

January 13, 2015

R&M No. 2186.01

Grant Lidren
Alaska Department of Environmental Conservation
Contaminated Sites Program
555 Cordova Street
Anchorage, Alaska 99501

RE: Port of Anchorage Marine Storage Building
Anchorage, Alaska

Dear Mr. Lidren:

The following correspondence provides the results of the site assessment effort performed at the Port of Anchorage (Port) in Anchorage, Alaska during excavation activities related to construction of the new Marine Storage Building (MSB). On behalf of the Port of Anchorage (POA), R&M Consultants, Inc. (R&M) is requesting your review and approval of the recommendations presented in this letter which have been based on the attached site assessment conducted by Shannon and Wilson (S&W).

On 21 October 2014, contaminated soil was encountered during excavation for construction of the MSB. The construction contractor could not determine immediately if the source of contamination was indicative of a current or historical release. S&W was contacted immediately and work ceased pending discussions and approval to proceed with excavation from the Alaska Department of Environmental Contamination (ADEC). The attached report, prepared by S&W, summarizes the field screening and sampling efforts that occurred during the excavation (S&W, 2014).

The Port was listed in the ADEC contaminated sites database in 2012 based on historical releases of fuel from the 1964 earthquake (ADEC File #2100.38.535). As a result, it is assumed that low-level contamination is likely to be encountered in soil during excavation. On 28 October 2014 ADEC concurred that the contamination was likely attributed to historical contamination and the excavation was allowed to proceed. Pending analytical results, the excavation was backfilled with clean fill, leaving an approximately 25-50 CY soil stockpile.

RECOMMENDATIONS

1. *Transport and dispose of the excavated soil at the Anchorage Regional Landfill.*
Analytical results were received on 11 November 2014. The two samples collected from the soil stockpile, SS2 and SS5, exceeded the ADEC cleanup level of 250 mg/kg for Diesel Range Organics (DRO) at 354 mg/kg and 303 mg/kg, respectively. No other analytes were detected in the soil stockpile samples. The analytical results indicate that the contaminated soil is below the 1,000 mg/kg threshold and would be acceptable for disposal at the Anchorage Regional Landfill (ARL) (S&W, 2014).

2. *Additional excavation and soil/groundwater sampling is not recommended.*
Groundwater from monitoring wells located along the shoreline was collected and analyzed for petroleum constituents in 2013 and 2014 to determine if contamination was migrating into Cook Inlet (R&M, 2014a and R&M, 2014b). DRO was not detected above ADEC cleanup levels in monitoring well MW-A-1 – which is located directly west of the



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excavation along the shoreline – indicating that existing contamination is not migrating into Cook Inlet (see attached figure).

Should you require additional information regarding the investigation or the recommendations in this cover letter, please contact us.

Sincerely,

R&M CONSULTANTS, INC.



Kristi M. McLean, LEED AP BD+C
Group Manager – Environmental Services

Attachment A: Figure 1

Attachment B: Contaminated Soil Assessment, New Marine Storage Building, Port of Anchorage, Alaska, December 2014

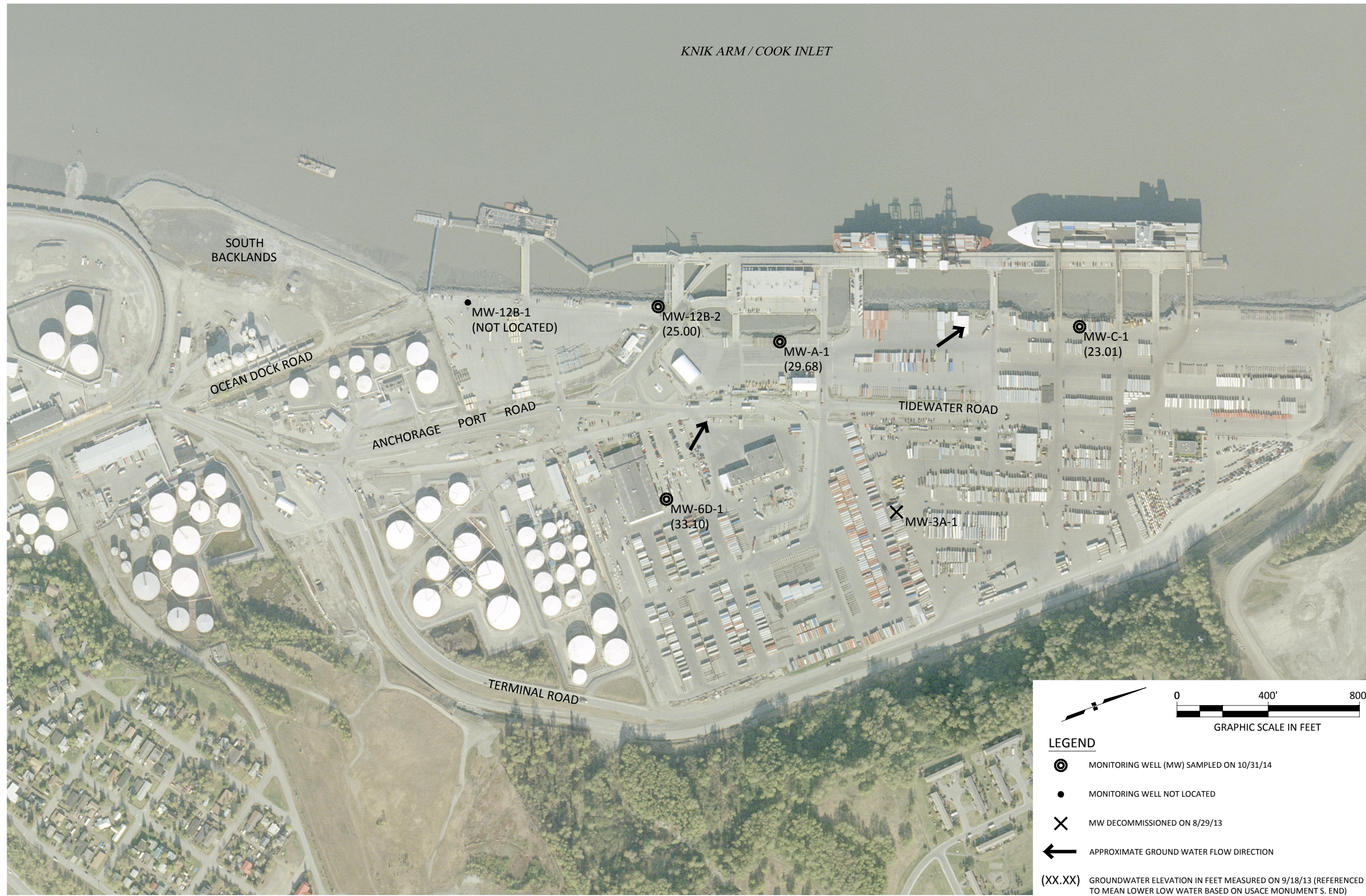
cc: Sharen Walsh, P.E., Port of Anchorage

REFERENCES

R&M Consultants, Inc. (R&M, 2014a). "2013 Groundwater Monitoring Report Tract H, Port of Anchorage Addition 1, Anchorage, Alaska." July, 2014.

R&M Consultants, Inc. (R&M, 2014b). "2014 Groundwater Monitoring Report Tract H, Port of Anchorage Addition 1, Anchorage, Alaska." December, 2014.

Shannon and Wilson (S&W, 2014). "Contaminated Soil Assessment, New Marine Storage Building, Port of Anchorage, Alaska, December, 2014.



KNIK ARM / COOK INLET

SOUTH BACKLANDS

OCEAN DOCK ROAD

ANCHORAGE PORT ROAD

TERMINAL ROAD

TIDEWATER ROAD

MW-12B-1
(NOT LOCATED)

MW-12B-2
(25.00)





MW-A-1
(29.68)

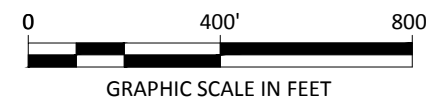
MW-C-1
(23.01)

MW-6D-1
(33.10)

MW-3A-1

LEGEND

-  MONITORING WELL (MW) SAMPLED ON 10/31/14
-  MONITORING WELL NOT LOCATED
-  MW DECOMMISSIONED ON 8/29/13
-  APPROXIMATE GROUND WATER FLOW DIRECTION
- (XX.XX)** GROUNDWATER ELEVATION IN FEET MEASURED ON 9/18/13 (REFERENCED TO MEAN LOWER LOW WATER BASED ON USACE MONUMENT S. END)



FB:	N/A
GRID:	1030
PROJ.NO:	2186.01.10
FIGURE:	1

PORT OF ANCHORAGE TRACT H, POA ADDITION 1
MONITORING WELL SITE MAP

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DWN:	P.M.H.
CKD:	K.M.M.
DATE:	DEC 2014
SCALE:	AS SHOWN

**Contaminated Soil Assessment
New Marine Storage Building
Port of Anchorage, Alaska**

December 2014



Excellence. Innovation. Service. Value.

Since 1954.

Submitted To:
Municipality of Anchorage
Department of Property and Facility Management
Facility Maintenance Division
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Anchorage, Alaska 99507

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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AST	Aboveground Storage Tank
cy	Cubic yard
DRO	Diesel range organics
DQO	Data quality objective
EPA	Environmental Protection Agency
GRO	Gasoline range organics
LCS/LCSD	Laboratory control sample/laboratory control sample duplicate
LDRC	Laboratory Data Review Checklist
LOQ	Limit of quantitation
mg/kg	Milligrams per kilogram
MS/MSD	Matrix spike/matrix spike duplicate
MOA	Municipality of Anchorage
PAH	Polynuclear Aromatic Hydrocarbons
PID	Photoionization detector
POA	Port of Anchorage
ppm	Parts per million
RCRA	Resource Conservation and Recovery Act
RPD	Relative percent difference
RRO	Residual range organics
SIMS	Selective ion monitoring system
SGS	SGS North America Inc.
S&W	Shannon & Wilson, Inc.

**CONTAMINATED SOIL ASSESSMENT
NEW MARINE STORAGE BUILDING
PORT OF ANCHORAGE, ALASKA**

1.0 INTRODUCTION

This report has been prepared by Shannon & Wilson, Inc. for the Municipality of Anchorage (MOA) to document the contaminated soil assessment performed at the New Marine Storage Building at the Port of Anchorage, Alaska.

This work was conducted under Shannon & Wilson, Inc.'s (Shannon & Wilson) MOA Department of Maintenance & Operations *Professional Services* Contract No. 29M&0185. The environmental sampling was verbally authorized on October 21, 2014 by Mr. Robert Nibert of the Municipality of Anchorage (MOA) followed by issuance of Purchase Order No. 20141805.

2.0 SITE AND PROJECT DESCRIPTION

2.1 Site Description

The project site is located at 2000 Anchorage Port Road near the Port of Anchorage Administration Building in Anchorage, Alaska. A vicinity map of the project area is included as Figure 1. A site plan showing the proposed footprint of the New Marine Storage Building, existing storage building, and other features in the project area is provided as Figure 2.

The Port of Anchorage is listed as an “Active” contaminated site in the Alaska Department of Environmental Conservation’s (ADEC) Contaminated Sites database, File No. 2100.38.535. However, the project site was not known to be contaminated with petroleum hydrocarbon concentrations above ADEC cleanup levels before the work presented in this report was conducted.

2.2 Project Description

On October 21, 2014, potential petroleum-impacted soil was encountered during excavation activities for the construction of the New Marine Storage Building. The MOA project manager requested Shannon & Wilson’s assistance in characterizing the type and extent of the petroleum-impacted soil. A review of Shannon & Wilson’s April 2014 *Geotechnical Engineering Report, Port of Anchorage Marine Storage Building, Anchorage, Alaska*, indicated that five borings, Borings B-1 through B-5, were advanced within the footprint of the proposed building in March 2014. The locations of these borings are shown on Figure 2. Four soil samples recovered from

the borings were submitted to SGS North America, Inc. (SGS) for analytical testing. Each soil sample was analyzed by SGS for gasoline range organics (GRO) by Alaska Method (AK) 101, diesel range organics (DRO) by AK 102, residual range organics (RRO) by AK 103, benzene, toluene, ethylbenzene, and xylenes (BTEX) by Environmental Protection Agency (EPA) Method 8021B, and Resource Conservation and Recovery Act (RCRA) metals by EPA Method 6020. The analytical results for these four samples showed concentrations of petroleum hydrocarbon contaminants were either below the ADEC cleanup levels or were not detected. Concentrations of metals were within the realm of naturally occurring background levels. Based on these results, contaminated soil was not anticipated during construction activities.

On October 21, 2014, four test pits were advanced by the construction contractor adjacent to original Borings B-1, B-3, B-4, and B-5 to confirm subsurface geotechnical conditions. Potential petroleum-impacted soil in the form of diesel fuel odors were encountered by the contractor during excavation of the test pit adjacent to Boring B-3.

The project included collecting soil samples from initial test pits, coordinating with the ADEC, monitoring contaminated soil removal activities, collecting field screening and analytical soil samples, laboratory testing, and preparing a summary report.

3.0 FIELD ACTIVITIES

Field activities for this project consisted of collecting soil samples from initial characterization test pits, coordinating with ADEC, observing soil excavation and stockpiling activities, and collecting field screening and analytical samples from the excavation and stockpiled soil. Photographs of the field activities are included in Appendix A. Copies of the field notes are included in Appendix B.

3.1 Initial Test Pits and Soil Contamination Characterization

On October 21, 2014, a representative from Shannon & Wilson visited the site at the request of the MOA project manager to collect field screening and analytical samples to characterize the type and concentration of contamination. Because Test Pit 1 (TP-1) was excavated near Boring B-1, it was designated TP-1/B-1. The locations of the four test pits, TP-1/B-1, TP-3/B-3, TP-4/B-4, and TP-5/B-5 are shown on Figure 3.

Field screening and analytical samples were collected from the soil that had already been excavated from Test Pits TP-1/B-1, TP-3/B-3, and TP-5/B-5 and stockpiled adjacent to the corresponding test pit. Field screening was accomplished with a hand-held Thermo Environmental Instruments Model 580B Photoionization Detector (PID). The PID was

calibrated before use with 100 parts per million (ppm) isobutylene in air standard gas. The field screening samples were collected in re-sealable bags, warmed in the truck cab to about 40 to 70 degrees Fahrenheit, and tested within 60 minutes following sample collection. Due to a malfunctioning PID, the field screening samples were retested with a second PID about 2 hours after sample collection. Both readings are recorded in the field notes and the second PID readings are recorded on Table 1.

Two samples, S2 and S3, were selected for analytical testing based on the highest headspace reading from two separate test pits. Sample S2 was collected about 0.5 foot below the surface of the soil stockpiled adjacent to TP-3/B-3. It is estimated that the soil represented by Sample S2 was removed from the bottom of TP-3/B-3 which was excavated to a depth of about 6 feet below ground surface (bgs). Sample S3 was collected about 0.5 foot below the surface of the soil stockpiled adjacent to TP-1/B-1 and represents the soil near the bottom of TP-1/B-1 which was excavated to a depth of about 4 feet bgs.

Samples S2 and S3 were collected from freshly exposed soil and placed into laboratory supplied sample jars. The sample jars were filled in decreasing order of volatility. For each sample, at least 25 grams of soil, but no more than what could be completely submerged with 25-milliliters of methanol, were placed into a pre-weighed, 4-ounce glass jar with a septa lid. A 25-milliliter aliquot of methanol containing laboratory-added surrogates was added to the sample jar to submerge the soil sample. Sample jars were filled using decontaminated stainless steel spoons, and placed in coolers with ice packs. The project sample locations, descriptions, and field screening results are summarized in Table 1. Sample locations are shown on Figure 3.

3.2 ADEC Spill Response Coordination

Based on the results of Sample S2, the MOA project manager requested Shannon & Wilson's assistance in coordinating with ADEC. A completed *Oil & Hazardous Substances Spill Notification Form* was submitted to Ms. Gay Harpole of the ADEC on October 23, 2014. A brief work plan was also submitted on October 23, 2014 to excavate the area near Test Pit TP-3/B-3. The objective stated in the work plan was to determine the extent of contamination and remove impacted soil to the extent practicable. The work plan indicated that field screening and analytical samples would be collected from the excavations and stockpiles in accordance with the ADEC May 2010 *Draft Field Sampling Guidance*. A copy of Shannon & Wilson's April 2014 Geotechnical Engineering Report was also submitted to Ms. Harpole. A copy of the *Oil & Hazardous Substances Spill Notification Form* is provided in Appendix C.

3.3 Impacted Soil Excavation Observation and Sampling

On October 24, 2014, excavation at Test Pit TP-3/B-3 continued and soil was segregated into “potentially clean” and “potentially contaminated” stockpiles. As soil was excavated at the location of Test Pit TP-3/B-3, approximately 75 cubic yards of potentially clean material was stored on site. Approximately 25 cubic yards of potentially contaminated material was placed in trucks and hauled to the designated stockpile area. A 1-inch PVC pipe, used to monitor water levels for geotechnical purposes and installed in Boring B-3 in April 2014, was encountered north of the center of the excavation. Direct PID screening indicated that the upper 6 feet of soil was clean. Shannon & Wilson’s representative indicated to the MOA project manager that soil in the upper portion of the excavation, shown in Photo 1, was potentially clean soil based on PID headspace readings of less than 10 ppm. This soil was stockpiled to the side and later re-used as backfill material. At a depth of about 6 feet bgs the PID readings increased and Shannon & Wilson’s representative indicated to the MOA project manager that soil in the lower portion of the excavation, shown in Photo 2, was potentially contaminated material. The lower portion of the excavation sidewalls and base exhibited dark gray discolored soil, as shown in Photo 2, and exhibited a hydrocarbon odor. PID headspace readings in the base of the excavation at about 8.5 feet bgs ranged from 40 ppm to 52 ppm. An excavation area of 10 feet by 25 feet, extending to a depth of approximately 8.5 feet, was completed prior to requests by the MOA and POA project managers to cease contaminated soil removal activities. The final excavation is shown in Figure 3.

Ten soil screening samples, comprising six sidewall and four base samples, were collected from the final excavation limits. Each screening sample was screened using the PID methods described in Section 3.1. Based on the ADEC May 2010 *Draft Field Sampling Guidance* document, one analytical sample is required for every 20 linear feet of sidewall and a minimum of two analytical samples are required for excavations with areas of 250 square feet. Seven analytical soil samples, comprising 4 sidewall, 2 base, and 1 duplicate, were collected from freshly exposed soil and placed into laboratory supplied sample jars. The project sample locations, descriptions, and field screening results are summarized in Table 1. Sample locations are shown on Figure 3.

3.4 Stockpiled Soil Characterization Sampling

Approximately 25 cubic yards of “potentially contaminated” soil were placed on a liner, as shown in Photo 3, and covered by folding the bottom liner over the stockpile. The stockpile is near the Port Security Office at the location shown on Figure 4. A total of six soil screening samples were collected for PID headspace screening. The two soil samples with the highest PID

headspace readings were selected for laboratory analysis. The project sample locations, descriptions, and field screening results are summarized in Table 1. Sample locations are shown on Figure 4.

The approximately 75 cubic yards of potentially clean soil was not screened or sampled prior to reuse as backfill material and remains on site.

4.0 SUBSURFACE CONDITIONS

The subsurface conditions encountered at the site generally consist of silty sand and gravel fill from the surface to the bottom of the excavation at approximately 8.5 feet bgs. A sandy silt with trace organic material and debris was present in the bottom of the excavation. Static water level in the 1-inch PVC pipe installed in Boring B-3 was measured at a depth of 28 feet bgs on March 24, 2014.

5.0 LABORATORY ANALYSIS

Two initial characterization samples were submitted to SGS for analysis on an expedited 24-hour turnaround basis. Samples S2 and S3 were analyzed for gasoline range organics (GRO) Alaska Method (AK) 101; diesel range organics (DRO) by AK 102; and benzene, toluene, ethylbenzene, and xylenes (BTEX) by Environmental Protection Agency (EPA) by 8021B.

Seven excavation confirmation soil samples, comprising four sidewall, two base, and one duplicate, were submitted to SGS for analysis on a regular 14-day turnaround basis. Initially, SGS was requested by Shannon & Wilson to analyze each sample for DRO and BTEX. The ADEC, however, requested a modification to the analytical program which was accepted by the MOA project manager. All seven samples from the excavation were analyzed for DRO by AK 102. Sample EXBS3 was also analyzed for GRO by AK 101, residual range organics (RRO) by AK 103, BTEX by EPA 8021B, and polynuclear aromatic hydrocarbons (PAHs) by EPA 8270D SIMS (Selective Ion Monitoring System). The duplicate of Sample EXBS3, Sample EXBS13, was additionally tested for BTEX by EPA 8021B.

Two analytical soil samples from the potentially contaminated soil stockpile were submitted to SGS for analysis of DRO on a regular 14-day turnaround basis. For quality control purposes, one soil trip blank (Sample TB) accompanied the analytical sample containers during each of the October 21 and 24 sampling events, and were tested for GRO and BTEX.

Under the sample numbering scheme used for this project, a typical analytical sample name is 02381-EXBS2. The “02381” indicates the Shannon & Wilson job number, and the “EXBS2”

designation is the sample identification. For brevity in the text of this report, the “02381” prefix is omitted.

6.0 DISCUSSION OF ANALYTICAL RESULTS

The reported contaminant concentrations were compared to the most stringent ADEC Method 2 soil cleanup levels listed in Tables B1 and B2 of 18 Alaska Administrative Code (AAC) 75.345 for the “Under 40 Inches” precipitation zone. The soil analytical results are summarized in Table 2. Copies of the analytical laboratory reports are provided in Appendix D.

6.1 Initial Test Pit Samples

Sample S2 had a DRO concentration of 501 milligrams per kilogram (mg/kg) which exceeds the ADEC migration to groundwater cleanup level of 250 mg/kg but is less than human health cleanup levels. Concentrations of GRO and BTEX in Sample S2 were either not detected or are less than the most stringent ADEC cleanup level. The concentrations of DRO, GRO, and BTEX in Sample S3 were either not detected or were less than ADEC cleanup level. A summary of the analytical results is provided in Table 2.

6.2 Excavation Soil Samples

Three soil samples, including one duplicate, were collected from the excavation base. As shown in Table 2, concentrations of DRO exceeding the ADEC Method 2 migration to groundwater cleanup level of 250 mg/kg were measured in the sample collected from the center of the excavation area (Sample EXBS2) and the sample just to the south (Sample EXBS3). These two samples were collected from stained soil areas that exhibited petroleum hydrocarbon odors. The DRO concentration in Sample EXBS2 was 798 mg/kg. Sample EXBS2 was not analyzed for any other analyte. Sample EXBS3 had a DRO concentration of 708 mg/kg. The DRO concentration in Sample EXBS13, the duplicate of EXBS3, was 845 mg/kg.

Sample EXBS3 had detectable concentrations of GRO, RRO, total xylenes, and several PAHs but at values less than ADEC cleanup levels. Sample EXBS13 also had a detectable concentration of total xylenes but below the ADEC cleanup level.

A total of four analytical soil samples were collected from the excavation sidewalls. Samples EXSW5 and EXSW6, collected from the northwest and northern sidewalls, respectively, had DRO concentrations above the ADEC migration to groundwater cleanup level of 250 mg/kg but less than human health cleanup levels. The DRO concentration in Sample EXSW5 was 541 mg/kg and in Sample EXSW6 was 757 mg/kg. Samples EXSW1 and EXSW2, collected from

the northeast and southeast sidewalls, respectively, did not have DRO concentrations exceeding the ADEC cleanup level.

6.3 Potentially Contaminated Stockpile Soil Samples

Two analytical samples, SS2 and SS5 were collected from the soil stockpile and analyzed for DRO. Sample SS2 had a DRO concentration of 354 mg/kg and Sample SS5 had a DRO concentration of 303 mg/kg which are above the ADEC cleanup level. The approximately 25 cubic yards was placed on a liner, covered, and is stockpiled near the Port Security Office at the location shown on Figure 4.

6.4 Source Area Evaluation

Shannon & Wilson's representative collected information regarding potential sources of the contamination encountered at Test Pit TP-3/B-3. The MOA project manager and Port of Anchorage (POA) personnel indicated that a 2,000-gallon, diesel, aboveground storage tank (AST) fueling facility, shown in Photo 4, was formerly located at the northwest corner of the proposed New Marine Storage Building about 35 feet northwest of TP-3/B-3. A review of Google Earth aerial photos indicates that the canopy over the AST fueling facility was present at this former location in the 1996 aerial image. The current location of this diesel AST fueling facility is shown on Figure 2. POA personnel who had been involved with the operation of this fueling facility stated they had no recollection of a leak or spill that would have caused the contamination encountered in the underlying soil at Test Pit TP-3/B-3. It was also stated that the AST had been placed on a concrete slab and that the surrounding surface area had been covered with asphalt pavement. The POA project manager indicated to Shannon & Wilson that the contaminated soil at Test Pit TP-3/B-3 was likely a result of historical contamination and not associated with the former AST fueling facility.

Samples EXSW5 and EXSW6, collected from depths of 4.5 and 3.5 feet bgs, respectively, characterize the soil as contaminated at these depths in the northwest and northern sidewalls of the excavation. Samples EXBS2, EXBS3, EXBS13 indicate the contamination extends to a depth of 8.5 feet bgs and to the south of Test Pit TP-3/B-3. Two soil samples, B3S1 and B3S3, were collected from Boring B-3, analyzed by SGS, and reported in Shannon & Wilson's April 2014 Geotechnical Engineering Report. The results of the analytical testing are provided in Table B-1 in Appendix C. Sample B3S1 did not have detectable concentrations of DRO and Sample B3S3 had a DRO concentration of 70 mg/kg. Sample B3S1 was collected at a depth of 0 to 2 feet bgs and Sample B3S3 was collected at a depth of 5 to 6.5 feet bgs. The DRO results for Samples EXSW1, EXSW2, B3S1 and B3S3 indicate that the upper portion of the soil profile in

the vicinity of Test Pit TP-3/B-3 toward the south can be characterized as clean if the above results for Samples B3S1 and B3S3 are considered. Additional assessment work would need to be performed at this site to evaluate whether the source of the DRO contamination documented in the soil samples presented in this report is from the former diesel AST fueling facility or from a historical release.

6.5 Quality Control Samples

The project laboratory follows on-going quality control procedures to evaluate conformance to applicable ADEC data quality objectives (DQO). Internal laboratory controls to assess data quality for this project included method blanks, matrix spike/matrix spike duplicates (MS/MSD), laboratory control sample/laboratory control sample duplicates (LCS/LCSD), and surrogates to determine precision, accuracy, and matrix bias. If a DQO was not met, the project laboratory provides a report specific note identifying the problem in the Case Narrative section of their Laboratory Analysis Report (See Appendix D).

Shannon & Wilson reviewed laboratory results for the field duplicate Sample EXBS13 and project Sample EXBS3 to evaluate the precision of the sampling and analytical process. The primary and duplicate sample results were compared using the calculated RPD values presented in SGS Laboratory Analysis Report Nos. 114533 and 114533 and the laboratory data review checklist (LDRC) included in Appendix D.

One laboratory-prepared trip blank accompanied the sample containers during transport to and from the project site on October 21 and 24, 2014. GRO and toluene were detected in the trip blank at estimated concentrations less than the laboratory reporting limits for the October 21, 2014 test pit stockpile sampling. GRO was detected in the method blank at an estimated concentration less than the laboratory reporting limit for the October 21, 2014 test pit stockpile sampling.

Quality control discrepancies and the impact to data quality/usability are described in further detail in the LDRCs. In our opinion, no non-conformances that would adversely impact data usability were noted, and we find the project data to be complete and useable to support the project purpose and objectives.

7.0 CONCLUSIONS

Diesel fuel odors were encountered on October 21, 2014 during excavation activities for the construction of the New Marine Storage Building. Shannon & Wilson screened and sampled the soil from three test pits to evaluate the presence and extent of petroleum hydrocarbon impacted

soil. A DRO concentration of 501 mg/kg, which exceeds the ADEC cleanup level of 250 mg/kg, was documented in a soil sample collected from a test pit near Boring B-3. Additional contaminated soil assessment and removal activities were conducted on October 24, 2014 by excavating approximately 75 cubic yards of potentially clean soil and approximately 25 cubic yards of contaminated soil.

Confirmation soil samples collected from the base and northwest and northern sidewall of the excavation encountered DRO concentrations exceeding the ADEC migration to groundwater cleanup level of 250 mg/kg but less than human health cleanup levels. Additional assessment work would need to be performed at this site to evaluate the source of the DRO contamination documented in the soil samples presented in this report.

Approximately 25 cubic yards of soil with DRO concentrations above the ADEC cleanup level were placed on a liner and remain stockpiled near the Port Security Office.

8.0 CLOSURE/LIMITATIONS

This report was prepared for the exclusive use of our client and their representatives. The findings we have presented within this report are based on the limited sampling and analyses that we conducted. They should not be construed as definite conclusions regarding the project site's soil conditions. It is possible that our subsurface tests missed higher levels, although our intention was to sample areas likely to be impacted and in accordance with the ADEC-approved work plan. As a result, the sampling and analyses performed can only provide you with our professional judgment as to the environmental characteristics of this site, and in no way guarantees that an agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. The data presented in this report should be considered representative of the time of our site assessment. Changes in site conditions can occur over time, due to natural forces or human activity. In addition, changes in government codes, regulations, or laws may occur. Because of such changes beyond our control, our observations and interpretations may need to be revised. Shannon & Wilson has prepared the document in Appendix E, Important Information About Your Geotechnical/Environmental Report, to assist you and others in understanding the use and limitations of our reports.

You are advised that various state and federal agencies (ADEC, EPA, etc.) may require the reporting of this information. Shannon & Wilson does not assume the responsibility for reporting these findings and therefore has not, and will not, disclose the results of this study unless specifically requested and authorized by you, or as required by law.

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

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

SHANNON & WILSON, INC.

A handwritten signature in blue ink that reads "Timothy M. Terry". The signature is written in a cursive style with a large, stylized initial 'T'.

Timothy M. Terry, C.P.G.
Senior Associate

TABLE 1 - SUMMARY OF SOIL ANALYTICAL RESULTS

Sample Number	Date	Sample Location (See Figures 3 & 4)	Depth (feet)	Headspace (ppm) [^]	Sample Classification
Test Pit Samples					
S1	10/21/2014	Stockpiled material from TP-3/B-3	3	51	Well-Graded Gravel with Sand and Silt (GW-GM)
* S2	10/21/2014	Stockpiled material from TP-3/B-3	6	107	Well-Graded Gravel with Sand and Silt (GW-GM)
* S3	10/21/2014	Stockpiled material from TP-1/B-1	4	32	Well-Graded Gravel with Sand and Silt (GW-GM)
S4	10/21/2014	Stockpiled material from TP-5/B-5	4	20	Well-Graded Gravel with Sand and Silt (GW-GM)
Excavation Base Samples					
EXBS1	10/24/2014	Center of Northern end of excavation	8.5	51	Gray Sandy Silt (ML); trace organics and debris; hydrocarbon odor
* EXBS2	10/24/2014	Center of Excavation	8.5	45	Gray Sandy Silt (ML); trace organics and debris; hydrocarbon odor
* EXBS3	10/24/2014	Midpoint between EXBS2 and EXBS4	8.5	52	Gray Sandy Silt (ML); trace organics and debris; hydrocarbon odor
EXBS4	10/24/2014	Center of Southern end of excavation	8.5	40	Gray Sandy Silt (ML); trace organics and debris; hydrocarbon odor
* EXBS13	10/24/2014	Duplicate of EXBS3	8.5	52	Gray Sandy Silt (ML); trace organics and debris; hydrocarbon odor
Excavation Sidewall Samples					
* EXSW1	10/24/2014	Northeast portion of excavation sidewall	2.5	7.2	Well-Graded Gravel with Sand and Silt (GW-GM)
* EXSW2	10/24/2014	Southeast portion of excavation sidewall	4	9.8	Well-Graded Gravel with Sand and Silt (GW-GM)
EXSW3	10/24/2014	Southern excavation sidewall	3	0.5	Well-Graded Gravel with Sand and Silt (GW-GM)
EXSW4	10/24/2014	Southwest portion of excavation sidewall	2	5.2	Well-Graded Gravel with Sand and Silt (GW-GM)
* EXSW5	10/24/2014	Northwest portion of excavation sidewall	4.5	1.6	Well-Graded Gravel with Sand and Silt (GW-GM)
* EXSW6	10/24/2014	Northern excavation sidewall	3.5	9.5	Well-Graded Gravel with Sand and Silt (GW-GM)
Stockpile Samples					
SS1	10/24/2014	West end of potentially-contaminated soil stockpile	1.5	20	Dark gray, Silt with Sand and Gravel (ML); moist; hydrocarbon odor
* SS2	10/24/2014	North end of potentially-contaminated soil stockpile	1.5	38	Dark gray, Silt with Sand and Gravel (ML); moist; hydrocarbon odor
SS3	10/24/2014	Northeast end of potentially-contaminated soil stockpile	1.5	16	Dark gray, Silt with Sand and Gravel (ML); moist; hydrocarbon odor
SS4	10/24/2014	Southeast end of potentially-contaminated soil stockpile	1.5	26	Dark gray, Silt with Sand and Gravel (ML); moist; hydrocarbon odor
* SS5	10/24/2014	Southern end of potentially-contaminated soil stockpile	1.5	32	Dark gray, Silt with Sand and Gravel (ML); moist; hydrocarbon odor
SS6	10/24/2014	Center of potentially-contaminated soil stockpile	1.5	18	Dark gray, Silt with Sand and Gravel (ML); moist; hydrocarbon odor
Quality Control Samples					
* TB-10/21	10/21/2014	Soil and methanol trip blank	-	-	Ottawa sand with methanol added in the laboratory
* TB-10/24	10/24/2014	Soil and methanol trip blank	-	-	Ottawa sand with methanol added in the laboratory

Notes:

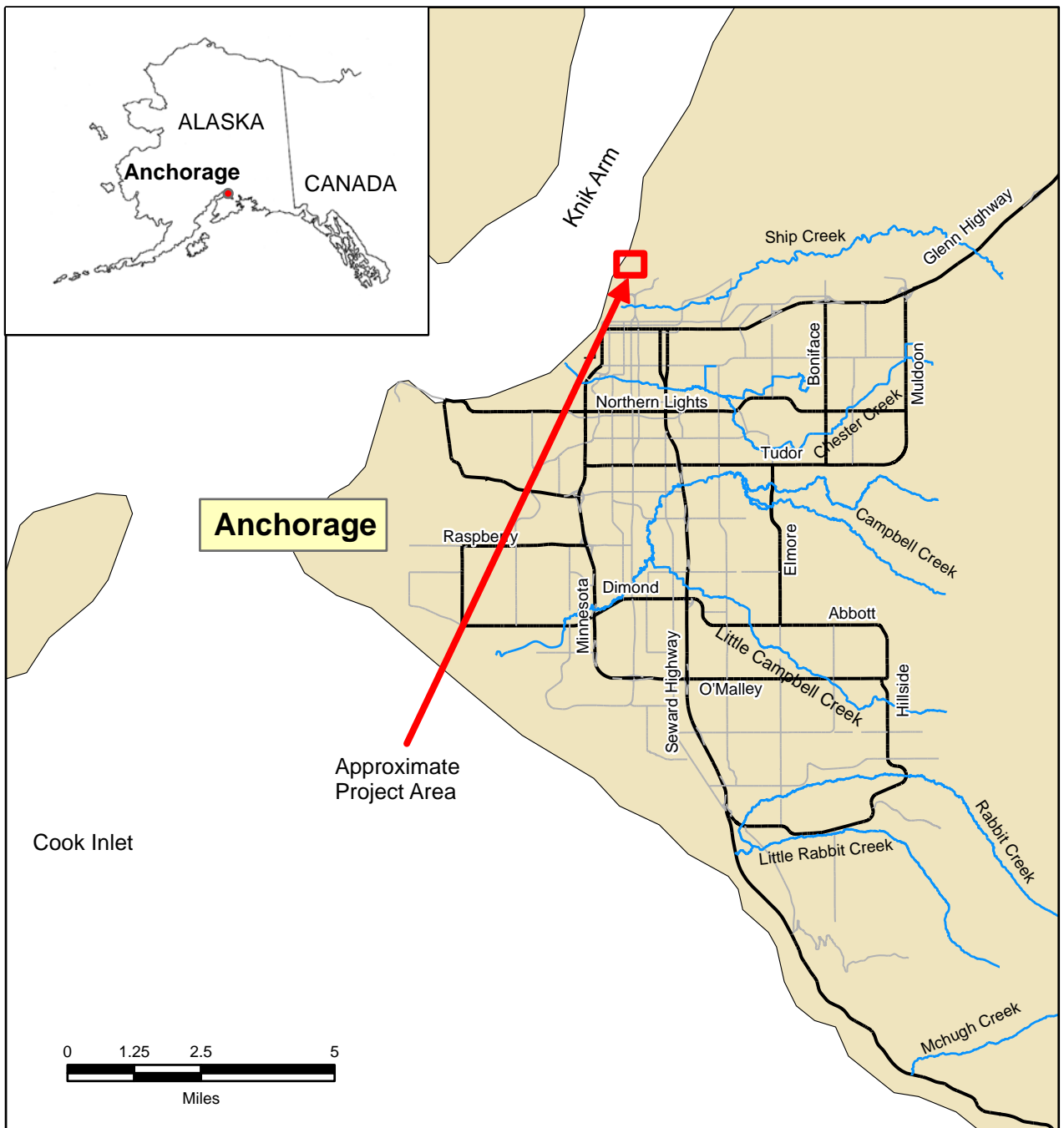
- * Sample analyzed by the project laboratory (See Table 2)
- ^ Field screening instrument was a ThermoInstruments 580B photoionization detector (PID)
- Measurement not recorded or not applicable
- ppm Parts per million

TABLE 2 - SUMMARY OF SOIL ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level (mg/kg)**	Sample Source, ID Number^, and Collection Depth in Feet (bgs) (See Figures 3 and 4 and Appendix D)												
			Test Pit Samples		Excavation Base Samples			Excavation Sidewall Samples				Stockpile Samples		QC Samples	
			S2 6	S3 4	EXBS2 8.5	EXBS3 8.5	~EXBS13 8.5	EXSW1 2.5	EXSW2 4	EXSW5 4.5	EXSW6 3.5	SS2 1.5	SS5 1.5	TB-10/21 -	TB-10/24 -
PID Headspace Reading - ppm	580B PID	-	106.6	32.3	45	52	52	7.2	9.8	1.6	9.5	38	32	-	-
Percent Solids	SM20 2540G	-	87.7	90.7	88.6	89.4	88.5	91.4	88.7	89.2	91.4	90.3	90.3	-	-
Gasoline Range Organics (GRO) - mg/kg	AK 101	300	<2.96 B	<2.61 B	-	9.57	-	-	-	-	-	-	-	<2.53 B	<1.25
Diesel Range Organics (DRO) - mg/kg	AK 102	250	501	115	798	708	845	<10.7	<11.0	541	757	354	303	-	-
Residual Range Organics (RRO) - mg/kg	AK 103	10,000	-	-	-	252	-	-	-	-	-	-	-	-	-
Aromatic Volatile Organics (BTEX)															
Benzene - mg/kg	EPA 8021B	0.025	<0.00680	<0.00655	-	<0.00685	<0.00695	-	-	-	-	-	-	<0.00630	<0.00625
Toluene - mg/kg	EPA 8021B	6.5	<0.0136	<0.0131	-	0.0113 J	0.0114 J	-	-	-	-	-	-	0.0119 J	<0.0125
Ethylbenzene - mg/kg	EPA 8021B	6.9	<0.0136	<0.0131	-	0.0113 J	0.0156 J	-	-	-	-	-	-	<0.0127	<0.0125
Xylenes (total) - mg/kg	EPA 8021B	63	0.0142 J	<0.0392	-	0.1262	0.124	-	-	-	-	-	-	<0.0380	<0.0375
Polynuclear Aromatic Hydrocarbons (PAHs)															
1-Methylnaphthalene - mg/kg	EPA 8270D SIMS	6.2	-	-	-	0.0793 J+	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene - mg/kg	EPA 8270D SIMS	6.1	-	-	-	0.0623 J+	-	-	-	-	-	-	-	-	-
Chrysene - mg/kg	EPA 8270D SIMS	360	-	-	-	0.0208 J+	-	-	-	-	-	-	-	-	-
Fluoranthene - mg/kg	EPA 8270D SIMS	1400	-	-	-	0.0327 J+	-	-	-	-	-	-	-	-	-
Fluorene - mg/kg	EPA 8270D SIMS	220	-	-	-	0.0906 J+	-	-	-	-	-	-	-	-	-
Phenanthrene - mg/kg	EPA 8270D SIMS	3000	-	-	-	0.112 J+	-	-	-	-	-	-	-	-	-
Pyrene - mg/kg	EPA 8270D SIMS	1000	-	-	-	0.0383 J+	-	-	-	-	-	-	-	-	-
All Other PAHs - mg/kg	EPA 8270D SIMS	Various	-	-	-	ND	-	-	-	-	-	-	-	-	-

Notes:

- * See Appendix D for compounds tested, methods, and laboratory reporting limits
- ** Soil cleanup level is the most stringent ADEC Method 2 standard listed in Table B1 or B2, 18 AAC 75, for the "under 40 inches (precipitation) zone" (April 2012).
- ^ Sample ID No. preceded by "02381" on the chain of custody form
- Sample not analyzed
- ~ Sample is a duplicate of the preceding sample.
- <0.00680 Analyte not detected; laboratory limit of detection of 0.00680 mg/kg
- 501** Analyte concentration exceeds applicable cleanup criterion
- bgs below ground surface
- ppm Parts per million
- Not applicable or sample not tested for this analyte
- mg/kg Milligrams per kilogram
- B Analyte concentration potentially affected by method blank contamination. See the ADEC Laboratory Data Review Checklist for details.
- J Result is an estimate less than the laboratory limit of quantitation. See SGS Laboratory Analytical Report for more details.
- J+ Result is potentially biased high due to surrogate failure. See the Laboratory Data Review Checklists for more details.
- ND Analyte not detected above the laboratory limit of detection



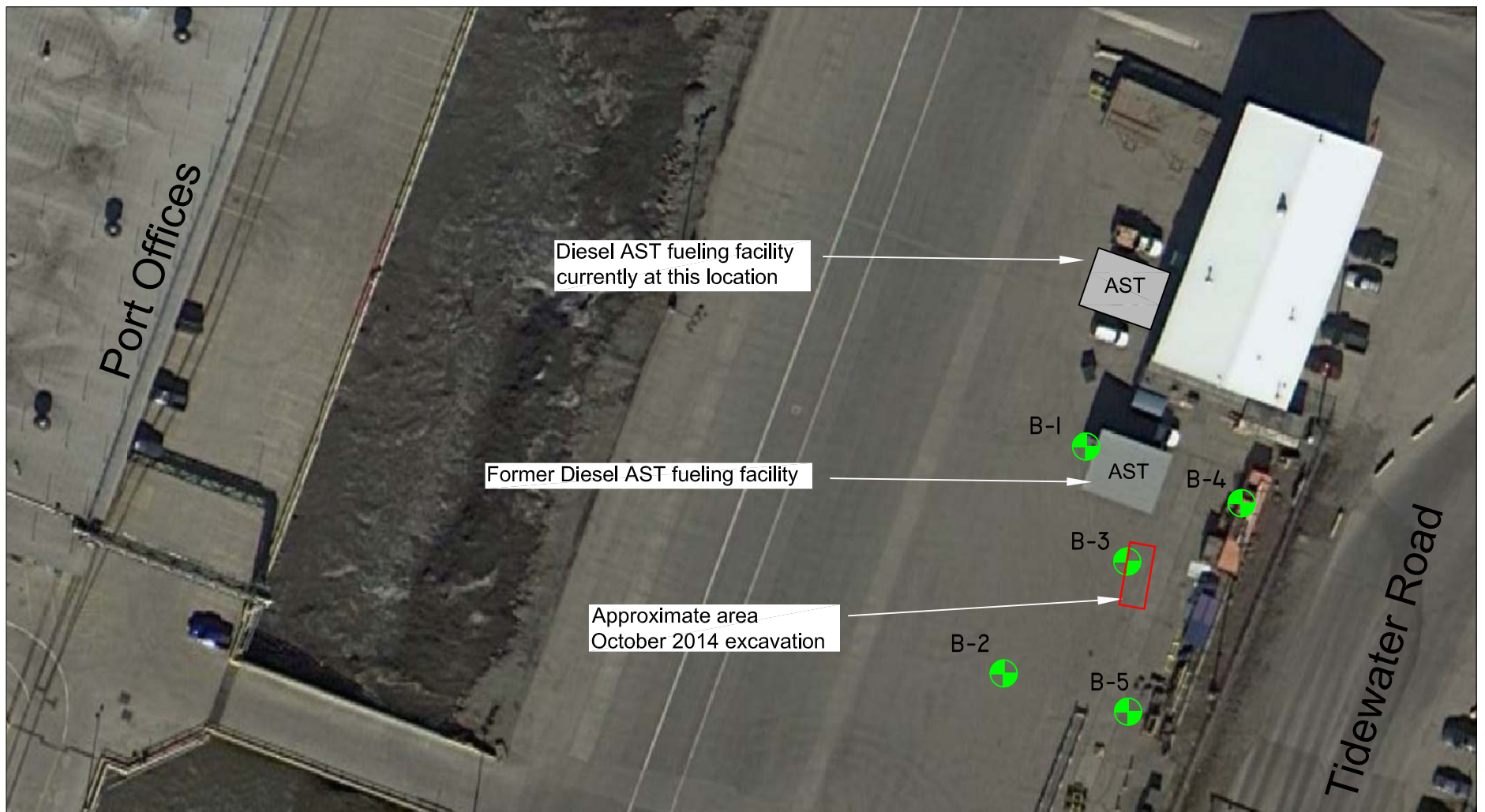
Map adapted from files provided by the Municipality of Anchorage, Geographical Information Systems website

LEGEND

- Streams
- Streets and Roads**
- Major
- Secondary




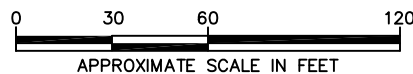
New Marine Storage Building Port of Anchorage, Alaska	
VICINITY MAP	
December 2014	32-1-02381-002
SHANNON & WILSON, INC. <small>GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS</small>	FIG. 1



Map adapted from April 14, 2011 aerial imagery provided by Google Earth Pro, reproduced by permission granted by Google Earth™ Mapping Service

LEGEND

- B-1  Approximate Location of Boring B-1, Advanced by Shannon & Wilson, March 2014
- AST Aboveground Storage Tank



New Marine Storage Building
Port of Anchorage, Alaska

SITE PLAN

December 2014

32-1-02381-002



FIG. 2

Existing Port of Anchorage
Marine Storage Building

Former Aboveground Storage Tank (AST)
Diesel Fueling Facility Location

TP-1/B-1
S3*

TP-4/B-4
(Not Sampled)

Approximate footprint of
New Marine Storage Building

EXSW6*

EXBS1
EXSW5* TP-3/B-3 EXSW1*
S2* EXBS2* S1

EXBS3*/
EXBS13* EXSW4 EXSW2*
EXBS4 EXSW3

Approximate Limits of
Excavation Area on
October 24, 2014
(10 feet x 25 feet)

B-2

TP-5/B-5
S4

Tidewater Road



LEGEND

TP-3/B-3

Approximate location of Boring B-3 advanced during April 2014 Geotechnical Study and Test Pit TP-3 screened and sampled on October 21, 2014 by Shannon & Wilson.

S1

Approximate location of field screening Sample S1 collected from test pit stockpile on October 21, 2014.

S2*

Approximate location of analytical Sample S2 collected from test pit stockpile on October 21, 2014 and submitted to laboratory.

EXSW1

Approximate location of excavation sidewall field screening sample.

EXBS2

Approximate location of excavation base field screening sample.

EXSW2*

Approximate location of excavation sidewall Sample EXSW2. Gray oval, bold number, and asterisk indicates analytical sample was selected from this location.

New Marine Storage Building
Port of Anchorage, Alaska

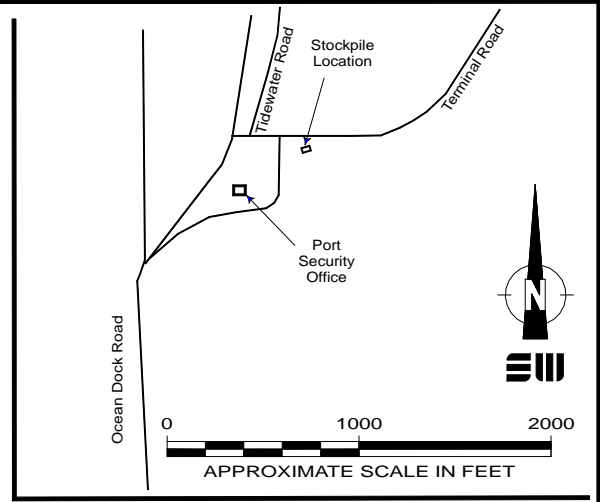
EXCAVATION SAMPLING PLAN

December 2014

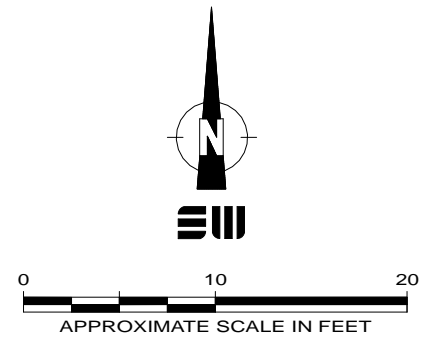
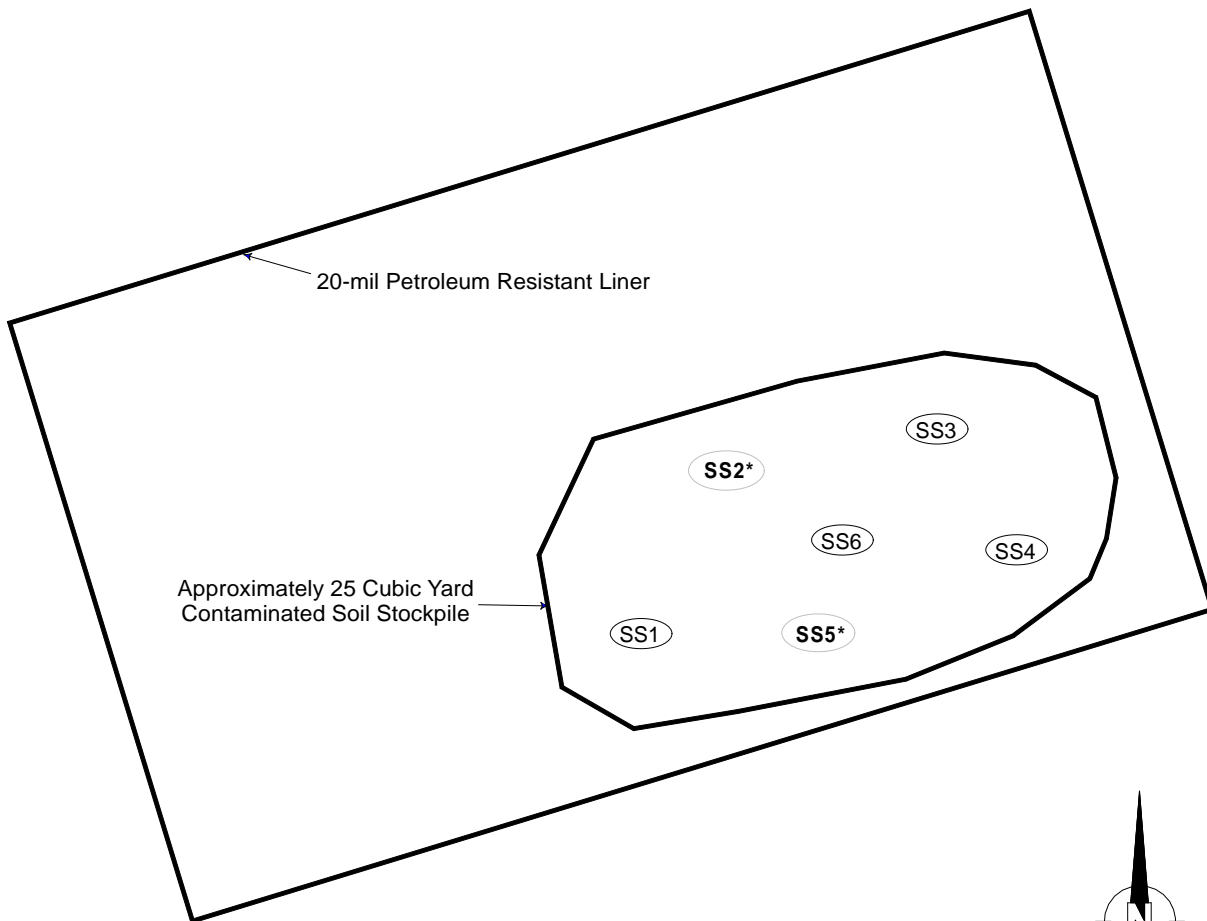
32-1-02381-002

SW SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 3



STOCKPILE LOCATION MAP



LEGEND

SS1 Approximate location of field screening Sample SS1.

SS5* Approximate location of Stockpile Sample SS5. Gray oval, bold number, and asterisk indicates analytical sample was selected from this location.

New Marine Storage Building Port of Anchorage, Alaska	
STOCKPILE SAMPLE LOCATIONS	
December 2014	32-1-02381-002
SHANNON & WILSON, INC. Geotechnical & Environmental Consultants	Fig. 4

APPENDIX A
SITE PHOTOGRAPHS



Photo 1: Looking southeast while excavating potentially contaminated soil at the TP-3/B-3 excavation. (October 24, 2014)



Photo 2: Looking southeast at the final depth of the TP-3/B-3 excavation. Note discolored soil in the lower portion of east sidewall. (October 24, 2014)

New Marine Storage Building
Port of Anchorage, Alaska

PHOTOS 1 AND 2

December 2014

32-1-02381-002



SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

A-1



Photo 3: Looking west at approximately 25-cubic yard stockpile of contaminated soil placed on 20-mil petroleum resistant liner and surrounded by timbers. (October 24, 2014)



Photo 4: This 2,000-gallon, diesel, aboveground storage tank fueling facility was formerly located at the northwest corner of the proposed New Marine Storage Building. (October 24, 2014)

APPENDIX B
FIELD NOTES

10.21.14

POA Maint. Bldg.

32-1-02381-002

KVW

1015 a. arrived on site

3 open pits

1 ~ @ B-3 to ~ 6' bgs. "smelliest" accord. to laborer on site

1 ~ @ B-5 to ~ 4' bgs "some, but not much smell"

1 ~ @ B-4 to ~ 4' bgs "no smell"

1 smell faint

No smell
no sheen
KVW

calibrate PID → 101 ppm

"B-3" stockpile under plastic liner

1028 S1 }
1031 S2 } ↑

"B1" stockpile no smell, just dug.

1038 S3 → from stockpile

B. Nibert on site. - directed no samples @ "B-4" or "B-5" stockpiles no smell by either of us.

B.N off site - says wants to know something as quick as possible. Told him (to another mtg). I would call T. Terry & make a plan.

PID background 0.1 to 0.5 jumping.

"B5" stockpile no smell

1104 S4

PID

S1 76.3

S2 5028

S3 767

S4

keeping "overrange"
lots of number jumping
overrange. suspect PID not reading correctly.

Recalibrate to 101.

S3 8887 overrange - jumping number + beeping.

collected analytical samples for GRO/BTEX + DRO

• 02381-002 S1 middle stockpile (small) 4x2x2 east side.
1123

• 02381-002 S2 " " west side
1121

"B-3" area

• 02381-002 S3 NW stockpile SE side "B-1" area
1131

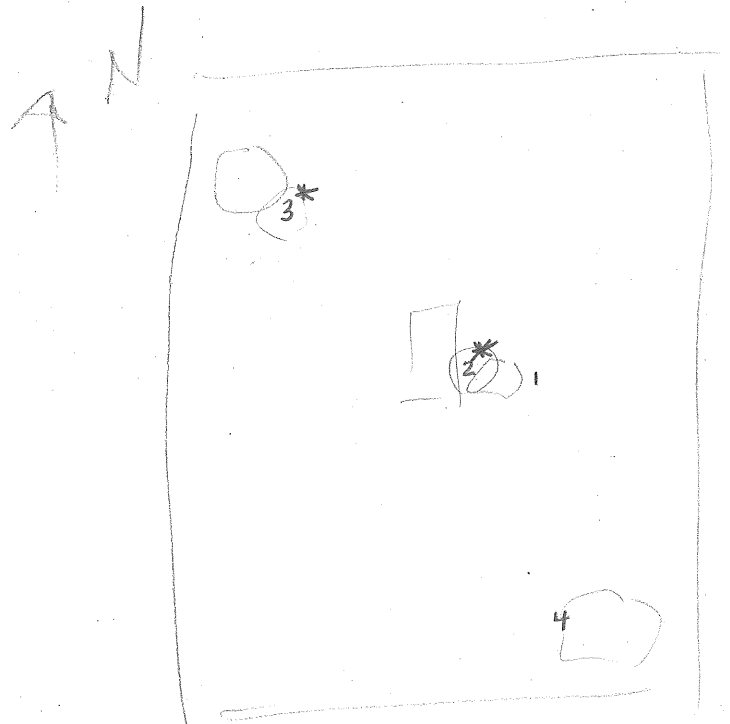
• 02381-002 S4 SE stockpile NW side "B-5" area
113b

1140 off site.

TCT PID 1238p.

S1 50.7
* S2 106.6
* S3 32.3
S4 19.7

Creeping slowly
S2-S4



* Samples analyzed by lab for DRO GRO/BTEX

1145252



SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY

Laboratory SGS Page 1 of 1
Attn: Tori Pennick

400 N. 34th Street, Suite 100 Seattle, WA 98103 (206) 632-8020
2355 Hill Road Fairbanks, AK 99709 (907) 479-0600
2255 S.W. Canyon Road Portland, OR 97201-2498 (503) 223-6147

2043 Westport Center Drive St. Louis, MO 63146-3564 (314) 699-9660
5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 561-2120
1200 17th Street, Suite 1024 Denver, Co 80202 (303) 825-3800

303 Wellsian Way Richland, WA 99352 (509) 946-6309

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	Analysis Parameters/Sample Container Description	Total Number of Containers	Remarks/Matrix
02381-002 S2		1127a	10/21	X	✓	920/12/15 AK-101/EPN 8021B	2	soil
02381-002 S3		1131a	10/21	X	✓	DR0 AK-102	2	soil
TB		945a	10/21		✓		1	trip blank
02381-002 S1		1123a	10/21	X				soil
02381-002 S4		1136a	10/21	X		DISPOSE		soil

Project Information	Sample Receipt
Project Number: <u>32-1-02381-002</u>	Total Number of Containers
Project Name: <u>POA Maint BHq.</u>	COC Seals/Intact? Y/N/NA
Contact: <u>Katrina Wedeking</u>	Received Good Cond./Cold
Ongoing Project? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Delivery Method:
Sampler: <u>KW</u>	(attach shipping bill, if any)

Instructions
Requested Turnaround Time:
Special Instructions: <u>24 HOUR RUSH!!</u>

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

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: <u>Katrina Wedeking</u> Time: <u>13:45</u>	Signature: _____ Time: _____	Signature: _____ Time: _____
Printed Name: <u>Katrina Wedeking</u> Date: <u>10/21</u>	Printed Name: _____ Date: _____	Printed Name: _____ Date: _____
Company: <u>Shannon + Wilson</u>	Company: _____	Company: _____
Received By: 1.	Received By: 2.	Received By: 3.
Signature: _____ Time: _____	Signature: _____ Time: _____	Signature: <u>Terri Draeger</u> Time: <u>13:43</u>
Printed Name: _____ Date: _____	Printed Name: _____ Date: _____	Printed Name: <u>Terri Draeger</u> Date: <u>10/21/14</u>
Company: _____	Company: _____	Company: <u>SGS</u>

Table 1 – Sample Locations and Descriptions

Soil Samples						
Sample Number	Date	Time	Sample Location (see Figure 1 and Table 2)	Depth (feet)	Sample Classification (i.e., Brown, silty, sandy, gravel, moist)	PID Type (ppm)
EXBS1 *	10/24	1345	Excavation Base Sample	8.5	Dark gray, Sandy Silt; moist; trace organics & debris HC odor	50.6
EXBS2	↓	1350	↓	↓		45.1
EXBS3 *	↓	1355	↓	↓		52.3
EXBS4	↓	1400	↓	↓		39.9
EXBS13 *	↓	1425	Duplicate of EXBS3	↓		52.3
EXSW1 *	10/24	1405	Excavation Sidewall Sample	2.5		Brown to gray; Gravelly Sand; trace silt; moist
EXSW2 *	↓	1410	↓	4	9.8	
EXSW3	↓	1415	↓	3	0.5	
EXSW4	↓	1420	↓	2	5.2	
EXSW5 *	↓	1430	↓	4.5	1.6	
EXSW6 *	↓	1435	↓	3.5	9.5	
Water Samples						
Sample Number	Date	Time	Sample Location (see Figure 1 and Table 2)	Depth (feet)	Sample Classification (i.e., Brown, silty, sandy, gravel, moist)	PID Type (ppm)
SS1	10/24	1500	Stockpile Sample	1.5	Dark gray; Sandy Silt with Gravel; moist; HC odor	20.3
SS2 *	↓	1503	↓	↓		38.2
SS3	↓	1506	↓	↓		15.9
SS4	↓	1509	↓	↓		26.5
SS5 *	↓	1512	↓	↓		31.8
SS6	↓	1515	↓	↓		18.5

Environmental Sampling Number Designations
 S1 Sample No. 1
 SS1 Surface Sample No. 1
 B1S1 Boring No. 1, Sample No. 1
 S1S1 Stockpile No 1, Sample No. 1
 TP1S1 Test Pit No. 1, Sample No. 1
 B1W1 Boring No. 1, Water Sample No. 1

B1MW1 Boring No. 1, Monitoring Well Water Sample No. 1
 E1W1 Excavation No. 1, Water Sample No. 1
 DW1W1 Drinking Water Well No. 1, Water Sample No. 1
 Example S103: Duplicate samples use fictitious sample numbers and cross-reference
 Sample: Y-5200-4-SS1 (Y = Environmental Project, 5200-4 = Project and Phase Number, SS1 = Surface Sample No. 1)

Date: _____
 Project Name: NOA - Port of Anch.

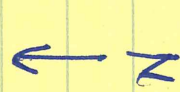
Jake Tracy
35°F Clear

MOA Port Project

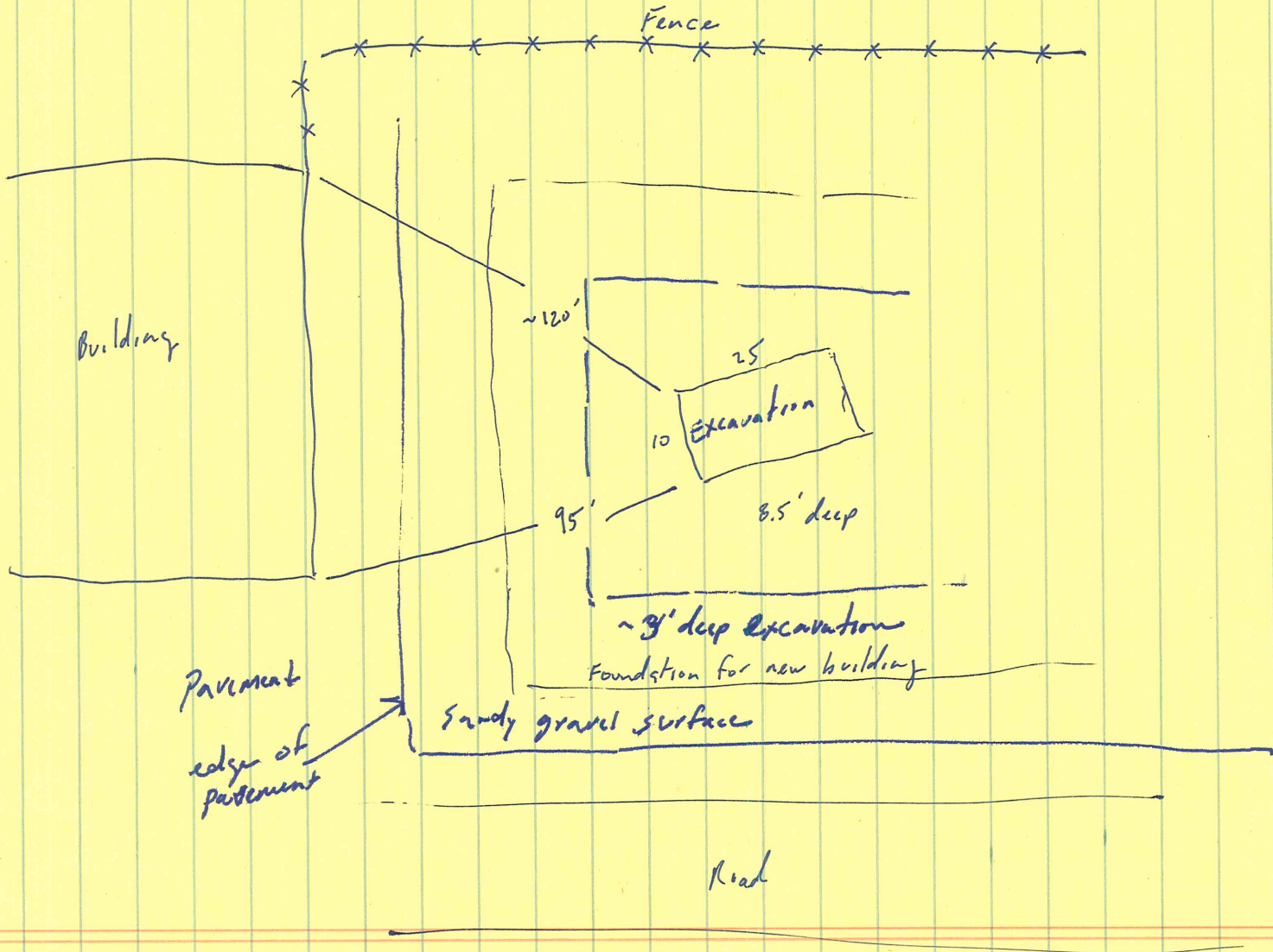
10/24/14

Site Plan

Tidewater Road



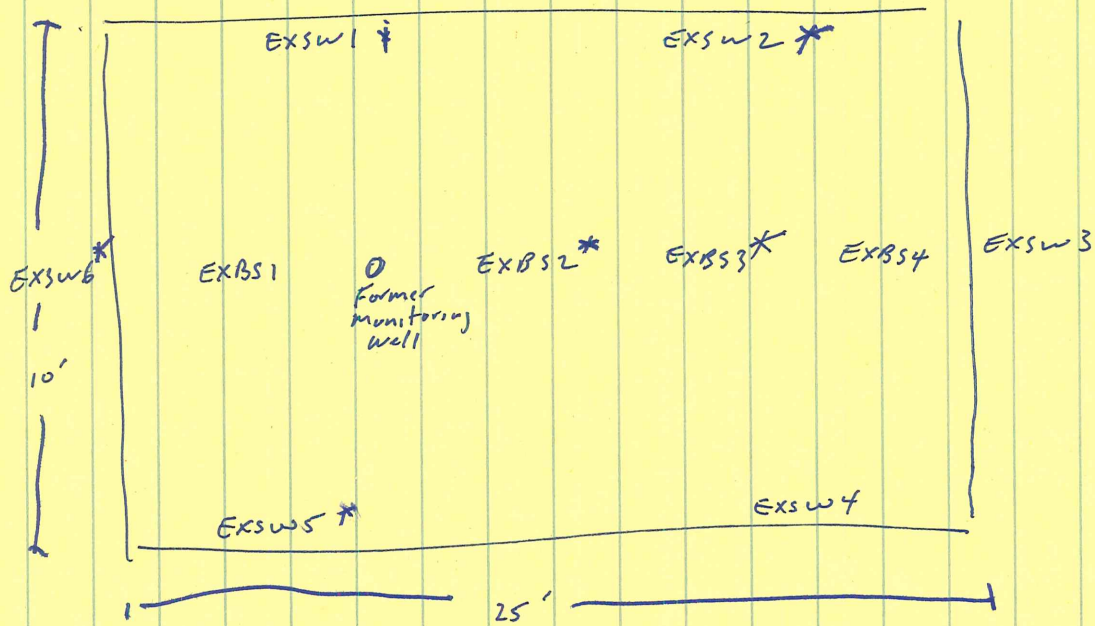
①



10/24/14

NOA Port Project

Take Tracy
35°F Clear

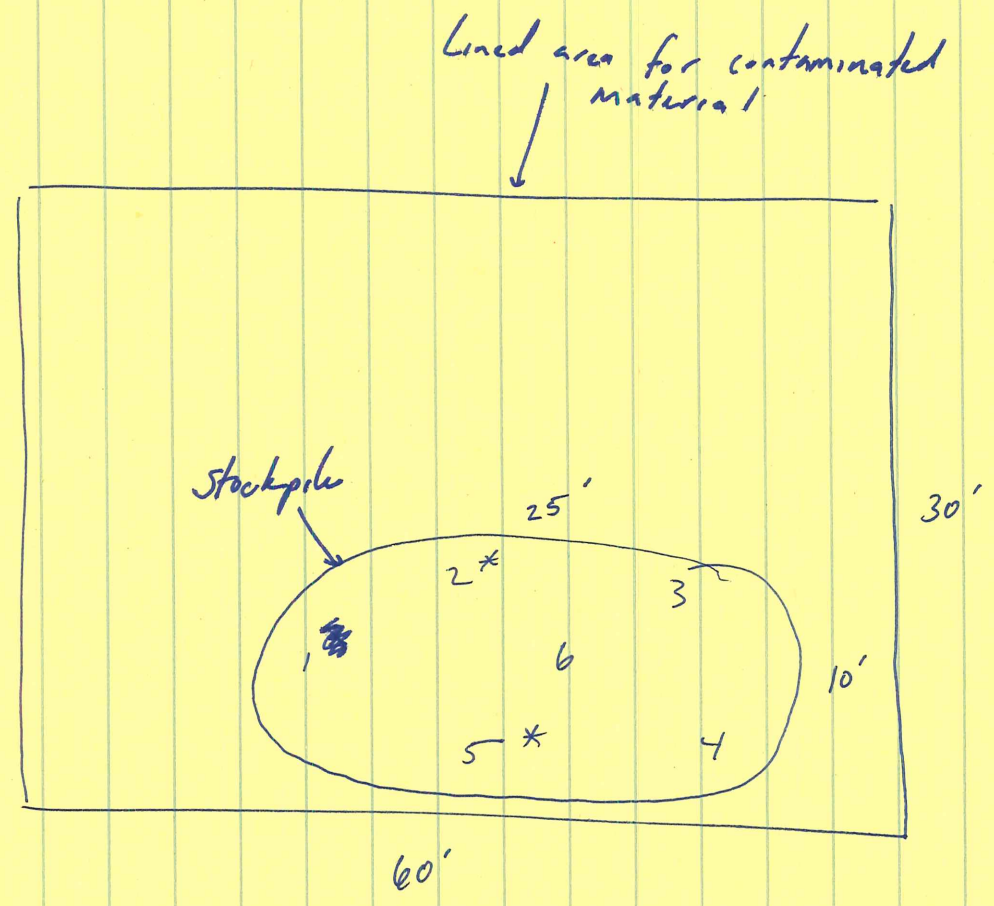


* indicates analytical sample collected
8.5-9' deep.

10/24/14

MOA Port Project

Jake Travy
35°F Clear



* indicates analytical sample was collected
 Stockpile is ~ 5' high and ~ 20 cu



APPENDIX C

ADEC OIL & HAZARDOUS SUBSTANCES SPILL NOTIFICATION FORM

AND TABLE B-1 FROM S&W APRIL 2014 GEOTECHNICAL

ENGINEERING REPORT



ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
OIL & HAZARDOUS SUBSTANCES SPILL NOTIFICATION FORM

ADEC USE ONLY

ADEC SPILL #:	ADEC FILE #:	ADEC LC:
---------------	--------------	----------

PERSON REPORTING: Tim Terry	PHONE NUMBER: 907-433-3230	REPORTED HOW? (ADEC USE ONLY) <input checked="" type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> Troopers
DATE/TIME OF SPILL: Historic	DATE/TIME DISCOVERED: October 22, 2014 @ 5:00 p.m.	DATE/TIME REPORTED: October 23, 2014 @ 10:24 a.m.

INCIDENT LOCATION/ADDRESS: Port of Anchorage Marine Storage Building, Tidewater Road, Anchorage, Alaska	DATUM: <input type="checkbox"/> NAD27 <input type="checkbox"/> NAD83 <input checked="" type="checkbox"/> WGS84 <input type="checkbox"/> Other _____	PRODUCT SPILLED: Diesel
	LAT. 61.2386888 N	
	LONG. 149.8861111 W	

QUANTITY SPILLED: Unknown <input checked="" type="checkbox"/> gallons <input type="checkbox"/> pounds	QUANTITY CONTAINED: 0 <input type="checkbox"/> gallons <input type="checkbox"/> pounds	QUANTITY RECOVERED: ~10 cubic yards <input type="checkbox"/> gallons <input type="checkbox"/> pounds	QUANTITY DISPOSED: 0 <input type="checkbox"/> gallons <input type="checkbox"/> pounds
---	--	--	---

POTENTIAL RESPONSIBLE PARTY: <i>Name/Business:</i> Port of Anchorage <i>Mailing Address:</i> 2000 Anchorage Port Road Anchorage, Alaska 99501 <i>Contact Name:</i> Robert Nibert <i>Contact Number:</i> 907-310-3021	OTHER PRP, IF ANY:	VESSEL NAME: NA
		VESSEL NUMBER: NA
		> 400 GROSS TON VESSEL: <input type="checkbox"/> Yes <input type="checkbox"/> No

SOURCE OF SPILL: Historic spills of diesel. Possibly from above ground fueling facility previously located in area.	CAUSE CLASSIFICATION: <input type="checkbox"/> Accident <input type="checkbox"/> Human Factors <input type="checkbox"/> Structural/Mechanical <input checked="" type="checkbox"/> Other
CAUSE OF SPILL: Historic spills of diesel. Contractor excavating foundation footings for new storage building smelled diesel. Shannon & Wilson collected 2 soil samples and found 501 milligrams per kilogram (mg/kg) diesel range organics (DRO) in the soil sample from the center test pit at a depth of about 5 to 6 feet below ground surface.	<input type="checkbox"/> Under Investigation

CLEANUP ACTIONS:
 Shannon & Wilson will monitor the excavation of impacted soil and placement of impacted soil in an on-site lined storage cell. Confirmation soil samples will be collected from the base and sidewalls of the excavation and potentially contaminated soil stockpiles.

DISPOSAL METHODS AND LOCATION:
 Contaminated soil will be characterized and transported, with ADEC PM approval, to Alaska Soil Recycling for thermal treatment.

AFFECTED AREA SIZE: unknown	SURFACE TYPE: (gravel, asphalt, name of river etc.) Gravel	RESOURCES AFFECTED/THREATENED: (Water sources, wildlife, wells, etc.) None
---------------------------------------	--	--

COMMENTS:
 A brief work plan will be submitted to Gay Harpole of ADEC on October 23, 2014 outlining proposed work which is planned for October 24, 2014 at 9:30 a.m.

ADEC USE ONLY

SPILL NAME:	NAME OF DEC STAFF RESPONDING:	C-PLAN MGR NOTIFIED? <input type="checkbox"/> Yes <input type="checkbox"/> No
--------------------	--------------------------------------	---

DEC RESPONSE: <input type="checkbox"/> Phone follow-up <input type="checkbox"/> Field visit <input type="checkbox"/> Took Report	CASELOAD CODE: <input type="checkbox"/> First and Final <input type="checkbox"/> Open/No LC <input type="checkbox"/> LC Assigned	CLEANUP CLOSURE ACTION: <input type="checkbox"/> NFA <input type="checkbox"/> Monitoring <input type="checkbox"/> Transferred to CS or STP
--	--	--

COMMENTS:	Status of Case: <input type="checkbox"/> Open <input type="checkbox"/> Closed	DATE CASE CLOSED:
------------------	--	--------------------------

REPORT PREPARED BY:	DATE:
----------------------------	--------------

TABLE B-1 - SUMMARY OF SOIL ANALYTICAL RESULTS

		Sample Source, ID Number [^] , and Collection Depth in Feet (See Appendix A, Figure 2, and Appendix B)					
		Soil Borings					
		Boring B-3		Boring B-4	Boring B-5		Trip Blank
Parameter Tested	Method*	Cleanup Level (mg/kg)**	B-3 S1 0-2	B-3 S3 5-6.5	B-4 S7 20-21.5	B-5 S8 25-26.5	02381 Trip Blank -
PID Headspace Reading - ppm	580B PID	-	26	46	19	93	-
Percent Solids	SM20 2540G	-	95	88	75	79	-
Gasoline Range Organics (GRO) - mg/kg	AK 101	300	<1.37	<3.40 B	23.0 J+	145J+	2.41 J
Diesel Range Organics (DRO) - mg/kg	AK 102	250	<20.8 B	70.0	89.0	163	-
Residual Range Organics (RRO) - mg/kg	AK 103	11,000	25.0	66.2	155	244	-
Aromatic Volatile Organics (BTEX)							
Benzene - mg/kg	EPA 8021B	0.025	<0.00680	<0.00850	<0.0158	<0.0134	<0.00640
Toluene - mg/kg	EPA 8021B	6.5	<0.0137	<0.0170	<0.0316	0.0862	<0.0128
Ethylbenzene - mg/kg	EPA 8021B	6.9	<0.0137	<0.0170	<0.0316	0.0862	<0.0128
Xylenes (total) - mg/kg	EPA 8021B	63	<0.0410	0.0384	0.0833	2.34	<0.0383
RCRA Metals							
Arsenic - mg/kg	SW 6020	3.9	4.42	4.67	18.9	12.8	-
Barium - mg/kg	SW 6020	1,100	70.1	119	168	304	-
Cadmium - mg/kg	SW 6020	5.0	0.0709 J	0.149 J	0.174 J	0.183 J	-
Chromium - mg/kg	SW 6020	25	20.1	49.6	45.7	40.0	-
Lead - mg/kg	SW 6020	400	3.83	10.4	12.9	10.7	-
Mercury - mg/kg	SW 6020	1.4	0.0380 J	0.0984	0.100	0.150	-
Selenium - mg/L	SW 6020	3.4	<0.510	<0.505	<0.605	<0.540	-
Silver - mg/kg	SW 6020	11.2	<0.102	0.120 J	0.290	0.421	-

KEY DESCRIPTION

*	See Appendix B for compounds tested, methods, and laboratory reporting limits
**	Soil cleanup level is the most stringent standard listed in Table B1 or B2, 18 AAC 75, for the "under 40 inches (precipitation) zone"
^	Sample ID No. preceded by "02381" on the chain of custody form
<1.37	Analyte not detected; laboratory reporting limit of 1.37 mg/kg
4.42	Analyte concentration exceeds applicable cleanup criterion
ppm	Parts per million
RCRA	Resource Conservation and Recovery Act
-	Not applicable or sample not tested for this analyte
mg/kg	Milligrams per kilogram
B	Analyte concentration potentially affected by method and/or trip blank contamination. See the Laboratory Data Review Checklists for more details.
J	Result is an estimate less than the laboratory limit of quantitation
J+	Result is an estimated value that may be considered biased high due to surrogate recoveries. See the Laboratory Data Review Checklists for more details.

APPENDIX D

RESULTS OF ANALYTICAL TESTING BY

SGS NORTH AMERICA INC.

OF ANCHORAGE, ALASKA AND

ADEC LABORATORY DATA REVIEW CHECKLIST

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks St. Suite 3
Anchorage, AK 99518
(907)561-2120

Report Number: **1145252**

Client Project: **32-1-02381-002 POA Maint Bldg.**

Dear Katra Wedeking,

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 five years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

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

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

Sincerely,
SGS North America Inc.


SGS North America Inc.
Environmental Services - Alaska Division
Project Manager

Victoria Pennick
2014.10.22
16:37:54 -08'00'

Victoria Pennick
Project Manager
Victoria.Pennick@sgs.com

Date

Print Date: 10/22/2014 4:31:12PM

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1145252**
Project Name/Site: **32-1-02381-002 POA Maint Bldg.**
Project Contact: **Katra Wedeking**

Refer to sample receipt form for information on sample condition.

02381-002 S2 (1145252001) PS

AK102 - The pattern is consistent with a weathered middle distillate.

02381-002 S3 (1145252002) PS

AK102 - The pattern is consistent with a weathered middle distillate.

Trip blank (1145252003): GRO and toluene were detected above the DL (J-flagged). Toluene was not detected in the associated samples, and both toluene and GRO concentrations were less than 1/2 the LOQ; therefore, no further action was taken.

*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: 10/22/2014 4:31:13PM

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6020, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 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	Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

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

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
02381-002 S2	1145252001	10/21/2014	10/21/2014	Soil/Solid (dry weight)
02381-002 S3	1145252002	10/21/2014	10/21/2014	Soil/Solid (dry weight)
TB	1145252003	10/21/2014	10/21/2014	Soil/Solid (dry weight)

<u>Method</u>	<u>Method Description</u>
AK101	AK101/8021 Combo. (S)
SW8021B	AK101/8021 Combo. (S)
AK102	Diesel Range Organics (S)
SM21 2540G	Percent Solids SM2540G

Print Date: 10/22/2014 4:31:16PM

Detectable Results Summary

Client Sample ID: **02381-002 S2**

Lab Sample ID: 1145252001

Semivolatile Organic Fuels

Volatile Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	501	mg/Kg
Gasoline Range Organics	2.96	mg/Kg
o-Xylene	14.2J	ug/Kg

Client Sample ID: **02381-002 S3**

Lab Sample ID: 1145252002

Semivolatile Organic Fuels

Volatile Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	115	mg/Kg
Gasoline Range Organics	1.15J	mg/Kg

Client Sample ID: **TB**

Lab Sample ID: 1145252003

Volatile Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	0.781J	mg/Kg
Toluene	11.9J	ug/Kg

Results of 02381-002 S2

Client Sample ID: **02381-002 S2**
 Client Project ID: **32-1-02381-002 POA Maint Bldg.**
 Lab Sample ID: 1145252001
 Lab Project ID: 1145252

Collection Date: 10/21/14 11:27
 Received Date: 10/21/14 13:43
 Matrix: Soil/Solid (dry weight)
 Solids (%): 87.7
 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	501	22.5	6.98	mg/Kg	1		10/22/14 11:10
Surrogates							
5a Androstane	103	50-150		%	1		10/22/14 11:10

Batch Information

Analytical Batch: XFC11643
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 10/22/14 11:10
 Container ID: 1145252001-A

Prep Batch: XXX32241
 Prep Method: SW3550C
 Prep Date/Time: 10/21/14 14:50
 Prep Initial Wt./Vol.: 30.392 g
 Prep Extract Vol: 1 mL

Print Date: 10/22/2014 4:31:18PM



Results of 02381-002 S2

Client Sample ID: 02381-002 S2
Client Project ID: 32-1-02381-002 POA Maint Bldg.
Lab Sample ID: 1145252001
Lab Project ID: 1145252

Collection Date: 10/21/14 11:27
Received Date: 10/21/14 13:43
Matrix: Soil/Solid (dry weight)
Solids (%): 87.7
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 2.96, 2.72, 0.816, mg/Kg, 1, 10/21/14 18:35

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene, 112, 50-150, %, 1, 10/21/14 18:35

Batch Information

Analytical Batch: VFC12191
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/21/14 18:35
Container ID: 1145252001-B

Prep Batch: VXX26660
Prep Method: SW5035A
Prep Date/Time: 10/21/14 11:27
Prep Initial Wt./Vol.: 70.439 g
Prep Extract Vol: 33.6385 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene, 102, 72-119, %, 1, 10/21/14 18:35

Batch Information

Analytical Batch: VFC12191
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/21/14 18:35
Container ID: 1145252001-B

Prep Batch: VXX26660
Prep Method: SW5035A
Prep Date/Time: 10/21/14 11:27
Prep Initial Wt./Vol.: 70.439 g
Prep Extract Vol: 33.6385 mL

Print Date: 10/22/2014 4:31:18PM



Results of **02381-002 S3**

Client Sample ID: **02381-002 S3**
Client Project ID: **32-1-02381-002 POA Maint Bldg.**
Lab Sample ID: 1145252002
Lab Project ID: 1145252

Collection Date: 10/21/14 11:31
Received Date: 10/21/14 13:43
Matrix: Soil/Solid (dry weight)
Solids (%): 90.7
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	115	21.9	6.78	mg/Kg	1		10/22/14 11:20
Surrogates							
5a Androstane	90	50-150		%	1		10/22/14 11:20

Batch Information

Analytical Batch: XFC11643
Analytical Method: AK102
Analyst: AYC
Analytical Date/Time: 10/22/14 11:20
Container ID: 1145252002-A

Prep Batch: XXX32241
Prep Method: SW3550C
Prep Date/Time: 10/21/14 14:50
Prep Initial Wt./Vol.: 30.26 g
Prep Extract Vol: 1 mL

Print Date: 10/22/2014 4:31:18PM



Results of 02381-002 S3

Client Sample ID: 02381-002 S3
Client Project ID: 32-1-02381-002 POA Maint Bldg.
Lab Sample ID: 1145252002
Lab Project ID: 1145252

Collection Date: 10/21/14 11:31
Received Date: 10/21/14 13:43
Matrix: Soil/Solid (dry weight)
Solids (%): 90.7
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Gasoline Range Organics and Surrogates (4-Bromofluorobenzene).

Batch Information

Analytical Batch: VFC12191
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/21/14 18:54
Container ID: 1145252002-B

Prep Batch: VXX26660
Prep Method: SW5035A
Prep Date/Time: 10/21/14 11:31
Prep Initial Wt./Vol.: 65.805 g
Prep Extract Vol: 31.1471 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene, and Surrogates (1,4-Difluorobenzene).

Batch Information

Analytical Batch: VFC12191
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/21/14 18:54
Container ID: 1145252002-B

Prep Batch: VXX26660
Prep Method: SW5035A
Prep Date/Time: 10/21/14 11:31
Prep Initial Wt./Vol.: 65.805 g
Prep Extract Vol: 31.1471 mL

Print Date: 10/22/2014 4:31:18PM

Results of TB

Client Sample ID: **TB**
 Client Project ID: **32-1-02381-002 POA Maint Bldg.**
 Lab Sample ID: 1145252003
 Lab Project ID: 1145252

Collection Date: 10/21/14 09:45
 Received Date: 10/21/14 13:43
 Matrix: Soil/Solid (dry weight)
 Solids (%):
 Location:

Results by Volatile 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>
Gasoline Range Organics	0.781 J	2.53	0.758	mg/Kg	1		10/21/14 18:16

Surrogates

4-Bromofluorobenzene	92.5	50-150		%	1		10/21/14 18:16
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Batch Information

Analytical Batch: VFC12191
 Analytical Method: AK101
 Analyst: ST
 Analytical Date/Time: 10/21/14 18:16
 Container ID: 1145252003-A

Prep Batch: VXX26660
 Prep Method: SW5035A
 Prep Date/Time: 10/21/14 09:45
 Prep Initial Wt./Vol.: 49.503 g
 Prep Extract Vol: 25 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>
Benzene	6.30 U	12.6	4.04	ug/Kg	1		10/21/14 18:16
Ethylbenzene	12.7 U	25.3	7.88	ug/Kg	1		10/21/14 18:16
o-Xylene	12.7 U	25.3	7.88	ug/Kg	1		10/21/14 18:16
P & M -Xylene	25.3 U	50.5	15.2	ug/Kg	1		10/21/14 18:16
Toluene	11.9 J	25.3	7.88	ug/Kg	1		10/21/14 18:16

Surrogates

1,4-Difluorobenzene	104	72-119		%	1		10/21/14 18:16
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Batch Information

Analytical Batch: VFC12191
 Analytical Method: SW8021B
 Analyst: ST
 Analytical Date/Time: 10/21/14 18:16
 Container ID: 1145252003-A

Prep Batch: VXX26660
 Prep Method: SW5035A
 Prep Date/Time: 10/21/14 09:45
 Prep Initial Wt./Vol.: 49.503 g
 Prep Extract Vol: 25 mL



Method Blank

Blank ID: MB for HBN 1660778 [SPT/9476]

Blank Lab ID: 1241363

QC for Samples:

1145252001, 1145252002

Matrix: Soil/Solid (dry weight)

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: SPT9476

Analytical Method: SM21 2540G

Instrument:

Analyst: MJN

Analytical Date/Time: 10/21/2014 6:00:00PM

Print Date: 10/22/2014 4:31:20PM

Duplicate Sample Summary

Original Sample ID: 1145242015

Duplicate Sample ID: 1241364

QC for Samples:

1145252001, 1145252002

Analysis Date: 10/21/2014 18:00

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

<u>NAME</u>	<u>Original ()</u>	<u>Duplicate ()</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	88.0	90.5	2.80	15.00

Batch Information

Analytical Batch: SPT9476

Analytical Method: SM21 2540G

Instrument:

Analyst: MJN

Print Date: 10/22/2014 4:31:21PM

Method Blank

Blank ID: MB for HBN 1660805 [VXX/26660]

Blank Lab ID: 1241484

QC for Samples:

1145252001, 1145252002, 1145252003

Matrix: Soil/Solid (dry weight)

Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.926J	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene	101	50-150		%

Batch Information

Analytical Batch: VFC12191

Analytical Method: AK101

Instrument: Agilent 7890A PID/FID

Analyst: ST

Analytical Date/Time: 10/21/2014 11:57:00AM

Prep Batch: VXX26660

Prep Method: SW5035A

Prep Date/Time: 10/21/2014 8:00:00AM

Prep Initial Wt./Vol.: 50 g

Prep Extract Vol: 25 mL

Print Date: 10/22/2014 4:31:23PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1145252 [VXX26660]
 Blank Spike Lab ID: 1241487
 Date Analyzed: 10/21/2014 12:53

Spike Duplicate ID: LCSD for HBN 1145252 [VXX26660]
 Spike Duplicate Lab ID: 1241488
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1145252001, 1145252002, 1145252003

Results by AK101

Parameter	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	10.0	10.2	102	10.0	9.61	96	(60-120)	5.90	(< 20)

Surrogates

4-Bromofluorobenzene	1.25		103	1.25		102	(50-150)	0.78	
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Batch Information

Analytical Batch: **VFC12191**
 Analytical Method: **AK101**
 Instrument: **Agilent 7890A PID/FID**
 Analyst: **ST**

Prep Batch: **VXX26660**
 Prep Method: **SW5035A**
 Prep Date/Time: **10/21/2014 08:00**
 Spike Init Wt./Vol.: 10.0 mg/Kg Extract Vol: 25 mL
 Dup Init Wt./Vol.: 10.0 mg/Kg Extract Vol: 25 mL

Print Date: 10/22/2014 4:31:25PM

Method Blank

Blank ID: MB for HBN 1660805 [VXX/26660]
 Blank Lab ID: 1241484

Matrix: Soil/Solid (dry weight)

QC for Samples:
 1145252001, 1145252002, 1145252003

Results by SW8021B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	6.25U	12.5	4.00	ug/Kg
Ethylbenzene	12.5U	25.0	7.80	ug/Kg
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
Toluene	12.5U	25.0	7.80	ug/Kg
Surrogates				
1,4-Difluorobenzene	96.9	72-119		%

Batch Information

Analytical Batch: VFC12191
 Analytical Method: SW8021B
 Instrument: Agilent 7890A PID/FID
 Analyst: ST
 Analytical Date/Time: 10/21/2014 11:57:00AM

Prep Batch: VXX26660
 Prep Method: SW5035A
 Prep Date/Time: 10/21/2014 8:00:00AM
 Prep Initial Wt./Vol.: 50 g
 Prep Extract Vol: 25 mL

Print Date: 10/22/2014 4:31:27PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1145252 [VXX26660]
 Blank Spike Lab ID: 1241485
 Date Analyzed: 10/21/2014 12:16

Spike Duplicate ID: LCSD for HBN 1145252
 [VXX26660]
 Spike Duplicate Lab ID: 1241486
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1145252001, 1145252002, 1145252003

Results by SW8021B

Parameter	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	1250	1310	105	1250	1300	104	(75-125)	0.59	(< 20)
Ethylbenzene	1250	1260	101	1250	1260	100	(75-125)	0.10	(< 20)
o-Xylene	1250	1260	101	1250	1260	101	(75-125)	0.16	(< 20)
P & M -Xylene	2500	2540	102	2500	2540	102	(80-125)	0.15	(< 20)
Toluene	1250	1250	100	1250	1250	100	(70-125)	0.10	(< 20)
Surrogates									
1,4-Difluorobenzene	1250		105	1250		105	(72-119)	0.31	

Batch Information

Analytical Batch: **VFC12191**
 Analytical Method: **SW8021B**
 Instrument: **Agilent 7890A PID/FID**
 Analyst: **ST**

Prep Batch: **VXX26660**
 Prep Method: **SW5035A**
 Prep Date/Time: **10/21/2014 08:00**
 Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
 Dup Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

Matrix Spike Summary

Original Sample ID: 1145233004
 MS Sample ID: 1241489 MS
 MSD Sample ID: 1241490 MSD

Analysis Date: 10/21/2014 14:47
 Analysis Date: 10/21/2014 15:06
 Analysis Date: 10/21/2014 15:25
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1145252001, 1145252002, 1145252003

Results by SW8021B

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	21.7U	1737	1784	103	1737	1808	104	75-125	1.00	(< 20)
Ethylbenzene	43.3U	1737	1749	101	1737	1784	103	75-125	1.40	(< 20)
o-Xylene	43.3U	1737	1749	101	1737	1772	102	75-125	1.20	(< 20)
P & M -Xylene	86.6U	3462	3545	102	3462	3592	104	80-125	1.30	(< 20)
Toluene	43.3U	1737	1702	98	1737	1725	100	70-125	1.30	(< 20)
Surrogates										
1,4-Difluorobenzene		1737	1796	104	1737	1831	106	72-119	2.10	

Batch Information

Analytical Batch: VFC12191
 Analytical Method: SW8021B
 Instrument: Agilent 7890A PID/FID
 Analyst: ST
 Analytical Date/Time: 10/21/2014 3:06:00PM

Prep Batch: VXX26660
 Prep Method: AK101 Extraction (S)
 Prep Date/Time: 10/21/2014 8:00:00AM
 Prep Initial Wt./Vol.: 42.37g
 Prep Extract Vol: 25.00mL

Method Blank

Blank ID: MB for HBN 1660764 [XXX/32241]

Blank Lab ID: 1241309

QC for Samples:

1145252001, 1145252002

Matrix: Soil/Solid (dry weight)

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	72.6	60-120		%

Batch Information

Analytical Batch: XFC11643

Analytical Method: AK102

Instrument: HP 6890 Series II FID SV D R

Analyst: AYC

Analytical Date/Time: 10/22/2014 10:40:00AM

Prep Batch: XXX32241

Prep Method: SW3550C

Prep Date/Time: 10/21/2014 2:50:44PM

Prep Initial Wt./Vol.: 30 g

Prep Extract Vol: 1 mL

Print Date: 10/22/2014 4:31:32PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1145252 [XXX32241]
 Blank Spike Lab ID: 1241310
 Date Analyzed: 10/22/2014 10:50

Spike Duplicate ID: LCSD for HBN 1145252 [XXX32241]
 Spike Duplicate Lab ID: 1241311
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1145252001, 1145252002

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	167	142	85	167	154	92	(75-125)	8.00	(< 20)

Surrogates

5a Androstane	3.33		90	3.33		98	(60-120)	8.60	
---------------	------	--	----	------	--	----	------------	------	--

Batch Information

Analytical Batch: **XFC11643**
 Analytical Method: **AK102**
 Instrument: **HP 6890 Series II FID SV D R**
 Analyst: **AYC**

Prep Batch: **XXX32241**
 Prep Method: **SW3550C**
 Prep Date/Time: **10/21/2014 14:50**
 Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL
 Dup Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL



SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY RECORD

Page 1 of 1
Laboratory: SGS
Attn: Tori Pennick

400 N. 34th Street, Suite 100 Seattle, WA 98103 (206) 632-8020
2043 Westport Center Drive St. Louis, MO 63146-3564 (314) 699-9660
303 Wellsian Way Richland, WA 99352 (509) 946-6309

2355 Hill Road Fairbanks, AK 99709 (907) 479-0600
5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 561-2120

2255 S.W. Canyon Road Portland, OR 97201-2498 (503) 223-6147
1200 17th Street, Suite 1024 Denver, Co 80202 (303) 825-3800

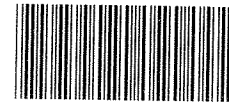
Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRAB/BOX	MR-101	EPA 8021B	DRG	MR-102	Total Number of Containers	Remarks/Matrix
02381-002 S2	①A-B	1127a	10/21	X	✓	✓	✓				2	soil
02381-002 S3	②A-B	1131a	10/21	X	✓	✓	✓				2	soil
TB	③A	945a	10/21		✓						1	trip blank
02381-002 S1		1123a	10/21	X								soil
02381-002 S4		1136a	10/21	X								soil

Project Information	Sample Receipt
Project Number: <u>32-1-02381-002</u>	Total Number of Containers
Project Name: <u>POA Maint Bldg.</u>	COC Seals/Intact? Y/N/NA
Contact: <u>Katra Wedeking</u>	Received Good Cond./Cold
Ongoing Project? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Delivery Method:
Sampler: <u>KW</u>	(attach shipping bill, if any)

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: <u>Katra Wedeking</u> Time: <u>13:43</u>	Signature: _____ Time: _____	Signature: _____ Time: _____
Printed Name: <u>Katra Wedeking</u> Date: <u>10/21</u>	Printed Name: _____ Date: _____	Printed Name: _____ Date: _____
Company: <u>Shannon + Wilson</u>	Company: _____	Company: _____
Received By: 1.	Received By: 2.	Received By: 3.
Signature: _____ Time: _____	Signature: _____ Time: _____	Signature: <u>Terri Draeger</u> Time: <u>13:43</u>
Printed Name: _____ Date: _____	Printed Name: _____ Date: _____	Printed Name: <u>Terri Draeger</u> Date: <u>10/21/14</u>
Company: _____	Company: _____	Company: <u>SGS</u>

Instructions
Requested Turnaround Time:
Special Instructions: <u>24 HOUR RUSH!!</u>
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File



SAMPLE RECEIPT FORM

Review Criteria:	Condition:	Comments/Action Taken:
Were custody seals intact? Note # & location, if applicable. COC accompanied samples?	Yes No <u>N/A</u> Yes No	<input type="checkbox"/> Exemption permitted if sampler hand carries/delivers.
Temperature blank compliant* (i.e., 0-6°C after CF)? If >6°C, were samples collected <8 hours ago? If <0°C, were all sample containers ice free? Cooler ID: <u>1</u> @ <u>9.2</u> w/ Therm.ID: <u>240</u> Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ If samples are 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 <u>nor</u> cooler temp can be obtained, note "ambient" or "chilled."	Yes No <u>N/A</u> Yes No <u>N/A</u> Yes No <u>N/A</u>	<input checked="" type="checkbox"/> Exemption permitted if chilled & collected <8 hrs ago. <i>Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.</i>
Delivery method (specify all that apply): <u>Client (hand carried)</u> USPS Lynden AK Air Alert Courier UPS FedEx RAVN C&D Delivery Carlisle Pen Air Warp Speed Other: _____ → For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?	Tracking/AB # or see attached or <u>N/A</u> Yes No <u>N/A</u>	
→ For samples received with payment, note amount (\$) and whether cash / check / CC (circle one) was received. → For samples received in FBKS , ANCH staff will verify all criteria are reviewed. SRF initiated in FBKS by:		
Were samples received within hold time? Do samples match COC* (i.e., sample IDs, dates/times collected)? Were analyses requested unambiguous?	<u>Yes</u> No N/A <u>Yes</u> No N/A <u>Yes</u> No N/A	<i>Note: Refer to form F-083 "Sample Guide" for hold times. Note: If times differ <1hr, record details and login per COC.</i>
Were samples in good condition (no leaks/cracks/breakage)? Packing material used (specify all that apply): Bubble Wrap Separate plastic bags Vermiculite Other:	<u>Yes</u> No	
Were proper containers (type/mass/volume/preservative*) used? Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples? Were all VOA vials free of headspace (i.e., bubbles ≤6 mm)? Were all soil VOAs field extracted with MeOH+BFB?	<u>Yes</u> No N/A <u>Yes</u> No N/A <u>Yes</u> No <u>N/A</u> <u>Yes</u> No <u>N/A</u>	<input type="checkbox"/> Exemption permitted for metals (e.g., 200.8/6020A).
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was pH verified and compliant ? If pH was adjusted, were bottles flagged (i.e., stickers)?	Yes No <u>N/A</u> Yes No <u>N/A</u>	
For special handling (e.g., "MI" soils, foreign soils, lab filter for dissolved..., lab extract for volatiles, Ref Lab, limited volume), were bottles/paperwork flagged (e.g., sticker)?	Yes No <u>N/A</u>	
For RUSH/SHORT Hold Time , were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	<u>Yes</u> No N/A	<i>Rush Done: 10/22/14</i>
For SITE-SPECIFIC QC , e.g. BMS/BMSD/BDUP, were containers / paperwork flagged accordingly?	Yes No <u>N/A</u>	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	Yes No <u>N/A</u>	SRF Completed by: <u>CRD</u> PM notified: N/A
Was PEER REVIEW of <i>sample numbering/labeling completed</i> ?	Yes No <u>N/A</u>	Peer Reviewed by: N/A
Additional notes (if applicable):		

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



Returned Bottles Inventory

Name of individual returning bottles:

Katrina Wedeking

Date Received:

10/21/14

Client Name:

Shannon Wilson

Received by:

Cory Dunning

Project Name:

POA Wedeking

SGS PM:

Tori Pennick

HDPE/Nalgene:	1-L				
	500-ml				
	250-ml or 8-oz				
	125-ml or 4-oz				
	60-ml or 2-oz				
	other				
amber glass:	1-L				
	500-ml				
	250-ml or 8-oz				
	125-ml or 4-oz with or without septa	2			
	40-ml VOA vial	1			
	other				
Subtotal:		3			

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

Amount to Invoice Client \$:

12.00

WO#:

1145252





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>
1145252001-A	No Preservative Required	OK			
1145252001-B	Methanol field pres. 4 C	OK			
1145252002-A	No Preservative Required	OK			
1145252002-B	Methanol field pres. 4 C	OK			
1145252003-A	Methanol field pres. 4 C	OK			

Container Condition Glossary

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

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

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

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

LABORATORY DATA REVIEW CHECKLIST

Completed by: Jake Greuey

Title: Senior Professional

Date: November 7, 2014

CS Report Name: POA Maintenance Building

Laboratory Report Date: October 22, 2014

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: SGS North America Inc.

Laboratory Report Number: 1145252

ADEC File Number: N/A

ADEC RecKey Number: NA

(NOTE: NA = not applicable; Text in *italics* added by Shannon & Wilson, Inc.)

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses? **Yes** / No / NA (please explain)

Comments: *SGS Environmental Services, Inc. in Anchorage, AK performed requested analyses.*

- b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS-approved?

Yes / No / **NA** (please explain)

Comments: *SGS performed all reported analyses.*

2. Chain of Custody (COC)

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

Yes / No / NA (please explain)

Comments:

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

Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?

Yes / **No** / NA (please explain)

Comments: *The temperature blank was 9.2°C .*

- b. Sample preservation acceptable - acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)? **Yes** / No / NA (please explain)

Comments:

- c. Sample condition documented - broken, leaking (Methanol), zero headspace (VOC vials)? **Yes** / No / NA (please explain)

Comments: *The laboratory does not note any sample-condition anomalies.*

- d. If there were any discrepancies, were they documented? – For example, incorrect sample containers/preservation, sample temperature outside acceptance range, insufficient or missing samples, etc.? **Yes** / No / NA (please explain)

Comments: *The sample temperatures were outside the acceptable range, but sample integrity was not affected since the samples were collected less than 8 hours upon submittal to the laboratory.*

- e. Data quality or usability affected? Please explain. **No**

Comments: *See above.*

4. Case Narrative

- a. Present and understandable? **Yes** / No / NA (please explain)

Comments:

- b. Discrepancies, errors or QC failures identified by the lab? **Yes** / No / NA (please explain)

Comments: *The laboratory notes the following:*

- *GRO and toluene were detected above the Detection Limit (J-Flagged) in the Trip Blank. Toluene was not detected in the associated samples, and both toluene and GRO concentrations were less than 1/2 the LOQ; therefore, no further action was taken.*

- c. Were corrective actions documented? Yes / No / **NA** (please explain)

Comments: *None to note.*

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

Comments: *The laboratory does not note an effect on data quality/usability.*

5. Sample Results

- a. Correct analyses performed/reported as requested on COC? **Yes** / No / NA (please explain)

Comments:

- b. All applicable holding times met? **Yes** / No / NA (please explain)

Comments:

- c. All soils reported on a dry weight basis? **Yes** / No / NA (please explain)
Comments:
- d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project? **Yes** / No / NA (please explain)
Comments:
- e. Data quality or usability affected? Please explain. **Yes** / No / NA
Comments:

6. QC Samples

a. Method Blank

- i. One method blank reported per matrix, analysis, and 20 samples?
Yes / No / NA (please explain)
Comments:
- ii. All method blank results less than LOQ? **Yes** / No / NA (please explain)
Comments: *GRO was detected in the method blank above the detection limit, but below the limit of quantitation.*
- iii. If above LOQ, what samples are affected? **NA**
Comments: *Although the reported GRO concentration in the method blank is less than the LOQ, samples from S2 and S3 associated with this method blank are "B" flagged when the reported sample concentration is within 10x the reported method blank concentration. If both the sample and method blank concentrations are reported at levels less than the LOQ, the sample concentration is reported as non-detect at the LOQ. If the reported sample concentration is greater than the LOQ and less than 5x the method blank concentration, the sample concentration is reported as non-detect at the detected sample concentration. If the sample concentration is greater than 5x the method blank concentration and less than or equal to 10x the method blank concentration, the sample concentration is reported at the detected sample concentration.*
- iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Yes / No / NA (please explain)
Comments: *The affected samples are "B" flagged in Table 2.*
- v. Data quality or usability affected? Please explain. **No**
Comments: *See above.*

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

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

(please explain)

Comments:

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

Comments: *Metals and/or inorganic analyses not requested.*

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

Comments:

- iv. Precision – All relative percent differences (RPDs) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages) **Yes / No / NA** (please explain)

Comments:

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

Comments:

- vi. Do the affected samples(s) have data flags? If so, are the data flags clearly defined? **Yes / No / NA** (please explain)

Comments:

- vii. Data quality or usability affected? Please explain. **No**

Comments:

c. Surrogates - Organics Only

- i. Are surrogate recoveries reported for organic analyses, field, QC, and laboratory samples? **Yes / No / NA** (please explain)

Comments:

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

Comments:

- iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined? **Yes / No / NA** (please explain)

Comments: *See above.*

- iv. Data quality or usability affected? Please explain. **Yes / No / NA** (please explain)

Comments: *See above.*

d. Trip Blank - Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.)
Water and Soil

- i. One trip blank reported per matrix, analysis and cooler? (If not, enter explanation below.) **Yes** / No / NA (please explain)

Comments:

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment stating why must be entered below.) **Yes** / No / NA (please explain)

Comments:

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

Comments: *GRO was detected above the detection limit at a J-Flagged concentration of 0.781 mg/kg. Toluene was detected above the detection limit of a J-Flagged concentration of 0.0119 mg/Kg.*

- iv. If above LOQ, what samples are affected? **Yes** / **No** / NA (please explain)

Comments: *The GRO results for Sample S2 and S3 are B-flagged due to a method blank detection for GRO. Although Toluene was detected in the trip blank, it was not detected in the project samples.*

- v. Data quality or usability affected? Please explain. **Yes** / **No** / NA (please explain)

Comments: *See above.*

e. Field Duplicate

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

Yes / **No** / NA (please explain)

Comments: *A duplicate was not required per the ADEC approved work plan.*

- ii. Submitted blind to the lab? **Yes** / No / **NA** (please explain)

Comments:

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

Comments:

- iv. Data quality or usability affected? Please explain. **Yes** / No / **NA** (please explain)

Comments:

f. Decontamination or Equipment Blank

Yes / **No** / NA (please explain)

Comments: *Equipment blanks were not part of the work-plan scope.*

Work Order Number: 1145252

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

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

v. Data quality or usability affected? Yes / No / **NA** (please explain)
Comments: *See above.*

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

a. Defined and appropriate? **Yes** / No / NA (please explain)
Comments: *A key is provided on page 3 of the laboratory report.*

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks Street, suite 3
Anchorage, AK 99518

Report Number: **1145333**

Client Project: **02381-002 Port of Anch.**

Dear Jacob Tracy,

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

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

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

Sincerely,

SGS North America Inc.



Victoria Pennick

2014.11.11

15:54:49 -09'00'

SGS North America Inc.
Environmental Services - Alaska Division
Project Manager

Victoria Pennick
Project Manager
Victoria.Pennick@sgs.com

Date

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1145333**
Project Name/Site: **02381-002 Port of Anch.**
Project Contact: **Jacob Tracy**

Refer to sample receipt form for information on sample condition.

02381-EXBS2 (1145333001) PS

AK102 - The pattern is consistent with a weathered middle distillate.

02381-EXBS3 (1145333002) PS

AK102 - The pattern is consistent with a weathered middle distillate.

AK103 - Unknown hydrocarbon with several peaks is present.

8270D SIM - Surrogate (2-fluorobiphenyl) recovery is outside of QC criteria due to sample dilution.

8270D SIM - LOQs are elevated due to sample dilution. Sample analyzed at a dilution due to matrix interference with internal standards.

02381-EXBS13 (1145333003) PS

AK102 - The pattern is consistent with a weathered middle distillate.

02381-EXSW5 (1145333006) PS

AK102 - The pattern is consistent with a weathered middle distillate.

02381-EXSW6 (1145333007) PS

AK102 - The pattern is consistent with a weathered middle distillate.

02381-SS2 (1145333008) PS

AK102 - The pattern is consistent with a weathered middle distillate.

02381-SS5 (1145333009) PS

AK102 - The pattern is consistent with a weathered middle distillate.

1145336001MS (1243729) MS

8270D SIM - MS recovery for benzo[b]fluoranthene is outside of QC criteria. Refer to LCS for accuracy.

1145336001MSD (1243730) MSD

8270D SIM - MSD recovery for fluoranthene and pyrene is outside of QC criteria. Refer to LCS for accuracy.

8270D SIM - MS/MSD RPD for fluoranthene and pyrene does not meet QC criteria.

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

Report of Manual Integrations

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Analytical Batch</u>	<u>Analyte</u>	<u>Reason</u>
8270D SIMS (PAH)				
1145336001	LABREFQC	XMS8391	Benzo[b]Fluoranthene	SP
1145336001	LABREFQC	XMS8391	Benzo[k]fluoranthene	BLC

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.

Print Date: 11/11/2014 3:28:37PM

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6020, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 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	Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

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

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
02381-EXBS2	1145333001	10/24/2014	10/27/2014	Soil/Solid (dry weight)
02381-EXBS3	1145333002	10/24/2014	10/27/2014	Soil/Solid (dry weight)
02381-EXBS13	1145333003	10/24/2014	10/27/2014	Soil/Solid (dry weight)
02381-EXSW1	1145333004	10/24/2014	10/27/2014	Soil/Solid (dry weight)
02381-EXSW2	1145333005	10/24/2014	10/27/2014	Soil/Solid (dry weight)
02381-EXSW5	1145333006	10/24/2014	10/27/2014	Soil/Solid (dry weight)
02381-EXSW6	1145333007	10/24/2014	10/27/2014	Soil/Solid (dry weight)
02381-SS2	1145333008	10/24/2014	10/27/2014	Soil/Solid (dry weight)
02381-SS5	1145333009	10/24/2014	10/27/2014	Soil/Solid (dry weight)
02381-TB	1145333010	10/24/2014	10/27/2014	Soil/Solid (dry weight)

<u>Method</u>	<u>Method Description</u>
8270D SIMS (PAH)	8270 PAH SIM Semi-Volatiles GC/MS
AK101	AK101/8021 Combo. (S)
SW8021B	AK101/8021 Combo. (S)
SW8021B	BTEX 8021 prepped by AK101 Field Prep
AK102	Diesel Range Organics (S)
AK102	Diesel/Residual Range Organics
AK103	Diesel/Residual Range Organics
SM21 2540G	Percent Solids SM2540G

Print Date: 11/11/2014 3:28:40PM

Detectable Results Summary

Client Sample ID: **02381-EXBS2**

Lab Sample ID: 1145333001

Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	798	mg/Kg

Client Sample ID: **02381-EXBS3**

Lab Sample ID: 1145333002

Polynuclear Aromatics GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
1-Methylnaphthalene	79.3	ug/Kg
2-Methylnaphthalene	62.3	ug/Kg
Chrysene	20.8J	ug/Kg
Fluoranthene	32.7J	ug/Kg
Fluorene	90.6	ug/Kg
Phenanthrene	112	ug/Kg
Pyrene	38.3J	ug/Kg

Semivolatile Organic Fuels

Diesel Range Organics	708	mg/Kg
Residual Range Organics	252	mg/Kg

Volatile Fuels

Ethylbenzene	11.3J	ug/Kg
Gasoline Range Organics	9.57	mg/Kg
o-Xylene	67.5	ug/Kg
P & M -Xylene	58.7	ug/Kg
Toluene	11.3J	ug/Kg

Client Sample ID: **02381-EXBS13**

Lab Sample ID: 1145333003

Semivolatile Organic Fuels

Diesel Range Organics	845	mg/Kg
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Volatile Fuels

Ethylbenzene	15.6J	ug/Kg
o-Xylene	71.9	ug/Kg
P & M -Xylene	52.1J	ug/Kg
Toluene	11.4J	ug/Kg

Client Sample ID: **02381-EXSW5**

Lab Sample ID: 1145333006

Semivolatile Organic Fuels

Diesel Range Organics	541	mg/Kg
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Client Sample ID: **02381-EXSW6**

Lab Sample ID: 1145333007

Semivolatile Organic Fuels

Diesel Range Organics	757	mg/Kg
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Client Sample ID: **02381-SS2**

Lab Sample ID: 1145333008

Semivolatile Organic Fuels

Diesel Range Organics	354	mg/Kg
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Client Sample ID: **02381-SS5**

Lab Sample ID: 1145333009

Semivolatile Organic Fuels

Diesel Range Organics	303	mg/Kg
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Results of **02381-EXBS2**

Client Sample ID: **02381-EXBS2**
Client Project ID: **02381-002 Port of Anch.**
Lab Sample ID: 1145333001
Lab Project ID: 1145333

Collection Date: 10/24/14 13:50
Received Date: 10/27/14 10:45
Matrix: Soil/Solid (dry weight)
Solids (%): 88.6
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	798	88.6	27.5	mg/Kg	4		11/08/14 00:21
Surrogates							
5a Androstane	89.4	50-150		%	4		11/08/14 00:21

Batch Information

Analytical Batch: XFC11670
Analytical Method: AK102
Analyst: AYC
Analytical Date/Time: 11/08/14 00:21
Container ID: 1145333001-A

Prep Batch: XXX32351
Prep Method: SW3550C
Prep Date/Time: 11/04/14 13:42
Prep Initial Wt./Vol.: 30.56 g
Prep Extract Vol: 1 mL

Print Date: 11/11/2014 3:28:42PM



Results of 02381-EXBS3

Client Sample ID: 02381-EXBS3
Client Project ID: 02381-002 Port of Anch.
Lab Sample ID: 1145333002
Lab Project ID: 1145333

Collection Date: 10/24/14 13:55
Received Date: 10/27/14 10:45
Matrix: Soil/Solid (dry weight)
Solids (%): 89.4
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their detection results.

Batch Information

Analytical Batch: XMS8392
Analytical Method: 8270D SIMS (PAH)
Analyst: RTS
Analytical Date/Time: 11/06/14 21:30
Container ID: 1145333002-A

Prep Batch: XXX32352
Prep Method: SW3550C
Prep Date/Time: 11/04/14 16:11
Prep Initial Wt./Vol.: 22.708 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS8397
Analytical Method: 8270D SIMS (PAH)
Analyst: RTS
Analytical Date/Time: 11/07/14 23:51
Container ID: 1145333002-A

Prep Batch: XXX32352
Prep Method: SW3550C
Prep Date/Time: 11/04/14 16:11
Prep Initial Wt./Vol.: 22.708 g
Prep Extract Vol: 1 mL

Print Date: 11/11/2014 3:28:42PM



Results of 02381-EXBS3

Client Sample ID: 02381-EXBS3
Client Project ID: 02381-002 Port of Anch.
Lab Sample ID: 1145333002
Lab Project ID: 1145333

Collection Date: 10/24/14 13:55
Received Date: 10/27/14 10:45
Matrix: Soil/Solid (dry weight)
Solids (%): 89.4
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: XFC11670
Analytical Method: AK102
Analyst: AYC
Analytical Date/Time: 11/08/14 00:31
Container ID: 1145333002-A
Prep Batch: XXX32351
Prep Method: SW3550C
Prep Date/Time: 11/04/14 13:42
Prep Initial Wt./Vol.: 30.746 g
Prep Extract Vol: 1 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: XFC11669
Analytical Method: AK103
Analyst: AYC
Analytical Date/Time: 11/07/14 16:35
Container ID: 1145333002-A
Prep Batch: XXX32351
Prep Method: SW3550C
Prep Date/Time: 11/04/14 13:42
Prep Initial Wt./Vol.: 30.746 g
Prep Extract Vol: 1 mL

Print Date: 11/11/2014 3:28:42PM



Results of 02381-EXBS3

Client Sample ID: 02381-EXBS3
Client Project ID: 02381-002 Port of Anch.
Lab Sample ID: 1145333002
Lab Project ID: 1145333

Collection Date: 10/24/14 13:55
Received Date: 10/27/14 10:45
Matrix: Soil/Solid (dry weight)
Solids (%): 89.4
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 9.57, 2.75, 0.824, mg/Kg, 1, 10/30/14 11:46

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene, 117, 50-150, %, 1, 10/30/14 11:46

Batch Information

Analytical Batch: VFC12216
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/30/14 11:46
Container ID: 1145333002-B

Prep Batch: VXX26729
Prep Method: SW5035A
Prep Date/Time: 10/24/14 13:55
Prep Initial Wt./Vol.: 65.077 g
Prep Extract Vol: 31.9273 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene, 90.3, 72-119, %, 1, 10/30/14 11:46

Batch Information

Analytical Batch: VFC12216
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/30/14 11:46
Container ID: 1145333002-B

Prep Batch: VXX26729
Prep Method: SW5035A
Prep Date/Time: 10/24/14 13:55
Prep Initial Wt./Vol.: 65.077 g
Prep Extract Vol: 31.9273 mL

Print Date: 11/11/2014 3:28:42PM



Results of **02381-EXBS13**

Client Sample ID: **02381-EXBS13**
Client Project ID: **02381-002 Port of Anch.**
Lab Sample ID: 1145333003
Lab Project ID: 1145333

Collection Date: 10/24/14 14:25
Received Date: 10/27/14 10:45
Matrix: Soil/Solid (dry weight)
Solids (%): 88.5
Location:

Results by **Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result</u>	<u>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	845		89.4	27.7	mg/Kg	4		11/08/14 00:41
Surrogates								
5a Androstane	104		50-150		%	4		11/08/14 00:41

Batch Information

Analytical Batch: XFC11670
Analytical Method: AK102
Analyst: AYC
Analytical Date/Time: 11/08/14 00:41
Container ID: 1145333003-A

Prep Batch: XXX32351
Prep Method: SW3550C
Prep Date/Time: 11/04/14 13:42
Prep Initial Wt./Vol.: 30.34 g
Prep Extract Vol: 1 mL

Print Date: 11/11/2014 3:28:42PM



Results of **02381-EXBS13**

Client Sample ID: **02381-EXBS13**
Client Project ID: **02381-002 Port of Anch.**
Lab Sample ID: 1145333003
Lab Project ID: 1145333

Collection Date: 10/24/14 14:25
Received Date: 10/27/14 10:45
Matrix: Soil/Solid (dry weight)
Solids (%): 88.5
Location:

Results by **Volatile 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>
Benzene	6.95 U	13.9	4.46	ug/Kg	1		10/30/14 13:38
Ethylbenzene	15.6 J	27.9	8.69	ug/Kg	1		10/30/14 13:38
o-Xylene	71.9	27.9	8.69	ug/Kg	1		10/30/14 13:38
P & M -Xylene	52.1 J	55.7	16.7	ug/Kg	1		10/30/14 13:38
Toluene	11.4 J	27.9	8.69	ug/Kg	1		10/30/14 13:38
Surrogates							
1,4-Difluorobenzene	90.9	72-119		%	1		10/30/14 13:38

Batch Information

Analytical Batch: VFC12216
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/30/14 13:38
Container ID: 1145333003-B

Prep Batch: VXX26729
Prep Method: SW5035A
Prep Date/Time: 10/24/14 14:25
Prep Initial Wt./Vol.: 66.081 g
Prep Extract Vol: 32.594 mL

Print Date: 11/11/2014 3:28:42PM



Results of **02381-EXSW1**

Client Sample ID: **02381-EXSW1**
Client Project ID: **02381-002 Port of Anch.**
Lab Sample ID: 1145333004
Lab Project ID: 1145333

Collection Date: 10/24/14 14:05
Received Date: 10/27/14 10:45
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	10.7 U	21.3	6.59	mg/Kg	1		11/07/14 16:55
Surrogates							
5a Androstane	89.7	50-150		%	1		11/07/14 16:55

Batch Information

Analytical Batch: XFC11669
Analytical Method: AK102
Analyst: AYC
Analytical Date/Time: 11/07/14 16:55
Container ID: 1145333004-A

Prep Batch: XXX32351
Prep Method: SW3550C
Prep Date/Time: 11/04/14 13:42
Prep Initial Wt./Vol.: 30.862 g
Prep Extract Vol: 1 mL

Print Date: 11/11/2014 3:28:42PM



Results of **02381-EXSW2**

Client Sample ID: **02381-EXSW2**
Client Project ID: **02381-002 Port of Anch.**
Lab Sample ID: 1145333005
Lab Project ID: 1145333

Collection Date: 10/24/14 14:10
Received Date: 10/27/14 10:45
Matrix: Soil/Solid (dry weight)
Solids (%): 88.7
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	11.0 U	22.0	6.82	mg/Kg	1		11/07/14 17:05
Surrogates							
5a Androstane	91	50-150		%	1		11/07/14 17:05

Batch Information

Analytical Batch: XFC11669
Analytical Method: AK102
Analyst: AYC
Analytical Date/Time: 11/07/14 17:05
Container ID: 1145333005-A

Prep Batch: XXX32351
Prep Method: SW3550C
Prep Date/Time: 11/04/14 13:42
Prep Initial Wt./Vol.: 30.757 g
Prep Extract Vol: 1 mL

Print Date: 11/11/2014 3:28:42PM

Results of 02381-EXSW5

Client Sample ID: **02381-EXSW5**
 Client Project ID: **02381-002 Port of Anch.**
 Lab Sample ID: 1145333006
 Lab Project ID: 1145333

Collection Date: 10/24/14 14:30
 Received Date: 10/27/14 10:45
 Matrix: Soil/Solid (dry weight)
 Solids (%): 89.2
 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	541	22.0	6.83	mg/Kg	1		11/07/14 17:15
Surrogates							
5a Androstane	101	50-150		%	1		11/07/14 17:15

Batch Information

Analytical Batch: XFC11669
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 11/07/14 17:15
 Container ID: 1145333006-A

Prep Batch: XXX32351
 Prep Method: SW3550C
 Prep Date/Time: 11/04/14 13:42
 Prep Initial Wt./Vol.: 30.56 g
 Prep Extract Vol: 1 mL

Results of 02381-EXSW6

Client Sample ID: **02381-EXSW6**
 Client Project ID: **02381-002 Port of Anch.**
 Lab Sample ID: 1145333007
 Lab Project ID: 1145333

Collection Date: 10/24/14 14:35
 Received Date: 10/27/14 10:45
 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	757	86.8	26.9	mg/Kg	4		11/07/14 17:45
Surrogates							
5a Androstane	110	50-150		%	4		11/07/14 17:45

Batch Information

Analytical Batch: XFC11669
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 11/07/14 17:45
 Container ID: 1145333007-A

Prep Batch: XXX32351
 Prep Method: SW3550C
 Prep Date/Time: 11/04/14 13:42
 Prep Initial Wt./Vol.: 30.231 g
 Prep Extract Vol: 1 mL

Results of 02381-SS2

Client Sample ID: **02381-SS2**
 Client Project ID: **02381-002 Port of Anch.**
 Lab Sample ID: 1145333008
 Lab Project ID: 1145333

Collection Date: 10/24/14 15:03
 Received Date: 10/27/14 10:45
 Matrix: Soil/Solid (dry weight)
 Solids (%): 90.3
 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	354	22.1	6.86	mg/Kg	1		11/07/14 17:25
Surrogates							
5a Androstane	102	50-150		%	1		11/07/14 17:25

Batch Information

Analytical Batch: XFC11669
 Analytical Method: AK102
 Analyst: AYC
 Analytical Date/Time: 11/07/14 17:25
 Container ID: 1145333008-A

Prep Batch: XXX32351
 Prep Method: SW3550C
 Prep Date/Time: 11/04/14 13:42
 Prep Initial Wt./Vol.: 30.048 g
 Prep Extract Vol: 1 mL



Results of 02381-SS5

Client Sample ID: **02381-SS5**
Client Project ID: **02381-002 Port of Anch.**
Lab Sample ID: 1145333009
Lab Project ID: 1145333

Collection Date: 10/24/14 15:12
Received Date: 10/27/14 10:45
Matrix: Soil/Solid (dry weight)
Solids (%): 90.3
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	303	22.1	6.85	mg/Kg	1		11/07/14 17:35
Surrogates							
5a Androstane	97.5	50-150		%	1		11/07/14 17:35

Batch Information

Analytical Batch: XFC11669
Analytical Method: AK102
Analyst: AYC
Analytical Date/Time: 11/07/14 17:35
Container ID: 1145333009-A

Prep Batch: XXX32351
Prep Method: SW3550C
Prep Date/Time: 11/04/14 13:42
Prep Initial Wt./Vol.: 30.045 g
Prep Extract Vol: 1 mL

Print Date: 11/11/2014 3:28:42PM



Results of 02381-TB

Client Sample ID: 02381-TB
Client Project ID: 02381-002 Port of Anch.
Lab Sample ID: 1145333010
Lab Project ID: 1145333

Collection Date: 10/24/14 10:00
Received Date: 10/27/14 10:45
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 1.25 U, 2.50, 0.750, mg/Kg, 1, 10/30/14 15:48

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene, 86.1, 50-150, %, 1, 10/30/14 15:48

Batch Information

Analytical Batch: VFC12216
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 10/30/14 15:48
Container ID: 1145333010-A

Prep Batch: VXX26729
Prep Method: SW5035A
Prep Date/Time: 10/24/14 10:00
Prep Initial Wt./Vol.: 49.989 g
Prep Extract Vol: 25 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene, 89.4, 72-119, %, 1, 10/30/14 15:48

Batch Information

Analytical Batch: VFC12216
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 10/30/14 15:48
Container ID: 1145333010-A

Prep Batch: VXX26729
Prep Method: SW5035A
Prep Date/Time: 10/24/14 10:00
Prep Initial Wt./Vol.: 49.989 g
Prep Extract Vol: 25 mL

Print Date: 11/11/2014 3:28:42PM



Method Blank

Blank ID: MB for HBN 1667365 [SPT/9486]

Matrix: Soil/Solid (dry weight)

Blank Lab ID: 1243749

QC for Samples:

1145333001, 1145333002, 1145333003, 1145333004, 1145333005, 1145333006, 1145333007, 1145333008, 1145333009

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: SPT9486

Analytical Method: SM21 2540G

Instrument:

Analyst: MJN

Analytical Date/Time: 11/4/2014 6:00:00PM

Print Date: 11/11/2014 3:28:44PM

Duplicate Sample Summary

Original Sample ID: 1145482001

Duplicate Sample ID: 1243750

QC for Samples:

1145333001, 1145333002, 1145333003, 1145333004, 1145333005, 1145333006, 1145333007, 1145333008, 1145333009

Analysis Date: 11/04/2014 18:00

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

<u>NAME</u>	<u>Original ()</u>	<u>Duplicate ()</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	94.5	94.8	0.29	15.00

Batch Information

Analytical Batch: SPT9486

Analytical Method: SM21 2540G

Instrument:

Analyst: MJN

Print Date: 11/11/2014 3:28:46PM

Method Blank

Blank ID: MB for HBN 1668761 [VXX/26729]

Blank Lab ID: 1243887

QC for Samples:

1145333002, 1145333003, 1145333010

Matrix: Soil/Solid (dry weight)

Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	1.25U	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene	94.1	50-150		%

Batch Information

Analytical Batch: VFC12216

Analytical Method: AK101

Instrument: Agilent 7890 PID/FID

Analyst: ST

Analytical Date/Time: 10/30/2014 10:14:00AM

Prep Batch: VXX26729

Prep Method: SW5035A

Prep Date/Time: 10/30/2014 8:00:00AM

Prep Initial Wt./Vol.: 50 g

Prep Extract Vol: 25 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1145333 [VXX26729]
 Blank Spike Lab ID: 1243890
 Date Analyzed: 10/30/2014 11:09

Spike Duplicate ID: LCSD for HBN 1145333 [VXX26729]
 Spike Duplicate Lab ID: 1243891
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1145333002, 1145333003, 1145333010

Results by AK101

Parameter	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	10.0	9.93	99	10.0	9.78	98	(60-120)	1.60	(< 20)
Surrogates									
4-Bromofluorobenzene	1.25	89.5	90	1.25	89.9	90	(50-150)	0.49	

Batch Information

Analytical Batch: **VFC12216**
 Analytical Method: **AK101**
 Instrument: **Agilent 7890 PID/FID**
 Analyst: **ST**

Prep Batch: **VXX26729**
 Prep Method: **SW5035A**
 Prep Date/Time: **10/30/2014 08:00**
 Spike Init Wt./Vol.: 10.0 mg/Kg Extract Vol: 25 mL
 Dupe Init Wt./Vol.: 10.0 mg/Kg Extract Vol: 25 mL

Method Blank

Blank ID: MB for HBN 1668761 [VXX/26729]
 Blank Lab ID: 1243887

Matrix: Soil/Solid (dry weight)

QC for Samples:
 1145333002, 1145333003, 1145333010

Results by SW8021B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	6.25U	12.5	4.00	ug/Kg
Ethylbenzene	12.5U	25.0	7.80	ug/Kg
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
Toluene	12.5U	25.0	7.80	ug/Kg
Surrogates				
1,4-Difluorobenzene	90.5	72-119		%

Batch Information

Analytical Batch: VFC12216
 Analytical Method: SW8021B
 Instrument: Agilent 7890 PID/FID
 Analyst: ST
 Analytical Date/Time: 10/30/2014 10:14:00AM

Prep Batch: VXX26729
 Prep Method: SW5035A
 Prep Date/Time: 10/30/2014 8:00:00AM
 Prep Initial Wt./Vol.: 50 g
 Prep Extract Vol: 25 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1145333 [VXX26729]
 Blank Spike Lab ID: 1243888
 Date Analyzed: 10/30/2014 10:32

Spike Duplicate ID: LCSD for HBN 1145333
 [VXX26729]
 Spike Duplicate Lab ID: 1243889
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1145333002, 1145333003, 1145333010

Results by SW8021B

Parameter	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	1250	1340	107	1250	1370	110	(75-125)	2.70	(< 20)
Ethylbenzene	1250	1240	99	1250	1280	103	(75-125)	3.70	(< 20)
o-Xylene	1250	1180	94	1250	1210	97	(75-125)	2.70	(< 20)
P & M -Xylene	2500	2420	97	2500	2500	100	(80-125)	3.20	(< 20)
Toluene	1250	1260	101	1250	1310	105	(70-125)	4.20	(< 20)
Surrogates									
1,4-Difluorobenzene	1250	96.8	97	1250	96.6	97	(72-119)	0.25	

Batch Information

Analytical Batch: **VFC12216**
 Analytical Method: **SW8021B**
 Instrument: **Agilent 7890 PID/FID**
 Analyst: **ST**

Prep Batch: **VXX26729**
 Prep Method: **SW5035A**
 Prep Date/Time: **10/30/2014 08:00**
 Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
 Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

Matrix Spike Summary

Original Sample ID: 1145333002
 MS Sample ID: 1243892 MS
 MSD Sample ID: 1243893 MSD

Analysis Date: 10/30/2014 11:46
 Analysis Date: 10/30/2014 12:05
 Analysis Date: 10/30/2014 12:23
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1145333002, 1145333003, 1145333010

Results by SW8021B

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	6.85U	1074	1163	108	1074	1197	111	75-125	2.80	(< 20)
Ethylbenzene	11.3J	1074	1091	100	1074	1112	102	75-125	1.90	(< 20)
o-Xylene	67.5	1074	1197	105	1074	1219	107	75-125	2.30	(< 20)
P & M -Xylene	58.7	2148	2181	99	2148	2237	102	80-125	2.70	(< 20)
Toluene	11.3J	1074	1113	103	1074	1130	104	70-125	1.50	(< 20)
Surrogates										
1,4-Difluorobenzene		1074	1017	95	1074	1036	96	72-119	1.80	

Batch Information

Analytical Batch: VFC12216
 Analytical Method: SW8021B
 Instrument: Agilent 7890 PID/FID
 Analyst: ST
 Analytical Date/Time: 10/30/2014 12:05:00PM

Prep Batch: VXX26729
 Prep Method: AK101 Extraction (S)
 Prep Date/Time: 10/30/2014 8:00:00AM
 Prep Initial Wt./Vol.: 65.08g
 Prep Extract Vol: 25.00mL

Method Blank

Blank ID: MB for HBN 1667265 [XXX/32351]
Blank Lab ID: 1243694

Matrix: Soil/Solid (dry weight)

QC for Samples:

1145333001, 1145333002, 1145333003, 1145333004, 1145333005, 1145333006, 1145333007, 1145333008, 1145333009

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	90.9	60-120		%

Batch Information

Analytical Batch: XFC11669
Analytical Method: AK102
Instrument: HP 6890 Series II FID SV D R
Analyst: AYC
Analytical Date/Time: 11/7/2014 3:35:00PM

Prep Batch: XXX32351
Prep Method: SW3550C
Prep Date/Time: 11/4/2014 1:42:44PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

Print Date: 11/11/2014 3:28:55PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1145333 [XXX32351]
 Blank Spike Lab ID: 1243695
 Date Analyzed: 11/07/2014 15:45

Spike Duplicate ID: LCSD for HBN 1145333
 [XXX32351]
 Spike Duplicate Lab ID: 1243696
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1145333001, 1145333002, 1145333003, 1145333004, 1145333005, 1145333006, 1145333007,
 1145333008, 1145333009

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	167	191	114	167	189	114	(75-125)	0.67	(< 20)
Surrogates									
5a Androstane	3.33	113	113	3.33	115	115	(60-120)	1.70	

Batch Information

Analytical Batch: **XFC11669**
 Analytical Method: **AK102**
 Instrument: **HP 6890 Series II FID SV D R**
 Analyst: **AYC**

Prep Batch: **XXX32351**
 Prep Method: **SW3550C**
 Prep Date/Time: **11/04/2014 13:42**
 Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL
 Dupe Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL



Method Blank

Blank ID: MB for HBN 1667265 [XXX/32351]
Blank Lab ID: 1243694

Matrix: Soil/Solid (dry weight)

QC for Samples:

1145333001, 1145333002, 1145333003, 1145333004, 1145333005, 1145333006, 1145333007, 1145333008, 1145333009

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	96	60-120		%

Batch Information

Analytical Batch: XFC11669
Analytical Method: AK103
Instrument: HP 6890 Series II FID SV D R
Analyst: AYC
Analytical Date/Time: 11/7/2014 3:35:00PM

Prep Batch: XXX32351
Prep Method: SW3550C
Prep Date/Time: 11/4/2014 1:42:44PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

Print Date: 11/11/2014 3:28:59PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1145333 [XXX32351]
 Blank Spike Lab ID: 1243695
 Date Analyzed: 11/07/2014 15:45

Spike Duplicate ID: LCSD for HBN 1145333
 [XXX32351]
 Spike Duplicate Lab ID: 1243696
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1145333001, 1145333002, 1145333003, 1145333004, 1145333005, 1145333006, 1145333007,
 1145333008, 1145333009

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	167	168	101	167	166	99	(60-120)	1.40	(< 20)
Surrogates									
n-Triacontane-d62	3.33	111	111	3.33	108	108	(60-120)	2.40	

Batch Information

Analytical Batch: **XFC11669**
 Analytical Method: **AK103**
 Instrument: **HP 6890 Series II FID SV D R**
 Analyst: **AYC**

Prep Batch: **XXX32351**
 Prep Method: **SW3550C**
 Prep Date/Time: **11/04/2014 13:42**
 Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL
 Dupe Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL

Method Blank

Blank ID: MB for HBN 1667361 [XXX/32352]
 Blank Lab ID: 1243727

Matrix: Soil/Solid (dry weight)

QC for Samples:
 1145333002

Results by 8270D SIMS (PAH)

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1-Methylnaphthalene	2.50U	5.00	1.50	ug/Kg
2-Methylnaphthalene	2.50U	5.00	1.50	ug/Kg
Acenaphthene	2.50U	5.00	1.50	ug/Kg
Acenaphthylene	2.50U	5.00	1.50	ug/Kg
Anthracene	2.50U	5.00	1.50	ug/Kg
Benzo(a)Anthracene	2.50U	5.00	1.50	ug/Kg
Benzo[a]pyrene	2.50U	5.00	1.50	ug/Kg
Benzo[b]Fluoranthene	2.50U	5.00	1.50	ug/Kg
Benzo[g,h,i]perylene	2.50U	5.00	1.50	ug/Kg
Benzo[k]fluoranthene	2.50U	5.00	1.50	ug/Kg
Chrysene	2.50U	5.00	1.50	ug/Kg
Dibenzo[a,h]anthracene	2.50U	5.00	1.50	ug/Kg
Fluoranthene	2.50U	5.00	1.50	ug/Kg
Fluorene	2.50U	5.00	1.50	ug/Kg
Indeno[1,2,3-c,d] pyrene	2.50U	5.00	1.50	ug/Kg
Naphthalene	2.50U	5.00	1.50	ug/Kg
Phenanthrene	2.50U	5.00	1.50	ug/Kg
Pyrene	2.50U	5.00	1.50	ug/Kg
Surrogates				
2-Fluorobiphenyl	69.4	45-105		%
Terphenyl-d14	105	30-125		%

Batch Information

Analytical Batch: XMS8391
 Analytical Method: 8270D SIMS (PAH)
 Instrument: HP 6890/5973 MS SVQA
 Analyst: RTS
 Analytical Date/Time: 11/5/2014 7:47:00PM

Prep Batch: XXX32352
 Prep Method: SW3550C
 Prep Date/Time: 11/4/2014 4:11:44PM
 Prep Initial Wt./Vol.: 22.5 g
 Prep Extract Vol: 1 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1145333 [XXX32352]

Blank Spike Lab ID: 1243728

Date Analyzed: 11/05/2014 20:01

Matrix: Soil/Solid (dry weight)

QC for Samples: 1145333002

Results by 8270D SIMS (PAH)

Parameter	Blank Spike (ug/Kg)			CL
	Spike	Result	Rec (%)	
1-Methylnaphthalene	22.2	16.9	76	(44-107)
2-Methylnaphthalene	22.2	15.5	70	(45-105)
Acenaphthene	22.2	15.9	71	(45-110)
Acenaphthylene	22.2	15.4	69	(45-105)
Anthracene	22.2	16.0	72	(55-105)
Benzo(a)Anthracene	22.2	20.8	93	(50-110)
Benzo[a]pyrene	22.2	13.1	59	(50-110)
Benzo[b]Fluoranthene	22.2	18.3	82	(45-115)
Benzo[g,h,i]perylene	22.2	13.8	62	(40-125)
Benzo[k]fluoranthene	22.2	19.0	86	(45-125)
Chrysene	22.2	21.4	96	(55-110)
Dibenzo[a,h]anthracene	22.2	14.2	64	(40-125)
Fluoranthene	22.2	24.1	108	(55-115)
Fluorene	22.2	16.9	76	(50-110)
Indeno[1,2,3-c,d] pyrene	22.2	14.2	64	(40-120)
Naphthalene	22.2	16.7	75	(40-105)
Phenanthrene	22.2	17.8	80	(50-110)
Pyrene	22.2	22.8	102	(45-125)
Surrogates				
2-Fluorobiphenyl	22.2	76.3	76	(45-105)
Terphenyl-d14	22.2	103	103	(30-125)

Batch Information

Analytical Batch: XMS8391

Analytical Method: 8270D SIMS (PAH)

Instrument: HP 6890/5973 MS SVQA

Analyst: RTS

Prep Batch: XXX32352

Prep Method: SW3550C

Prep Date/Time: 11/04/2014 16:11

Spike Init Wt./Vol.: 22.2 ug/Kg Extract Vol: 1 mL

Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1145336001
 MS Sample ID: 1243729 MS
 MSD Sample ID: 1243730 MSD

Analysis Date: 11/05/2014 20:16
 Analysis Date: 11/05/2014 20:30
 Analysis Date: 11/05/2014 20:45
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1145333002

Results by 8270D SIMS (PAH)

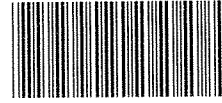
Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1-Methylnaphthalene	5.76U	25.6	22.7	89	25.2	20.6	82	44-107	9.90	(< 30)
2-Methylnaphthalene	5.76U	25.6	22.1	86	25.2	20.0	79	45-105	9.90	(< 30)
Acenaphthene	5.76U	25.6	22.1	86	25.2	20.1	80	45-110	9.50	(< 30)
Acenaphthylene	5.76U	25.6	24.7	88	25.2	22.7	82	45-105	8.70	(< 30)
Anthracene	5.76U	25.6	26.0	89	25.2	22.9	79	55-105	12.50	(< 30)
Benzo(a)Anthracene	23.0	25.6	37.3	56	25.2	47.3	96	50-110	23.50	(< 30)
Benzo(a)pyrene	11.0	25.6	24.7	53	25.2	28.4	69	50-110	14.10	(< 30)
Benzo(b)Fluoranthene	27.2	25.6	37.0	38 *	25.2	44.0	66	45-115	17.20	(< 30)
Benzo(g,h,i)perylene	5.76U	25.6	17.0	49	25.2	19.6	60	40-125	14.60	(< 30)
Benzo(k)fluoranthene	6.10	25.6	23.1	67	25.2	25.1	75	45-125	8.10	(< 30)
Chrysene	27.0	25.6	43.9	66	25.2	51.2	96	55-110	15.50	(< 30)
Dibenzo(a,h)anthracene	5.76U	25.6	14.4	56	25.2	17.2	68	40-125	17.60	(< 30)
Fluoranthene	29.6	25.6	51.8	87	25.2	81.6	206 *	55-115	44.60	* (< 30)
Fluorene	5.76U	25.6	24.2	95	25.2	22.9	91	50-110	5.60	(< 30)
Indeno[1,2,3-c,d] pyrene	5.76U	25.6	16.3	49	25.2	20.0	64	40-120	20.10	(< 30)
Naphthalene	5.76U	25.6	21.6	77	25.2	19.6	70	40-105	9.40	(< 30)
Phenanthrene	5.76U	25.6	32.1	108	25.2	27.4	91	50-110	16.10	(< 30)
Pyrene	30.7	25.6	45.6	58	25.2	71.1	160 *	45-125	43.70	* (< 30)
Surrogates										
2-Fluorobiphenyl		25.6	21.5	84	25.2	20.6	81	45-105	4.40	
Terphenyl-d14		25.6	25.1	98	25.2	24.0	95	30-125	4.40	

Batch Information

Analytical Batch: XMS8391
 Analytical Method: 8270D SIMS (PAH)
 Instrument: HP 6890/5973 MS SVQA
 Analyst: RTS
 Analytical Date/Time: 11/5/2014 8:30:00PM

Prep Batch: XXX32352
 Prep Method: Sonication Extraction Soil 8270 PAH SIM
 Prep Date/Time: 11/4/2014 4:11:44PM
 Prep Initial Wt./Vol.: 22.54g
 Prep Extract Vol: 1.00mL

1145333



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CHAIN-OF-CUSTODY RECORD

Laboratory SGS Page 1 of 1
Attn: Teri

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	DRB	AK102	GR0	AK101	RL0	AK103	PAW	EPA	DTG	SVA	SOILS	Total Number of Containers	Remarks/Matrix
02381-EXBS2	① AB	1350	10/24/14		X	X											2	Soil
EXBS3	② AB	1355	↓		X	X	X	X	X	X	X	X	X	X			2	↓
EXBS13	③ AB	1425		X	X								X				2	
EXSW1	④ AB	1405		X	X												2	
EXSW2	⑤ AB	1410		X	X												2	
EXSW5	⑥ AB	1430		X	X												2	
EXSW6	⑦ AB	1435		X	X												2	
SSZ	⑧ AB	1503		X	X												2	
SSS	⑨ AB	1512		X	X												2	
V TB	⑩ A	1000		↓			X	X						X			1	

Project Information	Sample Receipt
Project Number: <u>02381-002</u>	Total Number of Containers
Project Name: <u>Port of Anch.</u>	COC Seals/Intact? Y/N/NA
Contact: <u>John Tracy</u>	Received Good Cond./Cold
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method:
Sampler: <u>John Tracy</u>	(attach shipping bill, if any)

Instructions
Requested Turnaround Time: <u>Standard</u>
Special Instructions: <u>Revised COC for job # 1145333</u>

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

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: _____ Time: _____	Signature: _____ Time: _____	Signature: _____ Time: _____
Printed Name: _____ Date: _____	Printed Name: _____ Date: _____	Printed Name: _____ Date: _____
Company: _____	Company: _____	Company: _____
Received By: 1.	Received By: 2.	Received By: 3.
Signature: _____ Time: _____	Signature: _____ Time: _____	Signature: <u>Teri Draeger</u> Time: <u>10:45</u>
Printed Name: _____ Date: _____	Printed Name: _____ Date: _____	Printed Name: <u>Teri Draeger</u> Date: <u>10/27/14</u>
Company: _____	Company: _____	Company: <u>SGS</u>

Pennick, Victoria (Anchorage)

From: Jacob Tracy [JCT@shanwil.com]
Sent: Tuesday, October 28, 2014 10:56 AM
To: Pennick, Victoria (Anchorage)
Subject: RE: Port of Anchorage
Attachments: 201410281050.pdf

Hi Tori,

Attached is the revised COC for job number 1145333. Please let me know if you have any questions.

-Jake

From: Pennick, Victoria (Anchorage) [mailto:Victoria.Pennick@sgs.com]
Sent: Monday, October 27, 2014 11:23 AM
To: Jacob Tracy
Subject: RE: Port of Anchorage

Hi Jake,
We haven't started logging it in, other than assigning a number. Let me know what you find out.
Was there a quote for this work, or does this fall under the "open" quote?
Thanks,
Tori

From: Jacob Tracy [mailto:JCT@shanwil.com]
Sent: Monday, October 27, 2014 11:16 AM
To: Pennick, Victoria (Anchorage)
Subject: Port of Anchorage

Hi Tori,

I just submitted some samples for the Port of Anchorage, work order # 1145333. Can you please put these on hold? We are waiting to hear back from the client.

Thanks



SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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1145333



SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY RECORD

Laboratory SGS Page 1 of 1
Attn: Tori

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2255 S.W. Canyon Road Portland, OR 97201-2498 (503) 223-6147
1321 Bannock Street, Suite 200 Denver, CO 80204 (303) 825-3800
2043 Westport Center Drive St. Louis, MO 63146-3564 (314) 699-9660
5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 561-2120
2705 Saint Andrews Loop, Suite A Pasco, WA 99301-3378 (509) 946-6309

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	BTEX	EPA 8001B	DRD	AA100	Total Number of Containers	Remarks/Matrix
02381-EXBS2		1355	10/24/14	X	X	X				2	Soil
EXBS3		1355		X	X	X				2	
EXBS13		1425		X	X	X				2	
EXSW1		1405		X	X	X				2	
EXSW2		1410		X	X	X				2	
EXSW5		1430		X	X	X				2	
EXSW6		1435		X	X	X				2	
SS2		1503		X	X	X				2	
SS5		1512		X	X	X				2	
TB		1000			X					1	Trip Blank

Project Information	Sample Receipt
Project Number: <u>02381-002</u>	Total Number of Containers
Project Name: <u>Port of Anch.</u>	COC Seals/Intact? Y/N/NA
Contact: <u>JCT</u>	Received Good Cond./Cold
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method:
Sampler: <u>Take Trace</u>	(attach shipping bill, if any)

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: <u>[Signature]</u> Time: <u>1045</u>	Signature: _____ Time: _____	Signature: _____ Time: _____
Printed Name: <u>Take Trace</u> Date: <u>10/27/14</u>	Printed Name: _____ Date: _____	Printed Name: _____ Date: _____
Company: <u>SGW</u>	Company: _____	Company: _____

Instructions
Requested Turnaround Time: <u>Standard</u>
Special Instructions:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: _____ Time: _____	Signature: _____ Time: _____	Signature: <u>[Signature]</u> Time: <u>10:45</u>
Printed Name: _____ Date: _____	Printed Name: _____ Date: _____	Printed Name: <u>Tori Draeger</u> Date: <u>10/27/14</u>
Company: _____	Company: _____	Company: <u>SGS</u>

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

Pennick, Victoria (Anchorage)

From: Jacob Tracy [JCT@shanwil.com]
Sent: Monday, October 27, 2014 4:00 PM
To: Pennick, Victoria (Anchorage)
Subject: RE: Port of Anchorage

There was no quote for this work. I should hear something tomorrow sometime.

Thanks

From: Pennick, Victoria (Anchorage) [<mailto:Victoria.Pennick@sgs.com>]
Sent: Monday, October 27, 2014 11:23 AM
To: Jacob Tracy
Subject: RE: Port of Anchorage

Hi Jake,
We haven't started logging it in, other than assigning a number. Let me know what you find out. Was there a quote for this work, or does this fall under the "open" quote?
Thanks,
Tori

From: Jacob Tracy [<mailto:JCT@shanwil.com>]
Sent: Monday, October 27, 2014 11:16 AM
To: Pennick, Victoria (Anchorage)
Subject: Port of Anchorage

Hi Tori,

I just submitted some samples for the Port of Anchorage, work order # 1145333. Can you please put these on hold? We are waiting to hear back from the client.

Thanks



SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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SAMPLE RECEIPT FORM

Review Criteria:	Condition:	Comments/Action Taken:
Were custody seals intact? Note # & location, if applicable. COC accompanied samples?	Yes No <u>N/A</u> <u>Yes</u> No	<input type="checkbox"/> Exemption permitted if sampler hand carries/delivers.
Temperature blank compliant* (i.e., 0-6°C after CF)? If >6°C, were samples collected <8 hours ago? If <0°C, were all sample containers ice free? Cooler ID: <u>1</u> @ <u>3.5</u> w/ Therm.ID: <u>240</u> Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ If samples are received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled."	<u>Yes</u> No <u>N/A</u> Yes No <u>N/A</u> Yes No <u>N/A</u>	<input type="checkbox"/> Exemption permitted if chilled & collected <8 hrs ago. <i>Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.</i>
Delivery method (specify all that apply): <u>Client</u> (hand carried) USPS Lynden AK Air Alert Courier UPS FedEx RAVN C&D Delivery Carlisle Pen Air Warp Speed Other: _____ → For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?	Tracking/AB # or see attached or <u>N/A</u> Yes No <u>N/A</u>	
→ For samples received with payment, note amount (\$) and whether cash / check / CC (circle one) was received. → For samples received in FBKS , ANCH staff will verify all criteria are reviewed. SRF initiated in FBKS by:		
Were samples received within hold time? Do samples match COC* (i.e., sample IDs, dates/times collected)? Were analyses requested unambiguous?	<u>Yes</u> No N/A <u>Yes</u> No N/A <u>Yes</u> No N/A	<i>Note: Refer to form F-083 "Sample Guide" for hold times. Note: If times differ <1hr, record details and login per COC.</i>
Were samples in good condition (no leaks/cracks/breakage)? Packing material used (specify all that apply): Bubble Wrap Separate plastic bags Vermiculite Other:	<u>Yes</u> No	
Were proper containers (type/mass/volume/preservative*) used? Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples? Were all VOA vials free of headspace (i.e., bubbles ≤6 mm)? Were all soil VOAs field extracted with MeOH+BFB?	<u>Yes</u> No N/A <u>Yes</u> No N/A Yes No <u>N/A</u> <u>Yes</u> No N/A	<input type="checkbox"/> Exemption permitted for metals (e.g., 200.8/6020A). <i>* Provided MeOH containers but no analysis w/ them</i>
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was pH verified and compliant ? If pH was adjusted, were bottles flagged (i.e., stickers)?	Yes No <u>N/A</u> Yes No <u>N/A</u>	
For special handling (e.g., "MI" soils, foreign soils, lab filter for dissolved..., lab extract for volatiles, Ref Lab, limited volume), were bottles/paperwork flagged (e.g., sticker)?	Yes No <u>N/A</u>	
For RUSH/SHORT Hold Time , were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No <u>N/A</u>	
For SITE-SPECIFIC QC , e.g. BMS/BMSD/BDUP, were containers / paperwork flagged accordingly?	Yes No <u>N/A</u>	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	Yes No <u>N/A</u>	SRF Completed by: <u>TLD</u> PM notified: N/A
Was PEER REVIEW of <i>sample numbering/labeling completed</i> ?	Yes No <u>N/A</u>	Peer Reviewed by: N/A

Additional notes (if applicable):

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



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>
1145333001-A	No Preservative Required	OK			
1145333001-B	Methanol field pres. 4 C	OK			
1145333002-A	No Preservative Required	OK			
1145333002-B	Methanol field pres. 4 C	OK			
1145333003-A	No Preservative Required	OK			
1145333003-B	Methanol field pres. 4 C	OK			
1145333004-A	No Preservative Required	OK			
1145333004-B	Methanol field pres. 4 C	OK			
1145333005-A	No Preservative Required	OK			
1145333005-B	Methanol field pres. 4 C	OK			
1145333006-A	No Preservative Required	OK			
1145333006-B	Methanol field pres. 4 C	OK			
1145333007-A	No Preservative Required	OK			
1145333007-B	Methanol field pres. 4 C	OK			
1145333008-A	No Preservative Required	OK			
1145333008-B	Methanol field pres. 4 C	OK			
1145333009-A	No Preservative Required	OK			
1145333009-B	Methanol field pres. 4 C	OK			
1145333010-A	Methanol field pres. 4 C	OK			

Container Condition Glossary

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

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

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

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

LABORATORY DATA REVIEW CHECKLIST

Completed by: Jake Greuey

Title: Senior Professional

Date: November 12, 2014

CS Report Name: POA Maintenance Building

Laboratory Report Date: November 11, 2014

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: SGS North America Inc.

Laboratory Report Number: 1145333

ADEC File Number: N/A

ADEC RecKey Number: NA

(NOTE: NA = not applicable; Text in *italics* added by Shannon & Wilson, Inc.)

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses? **Yes** / No / NA (please explain)

Comments: *SGS Environmental Services, Inc. in Anchorage, AK performed requested analyses.*

- b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS-approved?

Yes / No / **NA** (please explain)

Comments: *SGS performed all reported analyses.*

2. Chain of Custody (COC)

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

Yes / No / NA (please explain)

Comments:

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

Comments: *A revised COC was sent to the laboratory after the original samples were submitted and received. The revised COC is included in the laboratory analytical report.*

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ}$ C)?

Yes / No / NA (please explain)

Comments: *The temperature blank was 3.5° C.*

- b. Sample preservation acceptable - acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)? **Yes** / No / NA (please explain)

Comments:

- c. Sample condition documented - broken, leaking (Methanol), zero headspace (VOC vials)? **Yes** / No / NA (please explain)

Comments: *The laboratory does not note any sample-condition anomalies.*

- d. If there were any discrepancies, were they documented? – For example, incorrect sample containers/preservation, sample temperature outside acceptance range, insufficient or missing samples, etc.? Yes / No / **NA** (please explain)

Comments:

- e. Data quality or usability affected? Please explain. **No**

Comments:

4. Case Narrative

- a. Present and understandable? **Yes** / No / NA (please explain)

Comments:

- b. Discrepancies, errors or QC failures identified by the lab? **Yes** / No / NA (please explain)

Comments: *The laboratory notes the following:*

8270D SIM – Surrogate (2-fluorobiphenyl) recovery is outside of QC criteria due to sample dilution for sample EXBS3.

8270D SIM - LOQs are elevated due to sample dilution for sample EXBS3. Sample analyzed at a dilution due to matrix interference with internal standards.

8270D SIM – MS recovery for benzo[b]fluoranthene is outside of QC criteria.

8270D SIM – MSD recovery for fluoranthene and pyrene is outside of QC criteria.

8270D SIM – MS/MSD RPD for fluoranthene and pyrene does not meet QC criteria.

- c. Were corrective actions documented? Yes / No / **NA** (please explain)

Comments: *None to note.*

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

Comments: *The laboratory does not note an effect on data quality/usability.*

5. Sample Results

- a. Correct analyses performed/reported as requested on COC? **Yes** / No / NA (please explain)

Comments:

- b. All applicable holding times met? **Yes** / No / NA (please explain)

Comments:

- c. All soils reported on a dry weight basis? **Yes** No / NA (please explain)

Comments:

- d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project? **Yes** No / NA (please explain)

Comments:

- e. Data quality or usability affected? Please explain. **Yes** No / NA

Comments:

6. QC Samples

a. Method Blank

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

Yes / No / NA (please explain)

Comments:

- ii. All method blank results less than LOQ? **Yes** / No / NA (please explain)

Comments:

- iii. If above LOQ, what samples are affected? **NA**

Comments:

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

Yes / No / **NA** (please explain)

Comments:

- v. Data quality or usability affected? Please explain. **No**

Comments:

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

- i. Organics - One LCS/LCSD reported per matrix, analysis, and 20 samples?

(LCS/LCSD required per AK methods, LCS required per SW846) **Yes** / No / NA (please explain)

Comments:

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

Comments:

- iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101

60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages) **Yes** / No / NA (please explain)

Comments:

- iv. Precision – All relative percent differences (RPDs) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages) **Yes** / No / NA (please explain)

Comments:

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

Comments:

- vi. Do the affected samples(s) have data flags? If so, are the data flags clearly defined? **Yes** / No / **NA** (please explain)

Comments:

- vii. Data quality or usability affected? Please explain. **No**

Comments:

c. Surrogates - Organics Only

- i. Are surrogate recoveries reported for organic analyses, field, QC, and laboratory samples? **Yes** / No / NA (please explain)

Comments:

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

Comments: *The surrogate (2-fluorobiphenyl) recovery is outside of QC criteria due to sample dilution for Sample EXBS3.*

- iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined? **Yes** / No / NA (please explain)

Comments: *The surrogate recovery was high so the detected organic constituents are potentially biased high and are flagged with a J+.*

- iv. Data quality or usability affected? Please explain. **Yes** / **No** / NA (please explain)

Comments: *The results were all below the ADEC cleanup levels.*

d. Trip Blank - Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.)
Water and Soil

- i. One trip blank reported per matrix, analysis and cooler? (If not, enter explanation below.) **Yes** / No / NA (please explain)

Comments:

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment stating why must be entered below.) **Yes** / **No** / **NA** (please explain)

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

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

Comments:

- iv. If above LOQ, what samples are affected? **Yes** / **No** / **NA** (please explain)

Comments:

- v. Data quality or usability affected? Please explain. **Yes** / **No** / **NA** (please explain)

Comments:

e. Field Duplicate

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

Yes / **No** / **NA** (please explain)

Comments: *Sample EXBS13 was a duplicate of sample EXBS3.*

- ii. Submitted blind to the lab? **Yes** / **No** / **NA** (please explain)

Comments:

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

Comments: *The RPDs are within the acceptable differences for the specified DOQs.*

- iv. Data quality or usability affected? Please explain. **Yes** / **No** / **NA** (please explain)

Comments:

f. Decontamination or Equipment Blank

Yes / **No** / **NA** (please explain)

Comments: *Equipment blanks were not part of the work-plan scope.*

- i. All results less than LOQ? **Yes** / **No** / **NA** (please explain)

Comments:

- ii. If above LOQ, what samples are affected? **NA**

Comments: *See above.*

- v. Data quality or usability affected? **Yes** / **No** / **NA** (please explain)

Comments: *See above.*

Work Order Number: 1145333

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

- a. Defined and appropriate? **Yes** / No / NA (please explain)

Comments: *A key is provided on page 3 of the laboratory report.*

APPENDIX E
IMPORTANT INFORMATION ABOUT
YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT



Date: December 2014
To: Municipality of Anchorage
Re: New Marine Storage Building, Port of Anchorage, Alaska

Important Information About Your Geotechnical/Environmental Report

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

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

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

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

SUBSURFACE CONDITIONS CAN CHANGE.

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

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

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

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

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

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

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

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

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

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

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

READ RESPONSIBILITY CLAUSES CLOSELY.

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

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