SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

ALASKA
CALIFORNIA
COLORADO
FLORIDA
MISSOURI
OREGON
WASHINGTON
WISCONSIN

October 19, 2015

City of Fairbanks
Engineering Division
800 Cushman Street
Fairbanks, Alaska 99701

Attn: Mr. Jackson Fox

RE: RESULTS OF MONITORING WELL SAMPLING, CITY OF FAIRBANKS PUBLIC WORKS, FAIRBANKS, ALASKA

Shannon & Wilson, Inc., prepared this report on our monitoring-well sampling activities at the City of Fairbanks Public Works Department yard (the site) in Fairbanks, Alaska. At your request, we have prepared the following report to summarize environmental services provided to assist in obtaining approval for decommissioning monitoring wells at the site.

BACKGROUND

In their June 27, 2011, letter, the Alaska Department of Environmental Conservation (ADEC) granted "Corrective Action Complete with Institutional Controls Determination" status for the FMUS – Public Works contaminated site (ADEC file 102.26.086). ADEC is requiring sampling of three of the monitoring wells on the site for gasoline range organics (GRO) and benzene, toluene, ethylbenzene, and xylenes (BTEX). We also understand the City would like to decommission the monitoring wells. We understand you will provide the report on groundwater monitoring results to ADEC in support of approval for monitoring well decommissioning.

SCOPE OF SERVICES

Our services were limited to providing monitoring-well sampling services (monitoring wells MW-2, MW-3, and MW-7) and preparing a brief report.

FIELD ACTIVITIES AND OBSERVATIONS

On August 25, 2015, Marcy Nadel, a geologist from the Shannon & Wilson Fairbanks office, completed the monitoring-well sampling activities. When she arrived at the site, she found that Public Works employees had attempted to locate the three monitoring wells. The casing of monitoring well MW-2 was found to be obstructed and the top of the casing was damaged (Photo 1). Public Works employees located MW-7, which was found to be full of gravel (Photo 2). No

2355 HILL ROAD
FAIRBANKS, ALASKA 99709-5326
907-479-0600 • FAX 907-479-5691

monument was present on the casing of MW-7. We attempted to remove the obstruction in MW-2, but were ultimately unable to collect groundwater samples from MW-2 and MW-7. Public Works Department personnel stated that MW-7 may have been filled with gravel during the construction of the new warm storage building in 2007. Less than one foot of sandy gravel fill covered the monuments of MW-2 and MW-3 and the casing of MW-7.

The depth to groundwater measured in MW-3 was about 12.5 feet below the ground surface. We did not observe a petroleum sheen or odor in purge water from MW-3.The top of the casing of MW-3 was also slightly damaged (Photos 3 and 4). We purged monitoring well MW-3 and collected a groundwater sample plus a quality-control (QC) field duplicate sample (*MW-13*) in laboratory-provided jars. In addition, the sample cooler contained a field blank sample, as required by ADEC. We treated the purge water using a granular activated carbon filter and discharged the treated water on site, down-gradient of MW-3.

We submitted the samples to SGS North America, an ADEC-approved analytical laboratory, for analysis of GRO by Alaska Method AK 101 and BTEX by US Environmental Protection Agency (EPA) Method 8021B.

ANALYTICAL RESULTS

Analytical results for the groundwater samples are summarizes in the attached Table 1. GRO was detected in the sample and its field duplicate sample at concentrations of 5.83 milligrams per liter (mg/L) and 5.47 mg/L, respectively. Benzene was detected in the sample and duplicate at 3,330 micrograms per liter (µg/L) and 3,060 µg/L, respectively. Other BTEX analytes were detected at concentrations ranging from an estimated 9.60 µg/L to 160 µg/L (Table 1).

QUALITY ASSURANCE/QUALITY CONTROL

Quality Assurance/Quality Control (QA/QC) procedures assist in producing data of acceptable quality and reliability. We reviewed the analytical results for laboratory QC samples and also conducted our own QA assessment for this project. We reviewed the chain-of-custody (COC) record and laboratory-receipt form to check that custody was not breached, sample holding-times were met, and the samples were properly handled from the point of collection through analysis by the laboratory. Our QA review procedures allowed us to document the accuracy and precision of the analytical data, as well as check the analyses were sufficiently sensitive to detect analytes at levels below regulatory standards.

We reviewed analytical sample results (SGS Work Order 1158552) for this project. The laboratory report, including the case narrative describing the laboratory QA results in detail, is included with the completed ADEC data-review checklist as an attachment. Details regarding the results of our QA review are presented in the attached *Quality Assurance/Quality Control Summary*.

By working in general accordance with our proposed scope of services, we consider the samples we collected for this project to be representative of site conditions at the locations and times they were obtained. Based on our QA review, no samples were rejected as unusable due to QC failures, and our completeness goal of obtaining 85-percent useable data was met. In general, the quality of the analytical data for this project does not appear to have been compromised by analytical irregularities and is adequate for the purposes of our assessment.

CONCLUSIONS

Concentrations of GRO and benzene in water samples from monitoring well MW-3 exceeded their ADEC groundwater-cleanup levels. Concentrations of toluene, ethylbenzene, and xylenes did not exceed their ADEC groundwater-cleanup levels. The conditions of MW-2 and MW-7 did not allow us to sample them.

LIMITATIONS

The observations and conclusions described in this report are based solely on the scope of service described in and implemented pursuant to the purchase order dated July 28, 2015, between the City of Fairbanks and Shannon & Wilson, Inc. Shannon & Wilson has not performed any observation, investigation, study, or testing that is not specifically listed in the scope of service. Other areas of contamination that were not obvious during our site work could be present at the site. Shannon & Wilson is not liable for failing to discover any condition whose discovery required the performance of services not authorized by the Agreement.

This report was prepared for the exclusive use of our Client and their representatives to document environmental conditions at selected monitoring wells at the Public Works Facility. This work presents our professional judgment as to the conditions in the site. Information presented here is based on the sampling and analyses we performed. It should not be construed as a definite conclusion about the soil conditions in the area, and it is possible our tests do not represent the highest levels of contamination at the site. Interpretations and recommendations

made by Shannon & Wilson are based solely upon information available to Shannon & Wilson at the time the interpretations and recommendations are made.

Within the limitations of scope, schedule, and budget, Shannon & Wilson has prepared this report in a professional manner, using that level of skill and care normally exercised for similar projects under similar conditions by reputable and competent environmental consultants currently practicing in this area.

This report presents results of groundwater samples from a monitoring well at the City of Fairbanks Public Works Facility. The data presented in this report are based on the sampling and analysis we performed; they should not be construed as a guarantee of the groundwater quality at the site. Our sampling was intended to confirm the presence or absence of selected contaminants at the sampled locations. It is possible our subsurface tests do not represent the highest levels of contamination. In addition, conclusions cannot be drawn on the presence or absence of contaminants for which laboratory analyses were not performed. As a result, the sampling and analysis performed can only provide you with our judgment as to the environmental characteristics of the site, and in no way guarantees others will reach the same conclusions.

The observed levels of contamination may be dependent upon changes due to natural forces or human activity. In addition, changes in government codes, regulations, or laws may occur. Due to such changes, or other factors beyond our control, our observations and recommendations applicable to this site may need to be revised. If substantial time has elapsed between submission of this report and the start of activities or action based upon it, we recommend this report be reviewed to determine the applicability of the conclusions. We have prepared and included as an attachment, "*Important Information about Your Geotechnical/Environmental Report*," to assist you and others in understanding the use and limitations of our reports.

Shannon & Wilson appreciates this opportunity to be of service. If you have any questions concerning this report, please contact me (907) 479-0600.

Sincerely,

SHANNON & WILSON, INC.

Digitally signed by Julie Keener
Date: 2015.10.19 09:08:17 -08'00'

Julie Keener, P.E.
Senior Engineer

Enc: Table 1 – Summary of Water-Sample Analytical Results
Copy of Field Notes
Selected Site Photographs
Analytical Laboratory Report (Work Order 1158552) and ADEC Data Review Checklist
Quality Assurance/Quality Control Summary
Important Information about your Geotechnical/Environmental Report

TABLE 1
SUMMARY OF WATER-SAMPLE ANALYTICAL RESULTS

Analyte	Units	Groundwater-cleanup level	Sample Number	
			MW-3	*MW-13*
GRO	mg/L	2.2	**5.83**	**5.47**
Benzene	µg/L	5	**3,330**	**3,060**
Toluene	µg/L	1000	15.1	9.60 J
Ethylbenzene	µg/L	700	78.5	73.1
p & m-Xylenes	µg/L	10000 (total)	160	149
o-Xylene	µg/L		46.1	40.7

Notes: ADEC groundwater-cleanup levels from 18 AAC 75.345.
mg/L milligrams per liter
µg/L micrograms per liter
J Estimated concentration, between detection limit and limit of quantitation.
BOLD Analyte concentration exceeds ADEC groundwater-cleanup level.

FIELD ACTIVITIES DAILY LOG

Date 8/25/15
Sheet 1 of 2
Project No. 1782-001

Project Name: City of FBX x3 MWs
Field activity subject: Pubic Work Dept well sampling
Description of daily activities and events:

0820 Prep equipt, calibrate YSI (556 rental #2)
Call Verge before leave office, no answer
0900 Arrive City of FBX Public Works facility
Meet w/ Verge, explains site + walk-through
Long-term plan is to remove all USTs in coordination w/ ADEC (existing contract w/ Nortech envital) and decomission all x9 wells
MW-7 filled w/ gravel, located by Verge's staff using metal detector (believe well is MW-7, not clear); per client may have been filled w/ gravel accidentally during construction of new (2007) warm storage building to N
Permission to discharge GAC water next to well
0925 Begin @ MW-2, clogged/obstructed, attempt to sample
0950 Begin @ MW-3, pH very low and param's not stabilizing, MXJ wanted to use rental for landfill so stops by to switch out
Use x2 YSIs in line to compare (ProPlus calibrated by MXJ), ProPlus C readings appear normal
Sample + DUP from MW-3
1140 Return to office to collect rods, use x3 for total of 11.9 ft (decon before use)
Unclog MW-2 ice lenses, still unable to fit pump
Feels soft/non-abrupt, may be bent casing ~9-9.5 ft
No obstacles to 12 ft using rods
1245 Discharge decon water through GAC filter to grassy area N of MW-2

Visitors on site: Verge, Public Works Dept General Foreman; MXJ

Changes from plans/specifications and other special orders and important decisions:
Unable to sample MW-7, MW-2

Weather conditions: light rain/overcast, 50s

Important telephone calls: ∅

Personnel on site: MDN
Signature: M. Nadel Date: 8/25/15

FIELD ACTIVITIES DAILY LOG

Date 8/25/15
Sheet 2 of 2
Project No. 1782-001

Project Name: City of FBX MW Sampling
Field activity subject: Public Works Dept
Description of daily activities and events:

Photo Log

107	Presumed MW-7, facing N towards new(er) warm storage building
108	MW-7, no monument
109	Facing E, shows loc'n of MW-7 w/ respect to northern tank dispense area
110	Facing NE, same
111-112	MW-2, Facing N towards storage bldg
113-116	MW-2, broken casing
117	MW-3, Facing E towards northern tank dispenser
118	MW-3, Facing SE (both tank dispensers are visible)
119	MW-3, Facing N towards new(er) warm storage
120-124	MW-3, broken casing, crushed mott cap
125-126	Pump and purge water setup @ MW-3

1300 Stop by Verge's office on way out, not in
1310 ~~Untomo~~ Drop samples @ SGS
Return to office, unload equipt
Verge calls ~1325, quick recap of MW-2
1400 complete project work

Visitors on site:

Changes from plans/specifications and other special orders and important decisions:

Weather conditions: see pg

Important telephone calls:

Personnel on site:

Signature: Date:

MONITORING WELL SAMPLING LOG

Owner/Client: City of FBX
Location: Public Works Dept
Sampling Personnel: MDN
Weather Conditions: Overcast, light rain Air Temp. (°F) ~~60s~~ 50s

Project No. 1782-001
Date 8/25/15
Well MW-2
Time started 0925 / 1203
Time completed 0930 / 1240

Sample No. MW-2 (MW) No sample Time
Duplicate Time
Equipment Blank Time

Depth to NAPL (ft.)
Depth to Water (ft.)
NAPL Thickness (ft.) N/A
Method of NAPL Measurement

Pump
Purging Method portable / dedicated pump
Pumping Start
Purge Rate (gal./min.) N/A
Pumping End

Pump Set Depth Below MP (ft.)
KuriTec Tubing (ft.) 10ft
TruPoly Tubing (ft.) ~~N/A~~ (MW)

Diameter and Type of Casing 2" PVC
Approximate Total Depth of Well Below MP (ft.) —
Measured Total Depth of Well Below MP (ft.) ~~9.40~~ 16.42
Depth to Water Below MP (ft.) ~~No sample~~ (MW) 10.64
Depth to Ice (if frozen) Below MP (ft.) —
Feet of Water in Well —
Gallons per foot 0.17
Gallons in Well —
Purge Water Volume (gal.) —

Purge Water Disposal

Monument Condition good, replaced washers

Casing Condition somewhat jagged/broken (see photo), ~~well casing~~ (MW) cap not on casing, obstructed

Wiring Condition (dedicated pumps) N/A

Measuring Point (MP) *Top of Casing (TOC)*

Monument type: *Stickup / Flushmount*
Measurement method: *Rod & level / Tape measure*

Top-of-casing to monument (ft.) 0.08
Monument to ground surface (ft.) -0.67 (below grade)

Datalogger type
Datalogger serial # N/A
Measured cable length (ft.)

- ☐ Lock present and operational No lock
- ☐ Well name legible on outside of well Not written
- ☐ Evidence of frost-jacking yes, casing pushed upwards (no room for well cap)

Notes obstructed @ 9.40, ~~may be~~ ice and/or ~~gravel~~ (MW)
able to break through ice lense @ 9.40 another @ 9.69 using rods
pump still doesn't ~~fit~~ down well (plumb bob does but only after some effort)

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1¼	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

MONITORING WELL SAMPLING LOG

Field Parameter Instrument _____ Circle one: *Parameters stabilized or >3 well volumes purged*

Sample Observations _____

Notes _____

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C)	Dissolved Oxygen (mg/L) [± 0.1 mg/L]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
			No sample			

Laboratory *SGS*

	Analysis	Sample Containers	Preservatives	Dup
☐	*BTEX (8260B)*	*3x 40-mL amber VOA vials*	*HCl*	☐
☐	*GRO (AK101)*	*3x 40-mL amber VOA vials*	*HCl*	☐
☐				☐
☐				☐
☐				☐

Well No. MW-2

MONITORING WELL SAMPLING LOG

Owner/Client: City of FBX
Location: Public Works Dept
Sampling Personnel: MDW
Weather Conditions: Overcast, light rain Air Temp. (°F): ~~60~~ 55s

Project No.: 1782-001
Date: 8/25/15
Well: MW-3
Time started: 0950
Time completed: 1135

Sample No.: MW-3 Time: 1212
Duplicate: MW-13 Time: 1215
Equipment Blank: —— Time: ——

Depth to NAPL (ft.): /
Depth to Water (ft.): N/A
NAPL Thickness (ft.):
Method of NAPL Measurement:

Pump: Grundfos c/controller SQ2
Purging Method: *portable / dedicated pump*
Pumping Start: 1016
Purge Rate (gal./min.): ~1 gal/min
Pumping End:

Diameter and Type of Casing: 2" PVC
Approximate Total Depth of Well Below MP (ft.): ——
Measured Total Depth of Well Below MP (ft.): 15.24 + 1.00 = 16.24
Depth to Water Below MP (ft.): 12.08
Depth to Ice (if frozen) Below MP (ft.): ——
Feet of Water in Well: ~~3.17~~ 4.16
Gallons per foot: 0.17
Gallons in Well: ~~0.54~~
Purge Water Volume (gal.):

Pump Set Depth Below MP (ft.): ~~20~~ (new) N/A
KuriTec Tubing (ft.): 18 + 10 = 28
TruPoly Tubing (ft.): ——

Purge Water Disposal: GAC drum, discharge to ground

Monument Condition: ~~good~~ (new), cap has no bolt holes (sits on top), slightly damaged, no concrete

Casing Condition: broken, casing cap crushed into casing (see photo), ~~replaced cap~~ (new) ~~NO CONCRETE~~ (new)

Wiring Condition (dedicated pumps): N/A

Measuring Point (MP): *Top of Casing (TOC)*
Monument type: *Stickup* / *Flushmount*
Measurement method: *Rod & level* / *Tape measure*

Top-of-casing to monument (ft.): +0.01 (above monument)
Monument to ground surface (ft.): −0.44 (below grade)

Datalogger type:
Datalogger serial #: N/A
Measured cable length (ft.):

- ☐ Lock present and operational — No ~~lock~~
- ☐ Well name legible on outside of well — Not written
- ☐ Evidence of frost-jacking — YES, casing pushed upward against flush mount

Notes: MP used = west side casing (N side broken)
same for ground surface, slightly sloped
Purge water drained ~~through GAC~~ (new) to E-SE

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1¼	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

MONITORING WELL SAMPLING LOG

Field Parameter Instrument 556 Rental #1 (EM) and YSI ProPlus C
Circle one: *Parameters stabilized* or >3 well volumes purged
Sample Observations ~~See below~~
Notes pH is lower than anticipated for GW in FB area. Use 2nd YSI (in line)

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C)	Dissolved Oxygen (mg/L) [± 0.1 mg/L]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
1016	pump	start				very turbid, dk brown
1019	0.45	1.89	109	0.28	431.3	sl. turbid
1022	0.42	1.59	158	1.33	354.5	clear
1025	0.44	1.17	190	2.37	284.2	"
1028	0.42	1.18	231	3.62	199.0	"
1031	0.41	1.14	252	3.81	152.8	"
1034	0.40	1.08	269	4.56	131.1	"
1037	0.40	0.82	291	4.98	98.0	"
1040	0.40	0.78	300	5.16	83.1	"
1043	0.41	0.80	315	5.40	62.7	"
1046	0.39	0.65	321	5.58	49.0	"
1049	0.38	0.79	334	5.74	33.5	"
1052	0.38	0.68	341	5.83	25.5	"
1055	0.37	0.75	349	5.93	15.2	"
1058	0.36	0.58	357	6.02	6.3	"
1101	0.37	0.70	364	6.10	-1.6	"
1104	0.37	0.54	371	6.15	-6.8	"
1105	sample	(turbid, wait for water to clear)				
12		very slightly turbid				

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
☒	BTEX (8260B)	3x 40-mL amber VOA vials	HCl	☒
☒	GRO (AK101)	3x 40-mL amber VOA vials	HCl	☒
☐				☐
☐				☐
☐				☐

Pro Plus

	Temp	DO	cond	pH	ORP	
1043	0.7	4.02	311	6.90	54.7	clear
1046	0.6	1.34	326	6.79	1.3	"
1049	0.6	1.21	331.2	6.82	-7.7	"
1052	0.6	1.18	336.8	6.85	-15.4	"
1055	0.6	1.08	344.9	6.88	-23.9	"
1058	0.6	1.06	352.5	6.90	-31.0	"
1101	0.6	1.10	358.5	6.91	-36.3	"
1104	0.6	1.15	~~365.9~~ 363.6 (mv)	6.93	-40.3	"

Use these →

Well No. MW-3

Photo 1: Monitoring well MW-2. (August 25, 2015)

Photo 2: Monitoring well MW-7. (August 25, 2015)

Photo 3: Monitoring well MW-3. (August 25, 2015)

Photo 4: Monitoring well MW-3; facing north towards Warm Storage Building. (August 25, 2015)

Laboratory Report of Analysis

To: Shannon & Wilson-Fairbanks
2355 Hill Rd
Fairbanks, AK 99709
(907)479-0600

Report Number: **1158552**

Client Project: **31-1-1782-001 City FBX PWD**

Dear Julie Keener,

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

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

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

Sincerely,
SGS North America Inc.

_____

Jennifer Dawkins Date
Project Manager

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

Case Narrative

SGS Client: **Shannon & Wilson-Fairbanks**
SGS Project: **1158552**
Project Name/Site: **31-1-1782-001 City FBX PWD**
Project Contact: **Julie Keener**

Refer to sample receipt form for information on sample condition.

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

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

Laboratory Qualifiers

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

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

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

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

Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
MW-3	1158552001	08/25/2015	08/26/2015	Water (Surface, Eff., Ground)
MW-13	1158552002	08/25/2015	08/26/2015	Water (Surface, Eff., Ground)
TB	1158552003	08/25/2015	08/26/2015	Water (Surface, Eff., Ground)

Method	Method Description
AK101	AK101/8021 Combo.
SW8021B	AK101/8021 Combo.

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

Detectable Results Summary

Client Sample ID: **MW-3**
Lab Sample ID: 1158552001
Volatile Fuels

Parameter	Result	Units
Benzene	3330	ug/L
Ethylbenzene	78.5	ug/L
Gasoline Range Organics	5.83	mg/L
o-Xylene	46.1	ug/L
P & M -Xylene	160	ug/L
Toluene	15.1	ug/L

Client Sample ID: **MW-13**
Lab Sample ID: 1158552002
Volatile Fuels

Parameter	Result	Units
Benzene	3060	ug/L
Ethylbenzene	73.1	ug/L
Gasoline Range Organics	5.47	mg/L
o-Xylene	40.7	ug/L
P & M -Xylene	149	ug/L
Toluene	9.60J	ug/L

Client Sample ID: **TB**
Lab Sample ID: 1158552003
Volatile Fuels

Parameter	Result	Units
Benzene	0.330J	ug/L

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

Results of **MW-3**

Client Sample ID: **MW-3**
Client Project ID: **31-1-1782-001 City FBX PWD**
Lab Sample ID: 1158552001
Lab Project ID: 1158552

Collection Date: 08/25/15 12:12
Received Date: 08/26/15 09:00
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	5.83		1.00	0.310	mg/L	10		09/06/15 19:17
Surrogates								
4-Bromofluorobenzene (surr)	91.1		50-150		%	10		09/06/15 19:17

Batch Information

Analytical Batch: VFC12637
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 09/06/15 19:17
Container ID: 1158552001-B

Prep Batch: VXX27842
Prep Method: SW5030B
Prep Date/Time: 09/06/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	3330		25.0	7.50	ug/L	50		09/07/15 13:22
Ethylbenzene	78.5		10.0	3.10	ug/L	10		09/06/15 19:17
o-Xylene	46.1		10.0	3.10	ug/L	10		09/06/15 19:17
P & M -Xylene	160		20.0	6.20	ug/L	10		09/06/15 19:17
Toluene	15.1		10.0	3.10	ug/L	10		09/06/15 19:17
Surrogates								
1,4-Difluorobenzene (surr)	96.6		77-115		%	10		09/06/15 19:17

Batch Information

Analytical Batch: VFC12636
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 09/07/15 13:22
Container ID: 1158552001-B

Prep Batch: VXX27843
Prep Method: SW5030B
Prep Date/Time: 09/07/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VFC12637
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 09/06/15 19:17
Container ID: 1158552001-B

Prep Batch: VXX27842
Prep Method: SW5030B
Prep Date/Time: 09/06/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **MW-13**

Client Sample ID: **MW-13**
Client Project ID: **31-1-1782-001 City FBX PWD**
Lab Sample ID: 1158552002
Lab Project ID: 1158552

Collection Date: 08/25/15 12:15
Received Date: 08/26/15 09:00
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	5.47		1.00	0.310	mg/L	10		09/06/15 19:36
Surrogates								
4-Bromofluorobenzene (surr)	88.6		50-150		%	10		09/06/15 19:36

Batch Information

Analytical Batch: VFC12637
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 09/06/15 19:36
Container ID: 1158552002-B

Prep Batch: VXX27842
Prep Method: SW5030B
Prep Date/Time: 09/06/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	3060		25.0	7.50	ug/L	50		09/07/15 13:41
Ethylbenzene	73.1		10.0	3.10	ug/L	10		09/06/15 19:36
o-Xylene	40.7		10.0	3.10	ug/L	10		09/06/15 19:36
P & M -Xylene	149		20.0	6.20	ug/L	10		09/06/15 19:36
Toluene	9.60	J	10.0	3.10	ug/L	10		09/06/15 19:36
Surrogates								
1,4-Difluorobenzene (surr)	96.3		77-115		%	10		09/06/15 19:36

Batch Information

Analytical Batch: VFC12636
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 09/07/15 13:41
Container ID: 1158552002-B

Prep Batch: VXX27843
Prep Method: SW5030B
Prep Date/Time: 09/07/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VFC12637
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 09/06/15 19:36
Container ID: 1158552002-B

Prep Batch: VXX27842
Prep Method: SW5030B
Prep Date/Time: 09/06/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/18/2015 8:44:34AM

J flagging is activated

Results of **TB**

Client Sample ID: **TB**
Client Project ID: **31-1-1782-001 City FBX PWD**
Lab Sample ID: 1158552003
Lab Project ID: 1158552

Collection Date: 08/25/15 12:12
Received Date: 08/26/15 09:00
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.0500	U	0.100	0.0310	mg/L	1		09/06/15 16:44
Surrogates								
4-Bromofluorobenzene (surr)	87.8		50-150		%	1		09/06/15 16:44

Batch Information

Analytical Batch: VFC12637
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 09/06/15 16:44
Container ID: 1158552003-C

Prep Batch: VXX27842
Prep Method: SW5030B
Prep Date/Time: 09/06/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.330	J	0.500	0.150	ug/L	1		09/06/15 16:44
Ethylbenzene	0.500	U	1.00	0.310	ug/L	1		09/06/15 16:44
o-Xylene	0.500	U	1.00	0.310	ug/L	1		09/06/15 16:44
P & M -Xylene	1.00	U	2.00	0.620	ug/L	1		09/06/15 16:44
Toluene	0.500	U	1.00	0.310	ug/L	1		09/06/15 16:44
Surrogates								
1,4-Difluorobenzene (surr)	83.7		77-115		%	1		09/06/15 16:44

Batch Information

Analytical Batch: VFC12637
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 09/06/15 16:44
Container ID: 1158552003-C

Prep Batch: VXX27842
Prep Method: SW5030B
Prep Date/Time: 09/06/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/18/2015 8:44:34AM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1719595 [VXX/27842]
Blank Lab ID: 1288937

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1158552001, 1158552002, 1158552003

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.0500U	0.100	0.0310	mg/L
Surrogates				
4-Bromofluorobenzene (surr)	95.1	50-150		%

Batch Information

Analytical Batch: VFC12637
Analytical Method: AK101
Instrument: Agilent 7890 PID/FID
Analyst: CRD
Analytical Date/Time: 9/6/2015 1:54:00PM

Prep Batch: VXX27842
Prep Method: SW5030B
Prep Date/Time: 9/6/2015 8:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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

Blank Spike Summary

Blank Spike ID: LCS for HBN 1158552 [VXX27842]
Blank Spike Lab ID: 1288940
Date Analyzed: 09/06/2015 14:51

Spike Duplicate ID: LCSD for HBN 1158552 [VXX27842]
Spike Duplicate Lab ID: 1288941
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1158552001, 1158552002, 1158552003

Results by **AK101**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	1.00	0.918	92	1.00	0.930	93	(60-120)	1.30	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	0.0500	98.2	98	0.0500	88.4	88	(50-150)	10.50	

Batch Information

Analytical Batch: **VFC12637**
Analytical Method: **AK101**
Instrument: **Agilent 7890 PID/FID**
Analyst: **CRD**

Prep Batch: **VXX27842**
Prep Method: **SW5030B**
Prep Date/Time: **09/06/2015 08:00**
Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

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

Method Blank

Blank ID: MB for HBN 1719595 [VXX/27842]
Blank Lab ID: 1288937

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1158552001, 1158552002, 1158552003

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	0.330J	0.500	0.150	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Surrogates				
1,4-Difluorobenzene (surr)	83.4	77-115		%

Batch Information

Analytical Batch: VFC12637
Analytical Method: SW8021B
Instrument: Agilent 7890 PID/FID
Analyst: CRD
Analytical Date/Time: 9/6/2015 1:54:00PM

Prep Batch: VXX27842
Prep Method: SW5030B
Prep Date/Time: 9/6/2015 8:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/18/2015 8:44:39AM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1158552 [VXX27842]
Blank Spike Lab ID: 1288938
Date Analyzed: 09/06/2015 14:32

Spike Duplicate ID: LCSD for HBN 1158552 [VXX27842]
Spike Duplicate Lab ID: 1288939
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1158552001, 1158552002, 1158552003

Results by **SW8021B**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	100	104	104	100	106	106	(80-120)	1.50	(< 20)
Ethylbenzene	100	103	103	100	104	104	(75-125)	1.00	(< 20)
o-Xylene	100	102	102	100	102	102	(80-120)	0.55	(< 20)
P & M -Xylene	200	206	103	200	207	104	(75-130)	0.82	(< 20)
Toluene	100	104	104	100	106	106	(75-120)	1.70	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	50	89.4	89	50	90.3	90	(77-115)	1.00	

Batch Information

Analytical Batch: **VFC12637**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890 PID/FID**
Analyst: **CRD**

Prep Batch: **VXX27842**
Prep Method: **SW5030B**
Prep Date/Time: **09/06/2015 08:00**
Spike Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL

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

Method Blank

Blank ID: MB for HBN 1719596 [VXX/27843]
Blank Lab ID: 1288942

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1158552001, 1158552002

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	0.320J	0.500	0.150	ug/L
Surrogates				
1,4-Difluorobenzene (surr)	83.5	77-115		%

Batch Information

Analytical Batch: VFC12636
Analytical Method: SW8021B
Instrument: Agilent 7890 PID/FID
Analyst: CRD
Analytical Date/Time: 9/7/2015 12:06:00PM

Prep Batch: VXX27843
Prep Method: SW5030B
Prep Date/Time: 9/7/2015 8:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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

Blank Spike Summary

Blank Spike ID: LCS for HBN 1158552 [VXX27843]
Blank Spike Lab ID: 1288943
Date Analyzed: 09/07/2015 12:44

Spike Duplicate ID: LCSD for HBN 1158552 [VXX27843]
Spike Duplicate Lab ID: 1288944
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1158552001, 1158552002

Results by **SW8021B**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	100	106	106	100	108	108	(80-120)	1.10	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	50	89.2	89	50	90.6	91	(77-115)	1.60	

Batch Information

Analytical Batch: **VFC12636**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890 PID/FID**
Analyst: **CRD**

Prep Batch: **VXX27843**
Prep Method: **SW5030B**
Prep Date/Time: **09/07/2015 08:00**
Spike Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL

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

1158552

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-(CORD

Page 1 of 1

Laboratory SGS
Attn: Jen Dawkins

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

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	BTEX (8021B) (8260B)	GRO (AK101)				Total Number of Containers	Remarks/Matrix
MW-3	①A-C	1212	8/25/15		X	X	X				3	GW
MW-13	②A-C	1215	↓		X	X	X				3	↓
*TB	③A-C	—	↓	—	—	X	X				3	BIK

Project Information		Sample Receipt	
Project Number:	31-1-17982-001	Total Number of Containers	6
Project Name:	City FBS Public Works Dept	COC Seals/Intact? Y/N/NA	—
Contact:	JAK	Received Good Cond./Cold	—
Ongoing Project? Yes ☐ No ☒		Delivery Method:	Hand
Sampler:	MDN	(attach shipping bill, if any)	

Instructions	
Requested Turnaround Time:	Std
Special Instructions:	N/A Bill to S&W

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1315	Signature: Time: 1400	Signature: Time:
Printed Name: Marcy Nadel Date: 8/25/15	Printed Name: Date: 8/25/15	Printed Name: Date:
Company: S&W	Company: SGS	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 1315	Signature: Time:	Signature: Time: 0900
Printed Name: Jen Dawkins Date: 8/25/15	Printed Name: Date:	Printed Name: Tori Layton Date: 8/26/15
Company: SGS	Company:	Company: SGS Anch 2.3 / 08 IF 18

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

F-19-91/UR

*TB in same cooler as BTEX/GRO (single cooler).

No. 33518

SGS

1158552

FAIRBANKS SAMPLE RECEIPT FORM

Note: This form is to be completed by Fairbanks Receiving Staff for all samples

Review Criteria:	Condition:	Comments/Actions Taken
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	Yes No ~~N/A~~ ~~Yes~~ No N/A	□*Exemption permitted if sampler hand carries/delivers.*
Temperature blank compliant* (i.e., 0-6°C) *If >6°C, were samples collected <8 hours ago?* *If <0°C, were all sample containers ice free?* Cooler ID: 1 @ 5.0 w/Therm. ID: D7 ~~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 and "**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"	~~Yes~~ No Yes No ~~N/A~~ Yes No ~~N/A~~	□*Exemption permitted if chilled & collected <8hrs ago* *Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.*
Delivery Method: Client (hand carried) Other:_____	Tracking/AB#: Or see attached ~~Or N/A~~	
→For samples received with payment, note amount ($) and whether cash / check / CC (**circle one**) was received.		
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): Bubble Wrap Separate plastic bags Vermiculite Other:_____	~~Yes~~ No N/A	*Note: some samples are sent to Anchorage without inspection by SGS Fairbanks personnel.*
Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples?	~~Yes~~ No N/A	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No ~~N/A~~ Yes No ~~N/A~~	
Additional notes (if applicable):		

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

1158552

SAMPLE RECEIPT FORM

Review Criteria:	Yes	N/A	No	Comments/Action Taken:
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	☑ ☑	☐ ☐	☐ ☐	***Exemption permitted if sampler hand carries/delivers.*** 2 Side
Temperature blank compliant* (i.e., 0-6°C after CF)? *If >6 °C, were samples collected <8 hours ago?* *If <0 °C, were all sample containers ice free?* Cooler ID: [1] _____ @ 2.3 _____ w/ Therm.ID: D8 _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ If samples are received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled."	☑ ☐ ☐	☐ ☑ ☑	☐ ☐ ☐	***Exemption permitted if chilled & collected <8 hrs ago.*** ***Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.***
Delivery method (specify all that apply): ☐Client (hand carried) ☐USPS ☑Lynden ☐AK Air ☐Alert Courier ☐UPS ☐FedEx ☐RAVN ☐C&D Delivery ☐Carlile ☐Pen Air ☐Warp Speed ☐Other: _____ → *For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?*	☐	☑	☐	
	Yes	N/A	No	
Were samples received within hold time? Do samples **match COC*** (i.e., sample IDs, dates/times collected)? Were analyses requested unambiguous?	☑ ☑ ☑	☐ ☐ ☐	☐ ☐ ☐	***Note: Refer to form F-083 "Sample Guide" for hold times.*** ***Note: If times differ <1hr, record details and login per COC.***
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): ☐Bubble Wrap ☐Separate plastic bags ☐Vermiculite ☐Other:	☑	☐	☐	
Were **proper containers** (type/mass/volume/preservative*) used? Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples? Were all VOA vials **free of headspace** (i.e., bubbles ≤6 mm)? Were all soil VOAs **field extracted** with MeOH+BFB?	☑ ☑ ☑ ☐	☐ ☐ ☐ ☑	☐ ☐ ☐ ☐	☐ ***Exemption permitted for metals (e.g., 200.8/6020A).***
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was **pH verified and compliant**? If pH was adjusted, were bottles flagged (i.e., stickers)?	☐ ☐	☑ ☑	☐ ☐	
For **special handling** (e.g., "MI" soils, foreign soils, lab filter for dissolved…, lab extract for volatiles, Ref Lab, limited volume), were bottles/paperwork flagged (e.g., sticker)?	☐	☑	☐	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	☐	☑	☐	
For **SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP**, were containers / paperwork flagged accordingly?	☐	☑	☐	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	☐	☑	☐	SRF Completed by: EDJ PM notified:
Was **PEER REVIEW** of ***sample numbering/labeling completed?***	☑	☐	☐	Peer Reviewed by: DC
Additional notes (if applicable):				

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

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1158552001-A	HCL to pH < 2	OK			
1158552001-B	HCL to pH < 2	OK			
1158552001-C	HCL to pH < 2	OK			
1158552002-A	HCL to pH < 2	OK			
1158552002-B	HCL to pH < 2	OK			
1158552002-C	HCL to pH < 2	OK			
1158552003-A	HCL to pH < 2	OK			
1158552003-B	HCL to pH < 2	OK			
1158552003-C	HCL to pH < 2	OK			

Container Condition Glossary

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

OK - The container was received at an acceptable pH for the analysis requested.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
BU - The container was received with headspace greater than 6mm.

Laboratory Data Review Checklist

Completed by:	Julie Keener, P.E.		
Title:	Senior Engineer	Date:	Oct 12, 2015
CS Report Name:	Results of Monitoring Well Sampling	Report Date:	Sep 18, 2015
Consultant Firm:	Shannon & Wilson, Inc.		
Laboratory Name:	SGS North America, Inc.	Laboratory Report Number:	1158552
ADEC File Number:	102.26.086	ADEC RecKey Number:	

1. Laboratory

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

(•) Yes ( ) No ( ) NA (Please explain.) Comments:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

Samples were not transferred to another laboratory.

2. Chain of Custody (COC)

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

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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:

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

( ) Yes ( ) No (•) NA (Please explain) Comments:

There were no sample-receipt discrepancies to report.

e. Data quality or usability affected? (Please explain)

Comments:

No; data quality and usability are not affected.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

( ) Yes (•) No ( ) NA (Please explain) Comments:

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

No corrective action was required.

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

Comments:

Data quality and usability are not affected.

5. Samples 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:

No soil samples were submitted.

d. Are the reported PQLs 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)

Comments:

No; data quality and usability are not affected.

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 PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

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

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

○ Yes ○ No ◉ NA (Please explain) Comments:

The method blank detection was not above the PQL.

v. Data quality or usability affected? (Please explain) Comments:

No; data quality and usability are not affected.

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:

Samples were not submitted for metals or inorganic analysis.

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 (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/DMSD, 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?

Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

LCS/LCSD samples were not affected.

vii. Data quality or usability affected? (Please explain) Comments:

No; data quality and usability are not affected.

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

iv. Data quality or usability affected? (Use the comment box to explain.). Comments:

No; data quality and usability are not affected.

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

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (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 explaining why must be entered below)

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

v. Data quality or usability affected? (Please explain.)

Comments:

No; data quality and usability are not affected.

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ○ NA (Please explain) Comments:

No; data quality and usability are not affected.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ◉ No ○ NA (Please explain) Comments:

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

No decontamination blank was submitted; equipment blanks on similar projects have shown that our decontamination procedures are satisfactory.

ii. If above PQL, what samples are affected?

Comments:

iii. Data quality or usability affected? (Please explain.)

Comments:

No; data quality and usability are not affected.

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

a. Defined and appropriate?

○ Yes ○ No ◉ NA (Please explain) Comments:

There were no other data flags or qualifiers.

Reset Form

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Attachment to and part of Report: 31-1-11782-001

Date:	October 2015
To:	City of Fairbanks Attn: Jackson Fox
Re:	Results of Monitoring Well Sampling, City of Fairbanks Public Works, Fairbanks, 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