ID: 1185779002-A

Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.036 g
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Residual Range Organics	7110	105	32.5	mg/Kg	5		10/12/18 13:57

Surrogates

n-Triacontane-d62 (surr)	121	50-150		%	5		10/12/18 13:57
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Batch Information

Analytical Batch: XFC14703
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/12/18 13:57
Container ID: 1185779002-A

Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.036 g
Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:00PM



Results of LF-3

Client Sample ID: LF-3
Client Project ID: TNC Landfarm
Lab Sample ID: 1185779003
Lab Project ID: 1185779

Collection Date: 10/05/18 11:15
Received Date: 10/09/18 08:09
Matrix: Soil/Solid (dry weight)
Solids (%):96.5
Location:

Results by Semivolatile Organic Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Diesel Range Organics, 52.4, 20.4, 6.34, mg/Kg, 1, 10/10/18 10:57

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 5a Androstane (surr), 95.8, 50-150, %, 1, 10/10/18 10:57

Batch Information

Analytical Batch: XFC14694
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/10/18 10:57
Container ID: 1185779003-A

Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.402 g
Prep Extract Vol: 5 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Residual Range Organics, 124, 20.4, 6.34, mg/Kg, 1, 10/10/18 10:57

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: n-Triacontane-d62 (surr), 99.6, 50-150, %, 1, 10/10/18 10:57

Batch Information

Analytical Batch: XFC14694
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/10/18 10:57
Container ID: 1185779003-A

Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.402 g
Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:00PM



Results of LF-4

Client Sample ID: LF-4
Client Project ID: TNC Landfarm
Lab Sample ID: 1185779004
Lab Project ID: 1185779

Collection Date: 10/05/18 11:20
Received Date: 10/09/18 08:09
Matrix: Soil/Solid (dry weight)
Solids (%):92.9
Location:

Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	24.8	21.3	6.61	mg/Kg	1		10/10/18 11:08
Surrogates							
5a Androstane (surr)	92.9	50-150		%	1		10/10/18 11:08

Batch Information

Analytical Batch: XFC14694
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/10/18 11:08
Container ID: 1185779004-A

Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.297 g
Prep Extract Vol: 5 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	40.8	21.3	6.61	mg/Kg	1		10/10/18 11:08
Surrogates							
n-Triacontane-d62 (surr)	95.5	50-150		%	1		10/10/18 11:08

Batch Information

Analytical Batch: XFC14694
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/10/18 11:08
Container ID: 1185779004-A

Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.297 g
Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:00PM



Results of LF-5

Client Sample ID: LF-5
Client Project ID: TNC Landfarm
Lab Sample ID: 1185779005
Lab Project ID: 1185779

Collection Date: 10/05/18 11:25
Received Date: 10/09/18 08:09
Matrix: Soil/Solid (dry weight)
Solids (%):95.9
Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	74.9	20.6	6.38	mg/Kg	1		10/10/18 11:18

Surrogates

5a Androstane (surr)	96.8	50-150		%	1		10/10/18 11:18
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Batch Information

Analytical Batch: XFC14694
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/10/18 11:18
Container ID: 1185779005-A

Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.413 g
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Residual Range Organics	119	20.6	6.38	mg/Kg	1		10/10/18 11:18

Surrogates

n-Triacontane-d62 (surr)	99.1	50-150		%	1		10/10/18 11:18
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Batch Information

Analytical Batch: XFC14694
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/10/18 11:18
Container ID: 1185779005-A

Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.413 g
Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:00PM



Results of LF-6

Client Sample ID: LF-6
Client Project ID: TNC Landfarm
Lab Sample ID: 1185779006
Lab Project ID: 1185779

Collection Date: 10/05/18 11:35
Received Date: 10/09/18 08:09
Matrix: Soil/Solid (dry weight)
Solids (%):95.8
Location:

Results by Semivolatile Organic Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Diesel Range Organics and Surrogates (5a Androstane).

Batch Information

Analytical Batch: XFC14694
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/10/18 11:29
Container ID: 1185779006-A
Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.164 g
Prep Extract Vol: 5 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Residual Range Organics and Surrogates (n-Triacontane-d62).

Batch Information

Analytical Batch: XFC14694
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/10/18 11:29
Container ID: 1185779006-A
Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.164 g
Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:00PM



Results of LF-7

Client Sample ID: LF-7
Client Project ID: TNC Landfarm
Lab Sample ID: 1185779007
Lab Project ID: 1185779

Collection Date: 10/05/18 11:40
Received Date: 10/09/18 08:09
Matrix: Soil/Solid (dry weight)
Solids (%):96.5
Location:

Results by Semivolatile Organic Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Diesel Range Organics and Surrogates (5a Androstane).

Batch Information

Analytical Batch: XFC14694
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/10/18 11:39
Container ID: 1185779007-A
Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.134 g
Prep Extract Vol: 5 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Residual Range Organics and Surrogates (n-Triacontane-d62).

Batch Information

Analytical Batch: XFC14694
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/10/18 11:39
Container ID: 1185779007-A
Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.134 g
Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:00PM



Results of LF-8

Client Sample ID: LF-8
Client Project ID: TNC Landfarm
Lab Sample ID: 1185779008
Lab Project ID: 1185779

Collection Date: 10/05/18 11:50
Received Date: 10/09/18 08:09
Matrix: Soil/Solid (dry weight)
Solids (%):96.7
Location:

Results by Semivolatile Organic Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Diesel Range Organics, 59.0, 20.4, 6.31, mg/Kg, 1, 10/10/18 11:50

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 5a Androstane (surr), 94.1, 50-150, %, 1, 10/10/18 11:50

Batch Information

Analytical Batch: XFC14694
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/10/18 11:50
Container ID: 1185779008-A

Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.456 g
Prep Extract Vol: 5 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Residual Range Organics, 117, 20.4, 6.31, mg/Kg, 1, 10/10/18 11:50

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: n-Triacontane-d62 (surr), 95.9, 50-150, %, 1, 10/10/18 11:50

Batch Information

Analytical Batch: XFC14694
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/10/18 11:50
Container ID: 1185779008-A

Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.456 g
Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:00PM



Results of BF-1

Client Sample ID: **BF-1**
Client Project ID: **TNC Landfarm**
Lab Sample ID: 1185779009
Lab Project ID: 1185779

Collection Date: 10/05/18 12:50
Received Date: 10/09/18 08:09
Matrix: Soil/Solid (dry weight)
Solids (%):91.4
Location:

Results by Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1-Methylnaphthalene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
2-Methylnaphthalene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Acenaphthene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Acenaphthylene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Anthracene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Benzo(a)Anthracene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Benzo[a]pyrene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Benzo[b]Fluoranthene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Benzo[g,h,i]perylene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Benzo[k]fluoranthene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Chrysene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Dibenzo[a,h]anthracene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Fluoranthene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Fluorene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Indeno[1,2,3-c,d] pyrene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Naphthalene	21.4 U	21.4	5.36	ug/Kg	1		10/16/18 12:42
Phenanthrene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Pyrene	26.8 U	26.8	6.70	ug/Kg	1		10/16/18 12:42
Surrogates							
2-Methylnaphthalene-d10 (surr)	62.4	58-103		%	1		10/16/18 12:42
Fluoranthene-d10 (surr)	82.7	54-113		%	1		10/16/18 12:42

Batch Information

Analytical Batch: XMS11156
Analytical Method: 8270D SIM (PAH)
Analyst: DSD
Analytical Date/Time: 10/16/18 12:42
Container ID: 1185779009-A

Prep Batch: XXX40707
Prep Method: SW3550C
Prep Date/Time: 10/11/18 08:30
Prep Initial Wt./Vol.: 22.977 g
Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:00PM



Results of **BF-1**

Client Sample ID: **BF-1**
Client Project ID: **TNC Landfarm**
Lab Sample ID: 1185779009
Lab Project ID: 1185779

Collection Date: 10/05/18 12:50
Received Date: 10/09/18 08:09
Matrix: Soil/Solid (dry weight)
Solids (%):91.4
Location:

Results by **Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	4920	87.5	27.1	mg/Kg	4		10/10/18 14:15

Surrogates

5a Androstane (surr)	98.8	50-150		%	4		10/10/18 14:15
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Batch Information

Analytical Batch: XFC14694
Analytical Method: AK102
Analyst: CMS
Analytical Date/Time: 10/10/18 14:15
Container ID: 1185779009-A

Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.031 g
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Residual Range Organics	552	87.5	27.1	mg/Kg	4		10/10/18 14:15

Surrogates

n-Triacontane-d62 (surr)	99.9	50-150		%	4		10/10/18 14:15
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Batch Information

Analytical Batch: XFC14694
Analytical Method: AK103
Analyst: CMS
Analytical Date/Time: 10/10/18 14:15
Container ID: 1185779009-A

Prep Batch: XXX40691
Prep Method: SW3550C
Prep Date/Time: 10/09/18 15:30
Prep Initial Wt./Vol.: 30.031 g
Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:00PM

Results of BF-2

Client Sample ID: **BF-2**
 Client Project ID: **TNC Landfarm**
 Lab Sample ID: 1185779010
 Lab Project ID: 1185779

Collection Date: 10/05/18 13:20
 Received Date: 10/09/18 08:09
 Matrix: Soil/Solid (dry weight)
 Solids (%):94.3
 Location:

Results by Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1-Methylnaphthalene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
2-Methylnaphthalene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Acenaphthene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Acenaphthylene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Anthracene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Benzo(a)Anthracene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Benzo[a]pyrene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Benzo[b]Fluoranthene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Benzo[g,h,i]perylene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Benzo[k]fluoranthene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Chrysene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Dibenzo[a,h]anthracene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Fluoranthene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Fluorene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Indeno[1,2,3-c,d] pyrene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Naphthalene	21.0 U	21.0	5.25	ug/Kg	1		10/16/18 13:03
Phenanthrene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Pyrene	26.3 U	26.3	6.56	ug/Kg	1		10/16/18 13:03
Surrogates							
2-Methylnaphthalene-d10 (surr)	90.9	58-103		%	1		10/16/18 13:03
Fluoranthene-d10 (surr)	83.3	54-113		%	1		10/16/18 13:03

Batch Information

Analytical Batch: XMS11156
 Analytical Method: 8270D SIM (PAH)
 Analyst: DSD
 Analytical Date/Time: 10/16/18 13:03
 Container ID: 1185779010-A

Prep Batch: XXX40707
 Prep Method: SW3550C
 Prep Date/Time: 10/11/18 08:30
 Prep Initial Wt./Vol.: 22.711 g
 Prep Extract Vol: 5 mL

Results of BF-2

Client Sample ID: **BF-2**
 Client Project ID: **TNC Landfarm**
 Lab Sample ID: 1185779010
 Lab Project ID: 1185779

Collection Date: 10/05/18 13:20
 Received Date: 10/09/18 08:09
 Matrix: Soil/Solid (dry weight)
 Solids (%):94.3
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	346	21.0	6.52	mg/Kg	1		10/10/18 12:21

Surrogates

5a Androstane (surr)	96.6	50-150		%	1		10/10/18 12:21
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Batch Information

Analytical Batch: XFC14694
 Analytical Method: AK102
 Analyst: CMS
 Analytical Date/Time: 10/10/18 12:21
 Container ID: 1185779010-A

Prep Batch: XXX40691
 Prep Method: SW3550C
 Prep Date/Time: 10/09/18 15:30
 Prep Initial Wt./Vol.: 30.238 g
 Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Residual Range Organics	161	21.0	6.52	mg/Kg	1		10/10/18 12:21

Surrogates

n-Triacontane-d62 (surr)	97.3	50-150		%	1		10/10/18 12:21
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Batch Information

Analytical Batch: XFC14694
 Analytical Method: AK103
 Analyst: CMS
 Analytical Date/Time: 10/10/18 12:21
 Container ID: 1185779010-A

Prep Batch: XXX40691
 Prep Method: SW3550C
 Prep Date/Time: 10/09/18 15:30
 Prep Initial Wt./Vol.: 30.238 g
 Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:00PM



Results of **BF-3**

Client Sample ID: **BF-3**
Client Project ID: **TNC Landfarm**
Lab Sample ID: 1185779011
Lab Project ID: 1185779

Collection Date: 10/05/18 13:25
Received Date: 10/09/18 08:09
Matrix: Soil/Solid (dry weight)
Solids (%):94.2
Location:

Results by **Polynuclear Aromatics GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
1-Methylnaphthalene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
2-Methylnaphthalene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Acenaphthene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Acenaphthylene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Anthracene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Benzo(a)Anthracene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Benzo[a]pyrene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Benzo[b]Fluoranthene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Benzo[g,h,i]perylene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Benzo[k]fluoranthene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Chrysene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Dibenzo[a,h]anthracene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Fluoranthene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Fluorene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Indeno[1,2,3-c,d] pyrene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Naphthalene	21.1 U	21.1	5.27	ug/Kg	1		10/16/18 13:23
Phenanthrene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Pyrene	26.3 U	26.3	6.58	ug/Kg	1		10/16/18 13:23
Surrogates							
2-Methylnaphthalene-d10 (surr)	89.1	58-103		%	1		10/16/18 13:23
Fluoranthene-d10 (surr)	83.1	54-113		%	1		10/16/18 13:23

Batch Information

Analytical Batch: XMS11156
Analytical Method: 8270D SIM (PAH)
Analyst: DSD
Analytical Date/Time: 10/16/18 13:23
Container ID: 1185779011-A

Prep Batch: XXX40707
Prep Method: SW3550C
Prep Date/Time: 10/11/18 08:30
Prep Initial Wt./Vol.: 22.663 g
Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:00PM

Results of BF-3

Client Sample ID: **BF-3**
 Client Project ID: **TNC Landfarm**
 Lab Sample ID: 1185779011
 Lab Project ID: 1185779

Collection Date: 10/05/18 13:25
 Received Date: 10/09/18 08:09
 Matrix: Soil/Solid (dry weight)
 Solids (%):94.2
 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	313	21.1	6.53	mg/Kg	1		10/10/18 12:31

Surrogates

5a Androstane (surr)	95.8	50-150		%	1		10/10/18 12:31
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Batch Information

Analytical Batch: XFC14694
 Analytical Method: AK102
 Analyst: CMS
 Analytical Date/Time: 10/10/18 12:31
 Container ID: 1185779011-A

Prep Batch: XXX40691
 Prep Method: SW3550C
 Prep Date/Time: 10/09/18 15:30
 Prep Initial Wt./Vol.: 30.21 g
 Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Residual Range Organics	136	21.1	6.53	mg/Kg	1		10/10/18 12:31

Surrogates

n-Triacontane-d62 (surr)	96.7	50-150		%	1		10/10/18 12:31
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Batch Information

Analytical Batch: XFC14694
 Analytical Method: AK103
 Analyst: CMS
 Analytical Date/Time: 10/10/18 12:31
 Container ID: 1185779011-A

Prep Batch: XXX40691
 Prep Method: SW3550C
 Prep Date/Time: 10/09/18 15:30
 Prep Initial Wt./Vol.: 30.21 g
 Prep Extract Vol: 5 mL



Method Blank

Blank ID: MB for HBN 1787495 [SPT/10646]
Blank Lab ID: 1481686

Matrix: Soil/Solid (dry weight)

QC for Samples:

1185779001, 1185779002, 1185779003, 1185779004, 1185779005, 1185779006, 1185779007, 1185779008, 1185779009, 1185779010, 1185779011

Results by SM21 2540G

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Total Solids	100			%

Batch Information

Analytical Batch: SPT10646
Analytical Method: SM21 2540G
Instrument:
Analyst: BRP
Analytical Date/Time: 10/9/2018 7:40:00PM

Print Date: 10/17/2018 3:24:02PM

Duplicate Sample Summary

Original Sample ID: 1185779002

Analysis Date: 10/09/2018 19:40

Duplicate Sample ID: 1481687

Matrix: Soil/Solid (dry weight)

QC for Samples:

1185779001, 1185779002, 1185779003, 1185779004, 1185779005, 1185779006

Results by SM21 2540G

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	95.2	95.1	%	0.12	(< 15)

Batch Information

Analytical Batch: SPT10646

Analytical Method: SM21 2540G

Instrument:

Analyst: BRP

Print Date: 10/17/2018 3:24:02PM

Duplicate Sample Summary

Original Sample ID: 1185779006

Analysis Date: 10/09/2018 19:40

Duplicate Sample ID: 1481688

Matrix: Soil/Solid (dry weight)

QC for Samples:

1185779003, 1185779004, 1185779005, 1185779006, 1185779007, 1185779008, 1185779009, 1185779010, 1185779011

Results by SM21 2540G

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	95.8	95.8	%	0.02	(< 15)

Batch Information

Analytical Batch: SPT10646

Analytical Method: SM21 2540G

Instrument:

Analyst: BRP

Print Date: 10/17/2018 3:24:02PM

Duplicate Sample Summary

Original Sample ID: 1185800007

Duplicate Sample ID: 1481689

QC for Samples:

1185779007, 1185779008, 1185779009, 1185779010, 1185779011

Analysis Date: 10/09/2018 19:40

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	52.1	54.1	%	3.80	(< 15)

Batch Information

Analytical Batch: SPT10646

Analytical Method: SM21 2540G

Instrument:

Analyst: BRP

Print Date: 10/17/2018 3:24:02PM

Method Blank

Blank ID: MB for HBN 1787474 [XXX/40691]
 Blank Lab ID: 1481610

Matrix: Soil/Solid (dry weight)

QC for Samples:

1185779001, 1185779002, 1185779003, 1185779004, 1185779005, 1185779006, 1185779007, 1185779008, 1185779009, 1185779010, 1185779011

Results by AK102

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Diesel Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
5a Androstane (surr)	105	60-120		%

Batch Information

Analytical Batch: XFC14694
 Analytical Method: AK102
 Instrument: Agilent 7890B R
 Analyst: CMS
 Analytical Date/Time: 10/10/2018 10:06:00AM

Prep Batch: XXX40691
 Prep Method: SW3550C
 Prep Date/Time: 10/9/2018 3:30:55PM
 Prep Initial Wt./Vol.: 30 g
 Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:04PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1185779 [XXX40691]
 Blank Spike Lab ID: 1481611
 Date Analyzed: 10/10/2018 10:17

Spike Duplicate ID: LCSD for HBN 1185779 [XXX40691]
 Spike Duplicate Lab ID: 1481612
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1185779001, 1185779002, 1185779003, 1185779004, 1185779005, 1185779006, 1185779007, 1185779008, 1185779009, 1185779010, 1185779011

Results by AK102

Parameter	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Diesel Range Organics	833	890	107	833	891	107	(75-125)	0.10	(< 20)

Surrogates

5a Androstane (surr)	16.7	108	108	16.7	110	110	(60-120)	1.20	
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Batch Information

Analytical Batch: **XFC14694**
 Analytical Method: **AK102**
 Instrument: **Agilent 7890B R**
 Analyst: **CMS**

Prep Batch: **XXX40691**
 Prep Method: **SW3550C**
 Prep Date/Time: **10/09/2018 15:30**
 Spike Init Wt./Vol.: 833 mg/Kg Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 833 mg/Kg Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1787474 [XXX/40691]
 Blank Lab ID: 1481610

Matrix: Soil/Solid (dry weight)

QC for Samples:

1185779001, 1185779002, 1185779003, 1185779004, 1185779005, 1185779006, 1185779007, 1185779008, 1185779009, 1185779010, 1185779011

Results by AK103

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Residual Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
n-Triacontane-d62 (surr)	112	60-120		%

Batch Information

Analytical Batch: XFC14694
 Analytical Method: AK103
 Instrument: Agilent 7890B R
 Analyst: CMS
 Analytical Date/Time: 10/10/2018 10:06:00AM

Prep Batch: XXX40691
 Prep Method: SW3550C
 Prep Date/Time: 10/9/2018 3:30:55PM
 Prep Initial Wt./Vol.: 30 g
 Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:07PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1185779 [XXX40691]
 Blank Spike Lab ID: 1481611
 Date Analyzed: 10/10/2018 10:17

Spike Duplicate ID: LCSD for HBN 1185779 [XXX40691]
 Spike Duplicate Lab ID: 1481612
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1185779001, 1185779002, 1185779003, 1185779004, 1185779005, 1185779006, 1185779007, 1185779008, 1185779009, 1185779010, 1185779011

Results by AK103

Parameter	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Residual Range Organics	833	873	105	833	881	106	(60-120)	0.90	(< 20)

Surrogates

n-Triacontane-d62 (surr)	16.7	105	105	16.7	103	103	(60-120)	2.00	
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Batch Information

Analytical Batch: **XFC14694**
 Analytical Method: **AK103**
 Instrument: **Agilent 7890B R**
 Analyst: **CMS**

Prep Batch: **XXX40691**
 Prep Method: **SW3550C**
 Prep Date/Time: **10/09/2018 15:30**
 Spike Init Wt./Vol.: 833 mg/Kg Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 833 mg/Kg Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:08PM



Method Blank

Blank ID: MB for HBN 1787570 [XXX/40707]
Blank Lab ID: 1482062

Matrix: Soil/Solid (dry weight)

QC for Samples:
1185779009, 1185779010, 1185779011

Results by 8270D SIM (PAH)

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1-Methylnaphthalene	6.85J	25.0	6.25	ug/Kg
2-Methylnaphthalene	12.5U	25.0	6.25	ug/Kg
Acenaphthene	12.5U	25.0	6.25	ug/Kg
Acenaphthylene	12.5U	25.0	6.25	ug/Kg
Anthracene	12.5U	25.0	6.25	ug/Kg
Benzo(a)Anthracene	12.5U	25.0	6.25	ug/Kg
Benzo[a]pyrene	12.5U	25.0	6.25	ug/Kg
Benzo[b]Fluoranthene	12.5U	25.0	6.25	ug/Kg
Benzo[g,h,i]perylene	12.5U	25.0	6.25	ug/Kg
Benzo[k]fluoranthene	12.5U	25.0	6.25	ug/Kg
Chrysene	12.5U	25.0	6.25	ug/Kg
Dibenzo[a,h]anthracene	12.5U	25.0	6.25	ug/Kg
Fluoranthene	12.5U	25.0	6.25	ug/Kg
Fluorene	12.5U	25.0	6.25	ug/Kg
Indeno[1,2,3-c,d] pyrene	12.5U	25.0	6.25	ug/Kg
Naphthalene	10.0U	20.0	5.00	ug/Kg
Phenanthrene	12.5U	25.0	6.25	ug/Kg
Pyrene	12.5U	25.0	6.25	ug/Kg
Surrogates				
2-Methylnaphthalene-d10 (surr)	80.5	58-103		%
Fluoranthene-d10 (surr)	85.4	54-113		%

Batch Information

Analytical Batch: XMS11156
Analytical Method: 8270D SIM (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: DSD
Analytical Date/Time: 10/16/2018 10:39:00AM

Prep Batch: XXX40707
Prep Method: SW3550C
Prep Date/Time: 10/11/2018 8:30:57AM
Prep Initial Wt./Vol.: 22.5 g
Prep Extract Vol: 5 mL

Print Date: 10/17/2018 3:24:10PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1185779 [XXX40707]

Blank Spike Lab ID: 1482063

Date Analyzed: 10/16/2018 11:00

Matrix: Soil/Solid (dry weight)

QC for Samples: 1185779009, 1185779010, 1185779011

Results by 8270D SIM (PAH)

Parameter	Blank Spike (ug/Kg)			CL
	Spike	Result	Rec (%)	
1-Methylnaphthalene	111	97.3	88	(43-111)
2-Methylnaphthalene	111	91.1	82	(39-114)
Acenaphthene	111	88.7	80	(44-111)
Acenaphthylene	111	91.2	82	(39-116)
Anthracene	111	93.7	84	(50-114)
Benzo(a)Anthracene	111	93.3	84	(54-122)
Benzo[a]pyrene	111	91.0	82	(50-125)
Benzo[b]Fluoranthene	111	99.1	89	(53-128)
Benzo[g,h,i]perylene	111	95.2	86	(49-127)
Benzo[k]fluoranthene	111	93.3	84	(56-123)
Chrysene	111	96.7	87	(57-118)
Dibenzo[a,h]anthracene	111	94.2	85	(50-129)
Fluoranthene	111	96.8	87	(55-119)
Fluorene	111	94.1	85	(47-114)
Indeno[1,2,3-c,d] pyrene	111	101	91	(49-130)
Naphthalene	111	87.2	79	(38-111)
Phenanthrene	111	93.0	84	(49-113)
Pyrene	111	103	92	(55-117)
Surrogates				
2-Methylnaphthalene-d10 (surr)	111	75.3	75	(58-103)
Fluoranthene-d10 (surr)	111	82.2	82	(54-113)

Batch Information

Analytical Batch: XMS11156

Analytical Method: 8270D SIM (PAH)

Instrument: Agilent GC 7890B/5977A SWA

Analyst: DSD

Prep Batch: XXX40707

Prep Method: SW3550C

Prep Date/Time: 10/11/2018 08:30

Spike Init Wt./Vol.: 111 ug/Kg Extract Vol: 5 mL

Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1185835007
 MS Sample ID: 1482110 MS
 MSD Sample ID: 1482111 MSD

Analysis Date: 10/16/2018 14:46
 Analysis Date: 10/16/2018 15:06
 Analysis Date: 10/16/2018 15:27
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1185779009, 1185779010, 1185779011

Results by 8270D SIM (PAH)

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Acenaphthene	1080	213	1260	84	215	1153	34 *	44-111	8.80	(< 20)
Acenaphthylene	121U	213	547	258 *	215	508	237 *	39-116	7.50	(< 20)
Anthracene	121U	213	366	173 *	215	349	163 *	50-114	5.00	(< 20)
Benzo(a)Anthracene	121U	213	188J	89	215	198J	93	54-122	5.40	(< 20)
Benzo[a]pyrene	121U	213	182J	86	215	192J	90	50-125	5.70	(< 20)
Benzo[b]Fluoranthene	121U	213	200J	94	215	213J	99	53-128	6.20	(< 20)
Benzo[g,h,i]perylene	121U	213	184J	87	215	193J	90	49-127	4.80	(< 20)
Benzo[k]fluoranthene	121U	213	194J	91	215	200J	94	56-123	3.30	(< 20)
Chrysene	121U	213	205J	97	215	215J	101	57-118	4.50	(< 20)
Dibenzo[a,h]anthracene	121U	213	183J	86	215	190J	88	50-129	3.30	(< 20)
Fluoranthene	121U	213	205J	97	215	213J	99	55-119	3.50	(< 20)
Fluorene	2320	213	2442	60	215	2229	-41 *	47-114	9.30	(< 20)
Indeno[1,2,3-c,d] pyrene	121U	213	198J	93	215	209J	98	49-130	5.40	(< 20)
Naphthalene	2530	213	2674	65	215	2481	-24 *	38-111	7.40	(< 20)
Phenanthrene	2210	213	2384	82	215	2229	11 *	49-113	6.50	(< 20)
Pyrene	121U	213	289	136 *	215	302	141 *	55-117	4.30	(< 20)
1-Methylnaphthalene	27900	213	27907	-37 *	215	28682	387 *	43-111	3.20	(< 20)
2-Methylnaphthalene	10300	213	10291	-16 *	215	10581	127 *	39-114	2.90	(< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		213	287	135 *	215	277	130 *	58-103	2.90	
Fluoranthene-d10 (surr)		213	166	78	215	175	82	54-113	5.40	

Batch Information

Analytical Batch: XMS11156
 Analytical Method: 8270D SIM (PAH)
 Instrument: Agilent GC 7890B/5977A SWA
 Analyst: DSD
 Analytical Date/Time: 10/16/2018 3:06:00PM

Prep Batch: XXX40707
 Prep Method: Sonication Extr Soil 8270 PAH SIM 5ml
 Prep Date/Time: 10/11/2018 8:30:57AM
 Prep Initial Wt./Vol.: 22.83g
 Prep Extract Vol: 5.00mL

Analytical Batch: XMS11161
 Analytical Method: 8270D SIM (PAH)
 Instrument: Agilent GC 7890B/5977A SWA
 Analyst: DSD
 Analytical Date/Time: 10/17/2018 11:50:00AM

Prep Batch: XXX40707
 Prep Method: Sonication Extr Soil 8270 PAH SIM 5ml
 Prep Date/Time: 10/11/2018 8:30:57AM
 Prep Initial Wt./Vol.: 22.83g
 Prep Extract Vol: 5.00mL

Print Date: 10/17/2018 3:24:12PM



1185779



CHI

Locations Nationwide
Alaska
Maryland
New Jersey
New York
North Carolina
Indiana
West Virginia
Kentucky
www.us.sgs.com

REVIEWED KGT

CLIENT: *EAH/TROUEK NATIVE CORPORATION*

CONTACT: *ERIC HENRY* **PHONE NO.:** *907-350-9008*

PROJECT PWSID/PERMIT#:

NAME: *TUC LANDFARM*

REPORTS TO: *ERIC HENRY* **E-MAIL:** *ehenry@bax*

INVOICE TO: *ERIC HENRY* **QUOTE #:** *ehyalaska@hotmail.com*

RESERVED for lab use **P.O. #:**

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE m/d/yy	TIME HH:MM	MATRIX/ MATRIX CODE
① A	LF-1	10/3/18	11:05	SOIL
② A	LF-2	10/3/18	11:11	SOIL
③ A	LF-3	10/3/18	11:15	SOIL
④ A	LF-4	10/3/18	11:20	SOIL
⑤ A	LF-5	10/3/18	11:25	SOIL
⑥ A	LF-6	10/3/18	11:35	SOIL
⑦ A	LF-7	10/3/18	11:40	SOIL
⑧ A	LF-8	10/3/18	11:50	SOIL
⑨ A				

Section 2

#	Type	CONTAINER	LINE	REMARKS/LOC ID
1	G			
1	G			
1	G			
1	G			
1	G			
1	G			
1	G			
1	G			
1	G			
1	G			
1	G			
1	G			

Section 3

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

Section 4 **DOD Project?** Yes No **Data Deliverable Requirements:**

Cooler ID: *NOORMAL*

Requested Turnaround Time and/or Special Instructions: *NOORMAL/NEWS*

Temp Blank °C: *3.0 D25* **Chain of Custody Seal: (Circle)** *2F* **INTACT** **BROKEN** **ABSENT**

or Ambient [] **(See attached Sample Receipt Form)** **(See attached Sample Receipt Form)**

Section 5

Relinquished By: (1) *ERIC HENRY* **Received By:** *RAJIV FURIGHT*

Relinquished By: (2) *ERIC HENRY* **Received By:**

Relinquished By: (3) **Received By:**

Relinquished By: (4) *ERIC HENRY* **Received For Laboratory By:** *NSW*

Date *10/9/18* **Time** *0809*

Date **Time**

Date **Time**

Date **Time**

1185779



SGS North America Inc.

200 W. Potter Dr. 3180 Peger Rd. Ste Anchorage, AK 99518 (ph) 190, Fairbanks, AK 99709 (ph) 907-474-561-5301 (fax) 907- 8656



Does a Profile exist in LIMS? If not, please send a request for new profile build.

Client Name: Eric Henry, Phone #: 907-350-9008, Project Name: Soil Samples, Profile #: NOA: Eric Henry 907-350-9008

Filename: SKIT_EHX Alaska_Soil Samples_2018-08-24 *Required Items

Table with columns: No., Samples, Matrix, Analysis, Container Size & Type, Pres., Bottle Lot #, Preservative Lot #, Hold Time, # QC Bottles, Total Bottles. Row 1: 12, soil, DRO/RRO (AK102/103) PAH (SW8270D-SIM), 1 x 4-oz amber glass, 14 days, 12.

- Pack for Shipping via ground (DOT)
Pack for Shipping via air carrier (IATA)
Temperature Blank (circle one: 120-ml OR 500-ml)
Foreign Soil
Soil VOA Trip Blank - Lot#:
Water VOA Trip Blank - Lot#:
524 VOA Trip Blank - Lot#:
Low Level Mercury Trip Blank- Lot#:
Coolers
Gel Ice
Bubble Wrap
Labels
Custody Seals
SGS COCs - Circle req'd forma: Blank COC
Send additional instructions/documents (Note to PM: Be sure to attach copy of requested form.)



Other Notes/Reminders for Kit Prep:

Empty box for notes.

Attention Client/Sampler:

- Do not rinse container; be aware of any acid preservative in container.
Fill container, but do not overfill (except volatile waters).
Label the container with your sample ID as well as the date/time of collection.
Fill out the Chain of Custody.
Add frozen gel packs or ice to your cooler & pack to prevent breakage.
Charges may be invoiced for bottles which are unused or improperly used.
If you have any questions concerning this sample kit, please contact your Project Manager for assistance. Thank you.

*This will email a copy of this form for confirmation to the client email and save the form to the network. This should not be

SHIPPER'S NAME, ADDRESS & PHONE EHX ERIC HENRY P.O. BOX 209 KENAI AK 99611		SHIPPER'S ACCOUNT NUMBER 9073509008	NOT AIR WAYBILL Ravn AIR GROUP 4700 Old International Airport Road Anchorage, Alaska 99502 (907)-243-2761	
CONSIGNEE'S NAME, ADDRESS & PHONE SGS NORTH AMERICA INC 200 W POTTER DR ANCHORAGE AK 99518		CONSIGNEE'S ACCOUNT NUMBER 9075622343	It is agreed the goods described herein are accepted in apparent good order and condition (except as noted) SUBJECT TO THE CONDITIONS OF CONTRACT as displayed at the Ravn cargo acceptance counter and online at www.flyravn.com/cargo-services/cargo-resources. ALL GOODS MAY BE CARRIED BY ANY OTHER MEANS INCLUDING ROAD OR OTHER CARRIER UNLESS SPECIFIC CONTRARY INSTRUCTIONS ARE GIVEN HEREON BY THE SHIPPER, AND SHIPPER AGREES THAT THE SHIPMENT MAYBE CARRIED VIA INTERMEDIATE STOPPING PLACES WHICH THE CARRIERS DEEMS APPROPRIATE. THE SHIPPER'S ATTENTION IS DRAWN TO NOTICES IN THE CARRIER'S CONDITIONS OF CONTRACT CONCERNING CARRIER'S LIMIT OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and paying a supplemental charge if required.	
ISSUING CARRIER'S AGENT NAME, CITY & PHONE		Received in Good Order and Condition at _____ Place _____ Date/Time _____		
AGENT'S IATA CODE		ACCOUNT NO.	Signature of Consignee or its agent: _____	
AIRPORT OF DEPARTURE Kenai		Declared Value \$ 0.00	Insured Amount \$ 0.00	ALSO NOTIFY NAME & ADDRESS
ROUTING AND DESTINATION		ACCOUNTING INFORMATION 7407839 Card VI 6338 Exp 0123		
TO	BY FIRST CARRIER	TO	BY	PO:
AIRPORT OF DESTINATION Anchorage		COMMENTS ERIC HENRY adl#559695		
No. Of Pieces Rep	Gross Weight	kg lb	Rate Class	Chargeable Weight
1	26	lb	M	1
			Commodity Item No.	Rate/Charge
				\$29.18
				Total
				\$29.18
				Nature and Quantity of Goods (Inclu. Dimensions or Volume)
				GEN // SOIL SAMPLES
				1185779
				
1	26			\$29.18
PREPAID		WEIGHT CHARGE	COLLECT	
\$29.18				
VALUATION CHARGE		OTHER CHARGES AND DESCRIPTION		
\$0.00		AMOUNT	DESCRIPTION	
FEDERAL EXCISE TAX				
\$1.82				
TOTAL OTHER CHARGES DUE AGENT				
\$0.00				
TOTAL OTHER CHARGES DUE CARRIER		HAZMAT No		
\$0.00		HAZMAT NO:		
TOTAL PREPAID		SHIPPER'S CERTIFICATION:		
\$31.00		Shipper certifies that (i) the particulars on the face hereof are correct, (ii) insofar as any part of the consignment contains restricted articles, such part is described by name and is in proper condition for carriage by air according to applicable US government regulations and International Air Transport Association's Dangerous Goods Regulation, and (iii) in the event of an payment dispute between Shipper and Consignee, Shipper shall remit any unpaid freight charges within 48 hours of billing by the Carrier.		
TOTAL COLLECT		Signature of Shipper or its _____		
		Printed Name/Title: _____		
STATION NUMBERS		Executed on (date) _____ At (place) _____ Signature of Issuing Carrier or its Agent _____		
ANCHORAGE - (907) 243-2761 ANIAK - (907) 675-4572 BARROW - (907) 852-5300 BETHEL - (907) 543-3825 DEADHORSE - (907) 659-9222 DILLINGHAM - (907) 842-2994 FAIRBANKS - (907) 450-7250 GALENA - (907) 656-1875		HOMER - (907) 235-7565 KENAI - (907) 283-1911 KING SALMON - (907) 246-1120 KODIAK - (907) 487-2663 KOTZEBUE - (907) 442-3020 NOME - (907) 443-7595 ST. MARYS - (907) 438-2247 UNALAKLEET - (907) 624-3595		

Alert Expeditors Inc.

#389101

Citywide Delivery • 440-3351
8421 Flamingo Drive • Anchorage, Alaska 99502

Date 10/9/18

From Eric Hany Kevin

To 0 565.

Collect <input type="checkbox"/>	Prepay <input type="checkbox"/> Account <input type="checkbox"/>	Advance Charges <input type="checkbox"/>
Job #	PO#	

<u>1 cook @ 26 lbs.</u>	<u>RAVN</u>
<u>7760225.</u>	

Shipped Signature [Signature]

Received By: [Signature] MIN 0809 Total Charge 37 of 39



e-Sample Receipt Form

SGS Workorder #:

1185779



1 1 8 5 7 7 9

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		
Were Custody Seals intact? Note # & location	YES	2F
COC accompanied samples?	YES	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	YES	Cooler ID: 1 @ 3.0 °C Therm. ID: D25
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
If samples received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		
Were samples received within holding time?		YES
Do samples match COC ** (i.e., sample IDs, dates/times collected)?		YES
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)		YES
Were proper containers (type/mass/volume/preservative***) used?		YES
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	N/A	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	
Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.		
Additional notes (if applicable):		



Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1185779001-A	No Preservative Required	OK			
1185779002-A	No Preservative Required	OK			
1185779003-A	No Preservative Required	OK			
1185779004-A	No Preservative Required	OK			
1185779005-A	No Preservative Required	OK			
1185779006-A	No Preservative Required	OK			
1185779007-A	No Preservative Required	OK			
1185779008-A	No Preservative Required	OK			
1185779009-A	No Preservative Required	OK			
1185779010-A	No Preservative Required	OK			
1185779011-A	No Preservative Required	OK			

Container Condition Glossary

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

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM - The container was received damaged.

FR - The container was received frozen and not usable for Bacteria or BOD analyses.

IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.