

August 21, 2018

Garrett's Tesoro  
724 West International Airport Road  
Anchorage, AK 99518

Attn: Mr. Nelson Garrett

**RE: GROUNDWATER SAMPLING AND REMEDIATION SYSTEM EVALUATION,  
724 WEST INTERNATIONAL AIRPORT ROAD, ANCHORAGE, ALASKA;  
ADEC SPILL NO. 1990210001001; ADEC FILE NO. 2100.26.078**

This letter report presents the results of Shannon & Wilson's groundwater sampling and remediation system evaluation activities conducted at 724 West International Airport Road, Anchorage, Alaska. Garrett's Tesoro, an active fueling station is located on the property. A site plan is included as Figure 1.

In a letter dated April 6, 2018 the Alaska Department of Environmental Conservation (ADEC) requested that the monitoring wells on site be sampled, a level-loop survey be conducted, and the remediation system be evaluated. The project purpose was to comply with the ADEC requests. The project was conducted in accordance with our June 13, 2018 revised work plan which was approved by Ms. Chelsy Passmore of the ADEC in a letter dated June 13, 2018.

### **BACKGROUND**

Monitoring Wells B1MWR2, B2MW, and B3MW were last sampled by Shannon & Wilson in July 2014. At that time, concentrations of gasoline range organics (GRO); diesel range organics (DRO); and benzene, toluene, ethylbenzene, and xylenes (BTEX) exceeding the ADEC Table C cleanup levels were documented in Wells B1MWR2 and B2MW. The sample collected from Well B3MW did not contain contaminant concentrations in excess of the applicable cleanup levels.

The remediation system, a combined vapor extraction/air injection system (VEAIS), was last evaluated by Shannon & Wilson in March 2014. The system was started and flame ionization detector (FID) measurements and one analytical vapor sample were collected from the sample port on the vapor extraction system (VES) blower discharge. Following a few days of operation, the flow rate was negligible, and the blower pressure indicated it was operating at maximum

capacity. The VES was turned off out of concern of over-stressing the blower. It was assumed that moisture accumulated and froze within the VES piping and eventually closed off the lines.

## **FIELD ACTIVITIES**

The project consisted of groundwater sampling, conducting a level-loop survey, evaluating the remediation system, and managing investigation-derived waste (IDW). SGS North America Inc. (SGS) of Anchorage, Alaska provided the analysis of the groundwater samples. Photographs of the remediation system are included as Attachment 1. Field notes documenting the sampling activities are included in Attachment 2.

### **Groundwater Sampling**

Groundwater samples were collected from Monitoring Wells B1MWR2, B2MW, and B3MW on June 25, 2018. Prior to initiating groundwater sampling activities, the static water level was measured in the wells and recorded for evaluation of groundwater flow direction and gradient. The water level indicator was decontaminated using analconox/water mixture and a water rinse prior to insertion in each well. The depths to groundwater in the monitoring wells are listed on Table 1.

The monitoring wells were purged and sampled using a low-flow technique, utilizing a submersible pump with disposable vinyl tubing. Sampling was initiated by purging each well to reduce the effect of stagnant well casing water on chemical concentrations and to obtain groundwater samples that are representative of the surrounding water-bearing formation. A submersible pump was placed approximately 1 foot below the groundwater interface to avoid sediment disturbance. The pump rate was set at approximately 0.1 to 0.4 liter per minute (L/min) with a goal of limiting the sustained water drawdown to a maximum of 0.3 foot. The drawdown was determined in each monitoring well using an electronic water probe that was checked regularly throughout the purging/sampling process.

During the purging process, field personnel monitored water quality parameters (pH, conductivity, temperature, and turbidity) and purge volume. After at least 1 well volume was purged and water quality parameters stabilized over three successive readings (pH within 0.1 unit, conductivity within 3 percent, temperature within 3 percent [minimum 0.2 degree Celsius], and turbidity within 10 percent or three consecutive readings of less than 10 Nephelometric Turbidity Units [NTUs]) groundwater samples were collected. Analytical samples were collected in decreasing order of volatility by transferring water directly from the in-well

submersible pump tubing into laboratory-supplied containers. The pump was decontaminated in between each well. Final water quality parameters are listed on Table 1.

### **Well Survey**

A level loop survey was conducted on July 10, 2018 to determine the top-of-casing elevations of the groundwater monitoring wells relative to a temporary benchmark with an elevation designated 100.00 feet. The elevations were surveyed to an accuracy of 0.01 foot. Based on the July 10, 2018 groundwater elevations and survey, the approximate groundwater flow direction is to the southwest. The historical groundwater flow direction is to the northwest. The surveyed well elevations and corresponding July 2018 groundwater elevations are listed in Table 1.

### **Investigation-Derived Waste**

IDW consisted of purge water and decontamination water which was placed in a 55-gallon drum, labeled, and currently stored on site with ADEC approval. Impacted media will be transported off-site for disposal/treatment by NRC Alaska, Inc. Shannon & Wilson will complete the ADEC's *Transport, Treatment & Disposal Approval Form for Contaminated Media* for ADEC review and approval prior to coordinating IDW disposal.

### **Remediation System Evaluation**

On July 10, 2018, a Shannon & Wilson representative visually assessed and documented the condition of the remediation system equipment. The VEAIS and main components of the system were successfully started and appeared operational. Operation parameters including VES exhaust temperature, pressure, and flow rate, and air injection system (AIS) pressure and flow rate were recorded. The condition of the VES is consistent with our March 2014 system evaluation. Positive pressure was observed through the sample port with the dilution valve closed. The AIS system appears to have a damaged connection (air flow coming from bottom of connection) and possibly needs to be repaired in order for the system to function properly. The VEAIS was turned off prior to leaving the site.

## **LABORATORY ANALYSES**

The groundwater samples were submitted to SGS for analysis using chain-of-custody procedures. The three groundwater samples, including one duplicate sample, were analyzed for GRO by Alaska Method (AK) 101 and volatile organic compounds (VOCs) by Environmental Protection

Agency (EPA) Method 8260C. Water trip blanks accompanied the samples and was analyzed for GRO by AK 101 and VOCs by EPA Method 8260C.

## **DISCUSSION OF ANALYTICAL RESULTS**

The analytical groundwater results were compared to ADEC Table C cleanup levels listed in 18 Alaska Administrative Code (AAC) 75 regulations (November 2017). The cleanup levels and analytical results for this project are provided in Table 2. The laboratory report and completed ADEC Laboratory Data Review Checklist (LDRC) are provided in Attachment 3.

### **Groundwater Samples**

The samples collected from Wells B1MWR2 and B2MW contained concentrations of GRO (maximum of 241 milligrams per liter [mg/L]), benzene (maximum of 59.5 mg/L), toluene (maximum of 37.9 mg/L), ethylbenzene (6.96 mg/L), and xylenes (maximum of 26.0 mg/L) exceeding the ADEC Table C cleanup levels of 2.2 mg/L, 0.0046 mg/L, 1.1 mg/L, 0.015 mg/L, and 0.190 mg/L, respectively. Wells B1MWR2 and B2MW contained concentrations of 1,2,4-trimethylbenzene (maximum of 1.86 mg/L) and 1,2-dichloroethane (maximum of 0.300 J mg/L), exceeding the ADEC Table C cleanup levels of 0.015 mg/L and 0.0017 mg/L, respectively. The sample collected from Well B1MWR2 also contained 0.0480 J mg/L 1,3,5-trimethylbenzene which exceeds the ADEC cleanup level of 0.120 mg/L. The sample collected from Well B3MW did not contain concentrations of GRO, BTEX, or VOCs above the ADEC Table C cleanup levels.

### **Quality Control**

The project laboratory implements on-going quality assurance/quality control procedures to evaluate conformance to ADEC data quality objectives (DQOs). Internal laboratory controls to assess data quality for this project include surrogates, method blanks, matrix spike/matrix spike duplicates (MS/MSD), and laboratory control sample/laboratory control sample duplicates (LCS/LCSD) to assess precision, accuracy, and matrix bias. If a DQO was not met, the project laboratory provides a brief narrative concerning the problem in the case narrative of their laboratory reports (See Attachment 3).

Field quality control samples included one water trip blank and one field duplicate sample. One laboratory prepared trip blank sample accompanied the project sample jars from the laboratory to the site during sampling activities and back again to SGS.

External quality controls include field records and a groundwater duplicate sample set. A duplicate sample set was collected to assess the sampling precision and calculate the relative percent difference (RPD). The RPD measurement provides an indication of the sample homogeneity and the precision of the analytical techniques. The RPDs are within the ADEC recommended DQO of 30 percent.

Shannon & Wilson reviewed the SGS data deliverables and completed an ADEC Laboratory Data Review Checklist for the project work orders. The laboratory report and data review checklist are included in Attachment 3. In our opinion, no non-conformances that would adversely impact data usability for the objectives of this project were noted.

### **CONCLUSIONS**

The groundwater samples collected during the June 2018 sampling event from Monitoring Wells B1MWR2 and B2MW contained concentrations of target analytes above the ADEC Table C cleanup levels. The sample collected from Well B3MW did not contain concentrations of target analytes above the ADEC Table C cleanup levels. These results are consistent with previous sampling events.

The remediation system was successfully started but may need maintenance to return the system to continuous operation.

### **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 research, sampling, and analyses that we conducted. They should not be construed as definite conclusions regarding the project site's groundwater quality. 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 Attachment 4, Important Information About Your Geotechnical/Environmental Report, to assist you and others in understanding the use and limitations of our reports.

Garrett's Tesoro  
Attn: Mr. Nelson Garrett  
August 21, 2018  
Page 6

SHANNON & WILSON, INC.

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 authorized by you or required by law.

We appreciate the opportunity to be of service. If you have questions or comments concerning this report, please call the undersigned at (907) 561-2120.

Sincerely,

SHANNON & WILSON, INC.

Prepared by:

A handwritten signature in blue ink, appearing to read "J. Kesler for:", with a stylized flourish at the end.

Jake Kesler  
Environmental Scientist

Approved by:

A handwritten signature in blue ink, appearing to read "Dan P. McMahon", with a stylized flourish at the end.

Dan P. McMahon  
Associate

Enc: Tables 1 and 2; Figure 1; and Attachments 1 through 4

**TABLE 1**  
**WELL DEVELOPMENT AND SAMPLING LOG**

	Monitoring Well Number		
	B1MWR2	B2MW	B3MW
<b>Water Level Measurement Data</b>			
Date Water Level Measured	6/25/2018	6/25/2018	6/25/2018
Time Water Level Measured	11:37	11:49	11:20
Measured Depth to Water (ft below TOC)	17.80	18.57	19.29
Well Stickup (ft)	-0.38	-0.29	-0.33
Depth to Water Below Ground Surface (ft)	18.18	18.86	19.62
TOC Elevation (ft)	98.81	99.56	100.24
Groundwater Elevation (ft)	81.01	80.99	80.95
<b>Sampling Data</b>			
Date Sampled	6/25/2018	6/25/2018	6/25/2018
Time Sampled	14:47	16:10	12:54
Measured Depth to Water (ft below TOC)	17.80	18.57	19.29
Total Depth of Well (ft below TOC)	19.86	24.45	21.89
Water Column in Well (ft)	2.06	5.88	2.60
Gallons per Foot	0.16	0.16	0.16
Water Column Volume (gallons)	0.33	0.94	0.42
Total Volume Pumped (gallons)	3.1	2.8	2.7
Sampling Method	Submersible pump	Submersible pump	Submersible pump
Diameter of Well Casing	2-inch	2-inch	2-inch
<b>Water Quality Data</b>			
Date Measured	6/25/2018	6/25/2018	6/25/2018
Temperature (°C)	7.28	6.66	7.11
pH (Standard Units)	6.23	6.48	5.56
Specific Conductivity (µS/cm)	2.63	1.12	0.97
Turbidity (NTU)	181.5	4.71	0.53
<b>Remarks</b>		Duplicate Sample B12MW	

## Notes:

Water quality parameters were measured with a YSI 556 and a Micro TPW turbidimeter

- = Not applicable or not measured

^ = Depth to water measurement prior to development

TOC = Top of casing

ft = Feet

°C = Degrees Celsius

µS/cm = Microsiemens per Centimeter

~ = Duplicate of preceding sample

NTU = Nephelometric Turbidity Unit

mV = Millivolts

**TABLE 2**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS**

Parameter Tested	Method*	Cleanup Level (mg/L)**	Sample ID Number^ and Water Depth in Feet BTOC (See Table 1 and Figure 1)					
			Monitoring Wells				Trip Blanks	
			B1MWR2 17.80	B2MW 18.57	B12MW~ 18.57	B3MW 19.29	WTB1 -	WTB2 -
Gasoline Range Organics (GRO) - mg/L	AK 101	2.2	<b>163</b>	<b>234</b>	<b>241</b>	<b>0.0539 J</b>	<0.0500	-
Volatile Organic Compounds (VOCs)								
Benzene - mg/L	EPA 8260C	0.0046	<b>8.84</b>	<b>57.2</b>	<b>59.5</b>	<0.000200	-	<0.000200
Toluene - mg/L	EPA 8260C	1.1	<b>33.1</b>	<b>36.9</b>	<b>37.9</b>	<0.000500	-	<0.000500
Ethylbenzene - mg/L	EPA 8260C	0.015	<b>6.96</b>	<b>3.37</b>	<b>3.57</b>	<0.000500	-	<0.000500
Xylenes (total) - mg/L	EPA 8260C	0.190	<b>26.0</b>	<b>14.5</b>	<b>14.8</b>	<0.00150	-	<0.00150
1,2,4-Trimethylbenzene - mg/L	EPA 8260C	0.015	<b>1.86</b>	<b>1.28</b>	<b>1.25</b>	<0.000500	-	<0.000500
1,2-Dichloroethane - mg/L	EPA 8260C	0.0017	<b>0.180 J</b>	<b>0.290 J</b>	<b>0.300 J</b>	<0.000250	-	<0.000250
1,3,5-Trimethylbenzene - mg/L	EPA 8260C	0.120	<b>0.480 J</b>	<0.500	<0.500	<0.000500	-	<0.000500
n-Propylbenzene - mg/L	EPA 8260C	0.660	<b>0.350 J</b>	<0.500	<0.500	<0.000500	-	<0.000500
Other VOC analytes - mg/L	EPA 8260C	various	ND	ND	ND	ND	-	ND

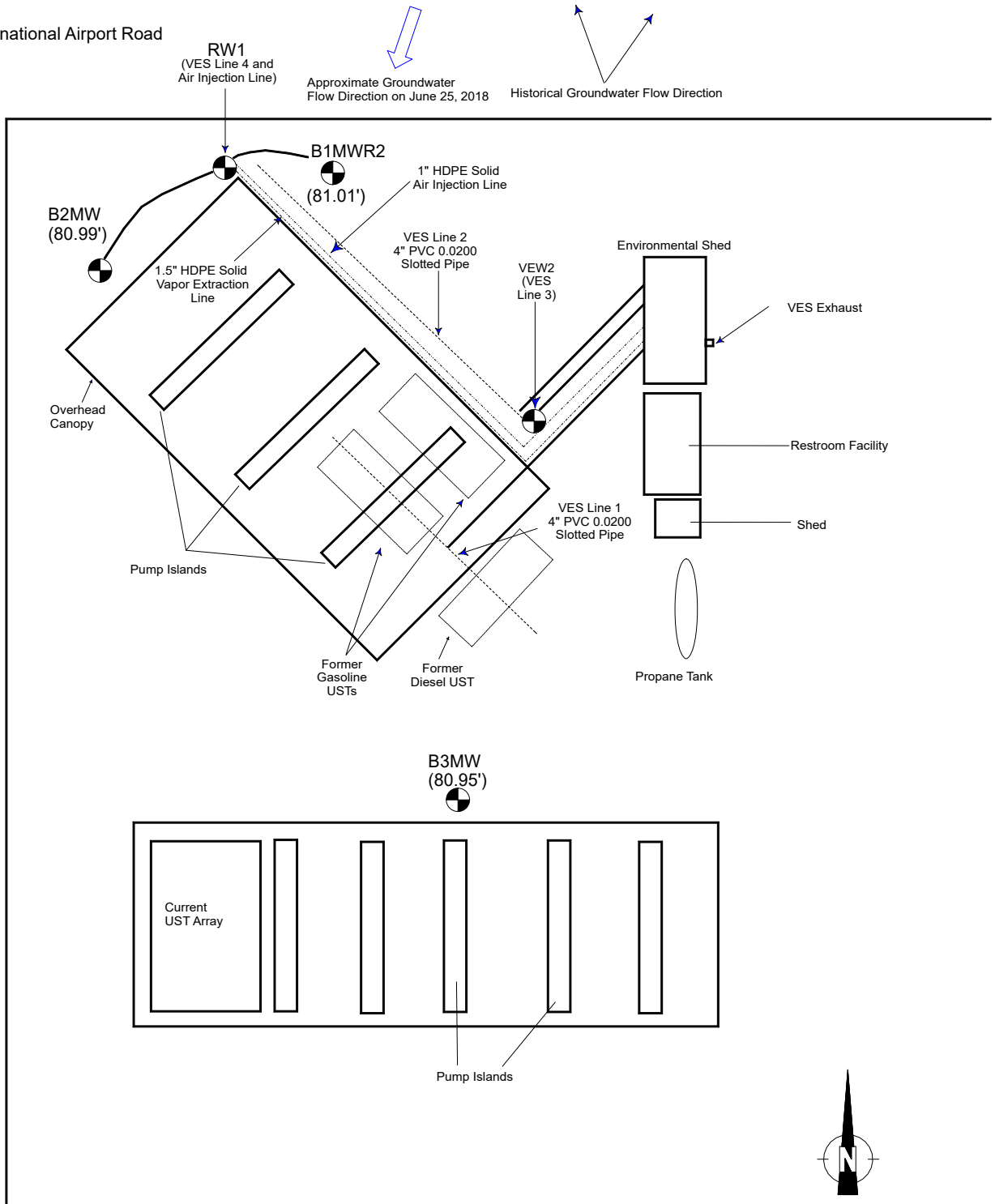
## Notes:

- \* = See Attachment 2 for compounds tested, methods, and laboratory reporting limits
- \*\* = Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (Nov. 2017)
- ^ = Sample ID number preceded by "100236-" on the chain of custody form
- mg/L = Milligrams per liter
- <0.0500 = Analyte not detected; laboratory limit of detection of 0.0500 mg/L
- 0.0539** = Analyte detected
- 163** = Reported concentration exceeds the regulated cleanup level
- = Not applicable or sample not tested for this analyte
- ~ = Duplicate of preceding sample
- J = Estimated concentration less than the limit of quantitation. See the SGS laboratory report for more details.
- BTOC = Below Top of Casing
- ND = Analyte not detected



West International Airport Road

Arctic Boulevard



**LEGEND**

----- 4" PVC 0.0200 Slotted Pipe

————— 4" HDPE Solid Pipe

----- 1.5" HDPE Solid Vapor Extraction Line

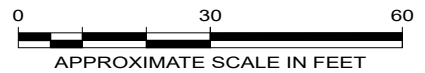
----- 1" HDPE Solid Air Injection Line

⊙ Approximate location of Monitoring Well B2MW installed by Shannon & Wilson.

B2MW RW1 = Vapor Extraction Line 4 and Air injection line

VEW2 = Vapor Extraction Line 3

(81.01') Approximate groundwater elevation based on July 10, 2018 survey and June 25, 2018 depth to water measurements



724 West International Airport Road Anchorage, Alaska	
<b>SITE PLAN</b>	
August 2018	100236-001
SHANNON & WILSON, INC. Geotechnical & Environmental Consultants	<b>Fig. 1</b>

**ATTACHMENT 1**  
**SITE PHOTOGRAPHS**

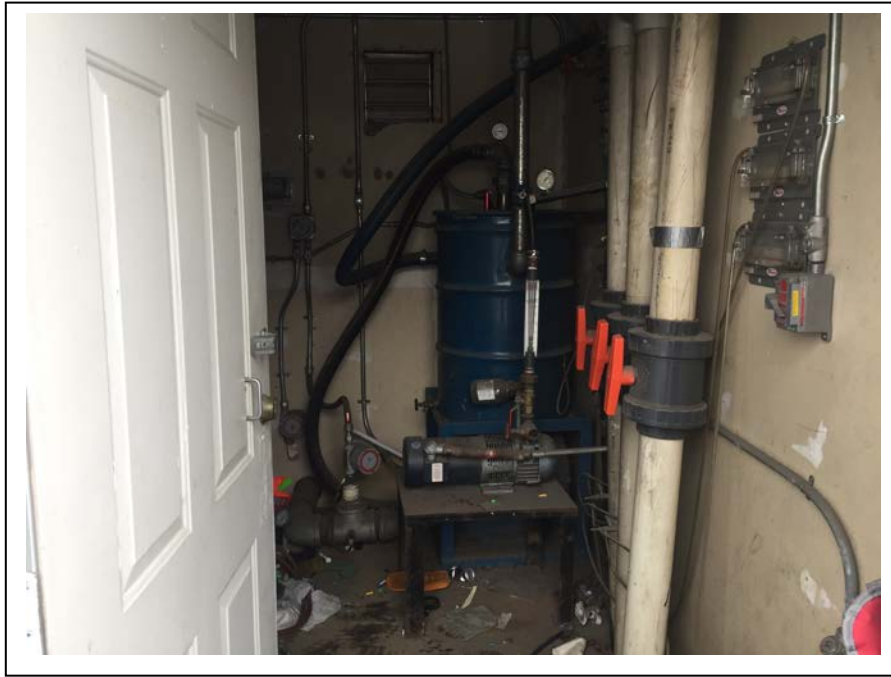


Photo 1: Looking into the remediation system shed. (July 10, 2018)



Photo 2: Looking at the VES lines of the remediation system. (July 10, 2018)

724 West International Airport Road  
Anchorage, Alaska

**PHOTOS 1 AND 2**

August 2018

100236-001



**SHANNON & WILSON, INC.**  
Geotechnical & Environmental Consultants



Photo 3: Looking at the AIS. (July 10, 2018)

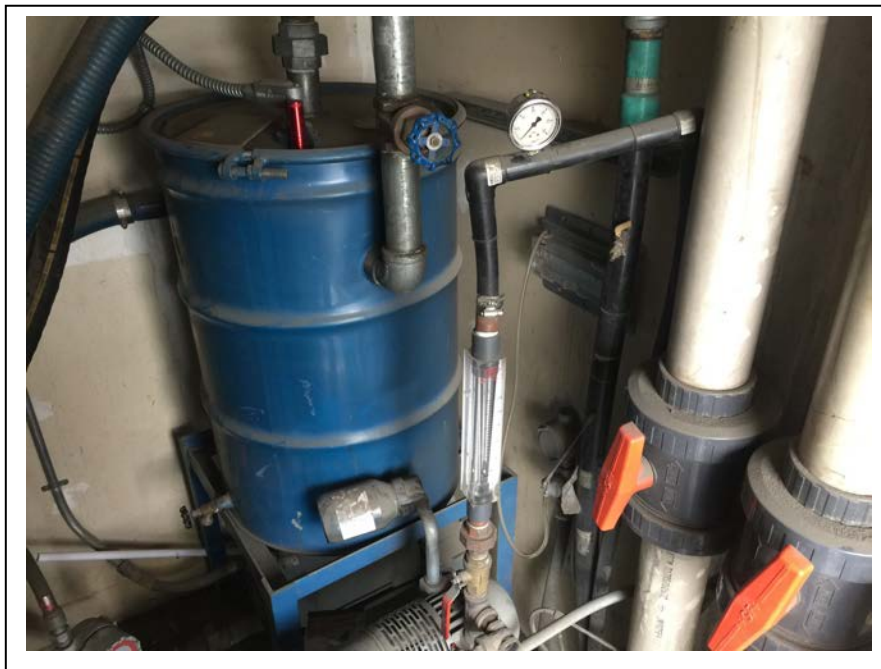


Photo 4: Looking at the VES. (July 10, 2018)

724 West International Airport Road  
Anchorage, Alaska

**PHOTOS 3 AND 4**

August 2018

100236-001



**SHANNON & WILSON, INC.**  
Geotechnical & Environmental Consultants

**ATTACHMENT 2**

**FIELD NOTES**

**LOW-FLOW WATER SAMPLING LOG**

Shannon & Wilson, Inc.

Job No: 100236 Location: Garrett's Tesco Weather: 50°F overcast  
 Well No.: \*AW3 B3MW  
 Date: 6/25/18 Time Started: 12:05 Time Completed: 13:05  
 Develop Date: - Develop End Time: - (24 hour break)

**INITIAL GROUNDWATER LEVEL DATA**

Time of Depth Measurement: 11:20 Date of Depth Measurement: 6/25/18  
 Measuring Point (MP): Top of PVC Casing / Top of Steel Protective Casing / Other: \_\_\_\_\_  
 Diameter of Casing: 2" Well Screen Interval: \_\_\_\_\_  
 Total Depth of Well Below MP: 21.89 Product Thickness, if noted: \_\_\_\_\_  
 Depth-to-Water (DTW) Below MP: 19.29  
 Water Column in Well: 2.60 (Total Depth of Well Below MP - DTW Below MP)  
 Gallons per foot: 0.16  
 Gallons in Well: 0.416 (Water Column in Well x Gallons per foot)

19.34

**PURGING DATA**

0.2 Date Purged: 6/25/18 Time Started: 12:25 Time Completed: 12:53  
 Three Well Volumes: 1.25 (Gallons in Well x 3)  
 Gallons Purged: 2.7 Depth of Pump (generally 2 ft from bottom): 20.29  
 Max. Drawdown (generally 0.3 ft): 0.11 Pump Rate: 0.3 L/min  
 Well Purged Dry: Yes  No  (If yes, use Well Purged Dry Log) 0.1

Time:	Gallons:	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
12:29	0.3	0.3	19.34	0.05	7.41	1.082	-	4.85	-	18.34
12:32	0.6	0.3	19.36	0.07	7.41	1.082	-	4.88	-	11.23
12:35	0.9	0.3	19.37	0.08	7.30	1.054	-	5.01	-	3.76
12:38	1.2	0.3	19.39	0.1	7.15	1.023	-	5.11	-	1.49
12:41	1.5	0.3	19.40	0.11	7.10	1.007	-	5.21	-	0.14
12:44	1.8	0.3	19.39	0.10	7.14	0.997	-	5.34	-	0.29

**SAMPLING DATA**

Odor: None Color: clear  
 Sample Designation: 100236-B3MW Time / Date: 12:54 6/25/18  
 QC Sample Designation: - Time / Date: -  
 QA Sample Designation: - Time / Date: -

Evacuation Method: Submersible Pump / Other: \_\_\_\_\_  
 Sampling Method: Submersible Pump / Other: \_\_\_\_\_

Water Quality Instruments Used/Manufacturer/Model Number Hera #6, YSP 556, turbidimeter #3  
 Calibration Info (Time, Ranges, etc) Calibrated 10:00  
 Remarks: broken PVC, missing well plug

Sampling Personnel: JJK

WELL CASING VOLUMES (GAL/FT): 1" = 0.04 2" = 0.16 4" = 0.65  
 ANNULAR SPACE VOLUME (GAL/FT): 4" casing and 2" well = 0.23

## LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Continued from previous page

Job No.: 100236 Location: Garrett's Tesoro Site: 724 W. International  
 Well No.: B3MW  
 Date: 6/25/18

Time:	Gallons:	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond. (uS/cm)	DO (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
12:47	2.1	0.3	19.39	0.10	7.13✓	0.988✓	—	5.46✓	—	0.70✓
12:50	2.4	0.3	19.38	0.09	7.07✓	0.973✓	—	5.52✓	—	0.46✓
12:53	2.7	0.3	19.38	0.09	7.11✓	0.970✓	—	5.56✓	—	0.53✓

	Interval (minutes)	Pump Rate (mL/min):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
ADEC (ay 2010)	3 to 5	100 to 150	<0.0328	±3% or ±0.2	±3%	±10%	±0.1	±10	±10%
EPA (an. 2010)	5	50	<0.3	±3%	±3%	±10%	±0.1	±10	±10% or <5 NTU

EPA guidance requires all parameters to stabilize for 3 consecutive readings before sampling. If not stable within 2 hours, collect sample.  
 ADEC guidance requires 3 parameters (4 if using temperature) to stabilize for 3 consecutive readings before sampling.

## LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Job No: 100236 Location: Garnett's Reservoir Weather: 50°F overcast  
 Well No.: B1/MWR2  
 Date: 6/25/18 Time Started: 13:35 Time Completed: 15:15  
 Develop Date: - Develop End Time: - (24 hour break)

### INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 11:37 Date of Depth Measurement: 6/25/18  
 Measuring Point (MP): Top of PVC Casing / Top of Steel Protective Casing / Other:  
 Diameter of Casing: 2" Well Screen Interval: \_\_\_\_\_  
 Total Depth of Well Below MP: 19.80 Product Thickness, if noted: \_\_\_\_\_  
 Depth-to-Water (DTW) Below MP: 17.80 → 17.79  
 Water Column in Well: 2.07 (Total Depth of Well Below MP - DTW Below MP)  
 Gallons per foot: 0.16  
 Gallons in Well: 0.33 (Water Column in Well x Gallons per foot)

### PURGING DATA

Date Purged: 6/25/18 Time Started: \_\_\_\_\_ Time Completed: 15:02  
 Three Well Volumes: 0.99 (Gallons in Well x 3)  
 Gallons Purged: 3.1 Depth of Pump (generally 2 ft from bottom): 18.89  
 Max. Drawdown (generally 0.3 ft): 0.41 Pump Rate: 0.1 L/min  
 Well Purged Dry: Yes  No  (If yes, use Well Purged Dry Log)

Time:	Gallons:	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
13:46	0.5	0.4	18.2	0.41	5.86	3.772	-	6.12	-	319.4
*13:52	0.8	0.1	18.02	*0.35028	7.26	3.384	-	5.97	-	282.0
13:55	0.9	0.1	-	-	8.05	3.373	-	6.01	-	343.4
13:58	1.0	0.1	-	-	8.55	3.073	-	6.13	-	328.6
14:01	1.1	0.1	17.95	0.16	8.70	3.000	-	6.22	-	-
14:04	1.1	0.1	-	-	8.89	2.991	-	6.28	-	-

### SAMPLING DATA

Odor: none Diesel Color: clear / opaque  
 Sample Designation: 100236-B1/MWR2 Time / Date: 14:49 6/25/18  
 QC Sample Designation: - Time / Date: -  
 QA Sample Designation: - Time / Date: -

Evacuation Method: Submersible Pump / Other: \_\_\_\_\_  
 Sampling Method: Submersible Pump / Other: \_\_\_\_\_

Water Quality Instruments Used/Manufacturer/Model Number Heron #6 DTW, YSI 556, turbidimeter #3

Calibration Info (Time, Ranges, etc) Calibrated 10:00

\* Remarks: adjust flow rate to 0.1 L/min to accommodate drawdown. re-calibrate turbidimeter @ 13:56

Sampling Personnel: JJK

WELL CASING VOLUMES (GAL/FT): 1" = 0.04 2" = 0.16 4" = 0.65  
 ANNULAR SPACE VOLUME (GAL/FT): 4" casing and 2" well = 0.23



## LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Continued from previous page

Job No: 100236 Location: Garrett's Tesco Site: 724 W. International  
 Well No.: B1M4/P2  
 Date: 6/25/18

Time:	Gallons:	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond (uS/cm)	DO (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
14:09	1.2	0.3	18.14	0.35	9.26	2.954	-	6.32✓	-	101
14:12	1.5	0.1	18.11	0.32	7.65	2.700	-	6.32✓	-	498.3
14:15	1.6	0.1	-	-	7.31	2.645	-	6.25	-	297.4
14:18	1.9	0.2	18.02	0.23	7.29✓	2.714✓	-	6.18✓	-	353.0✓
14:21	2.2	0.2	-	-	7.36✓	2.733✓	-	6.17✓	-	336.8✓
14:24	2.4	0.2	18.09	0.30	7.36✓	2.718	-	6.17✓	-	240.5
14:27	2.5	0.2	-	-	7.46✓	2.688	-	6.20	-	140.9
14:30	2.6	0.2	18.11	0.32	7.33	2.673	-	6.21	-	245.8
14:33	2.7	0.1	18.11	0.32	7.28	2.644	-	6.22	-	278.7
14:36	2.8	0.1	18.11	0.32	7.26	2.647	-	6.22	-	339.5
14:39	2.9	0.1	18.11	0.32	7.24	2.639	-	6.22	-	316.8
14:42	3.0	0.1	18.11	0.32	7.28	2.630	-	6.23	-	196.8
14:45	3.1	0.1	18.11	0.32	7.28	2.632	-	6.23	-	181.5

Interval (minutes)	Pump Rate (mL/min):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)	
ADEC (ay 2010)	3 to 5	100 to 150	<0.0328	±3% or ±0.2	±3%	±10%	±0.1	±10	±10%
EPA (an. 2010)	5	50	<0.3	±3%	±3%	±10%	±0.1	±10	±10% or <sup>10</sup> <5 NTU

EPA guidance requires all parameters to stabilize for 3 consecutive readings before sampling. If not stable within 2 hours, collect sample.  
 ADEC guidance requires 3 parameters (4 if using temperature) to stabilize for 3 consecutive readings before sampling.

**LOW-FLOW WATER SAMPLING LOG**

Shannon & Wilson, Inc.

Job No: 100236 Location: Garrett's Tesoro Weather: 50°F overcast  
 Well No.: B2MW  
 Date: 6/25/18 Time Started: 15:35 Time Completed: 16:35  
 Develop Date: \_\_\_\_\_ Develop End Time: — (24 hour break)

**INITIAL GROUNDWATER LEVEL DATA**

Time of Depth Measurement: 11:49 Date of Depth Measurement: 6/25/18  
 Measuring Point (MP): Top of PVC Casing / Top of Steel Protective Casing / Other: \_\_\_\_\_  
 Diameter of Casing: 2" Well Screen Interval: \_\_\_\_\_  
 Total Depth of Well Below MP: 24.45 Product Thickness, if noted: —  
 Depth-to-Water (DTW) Below MP: 18.57  
 Water Column in Well: 5.88 (Total Depth of Well Below MP - DTW Below MP)  
 Gallons per foot: 0.16  
 Gallons in Well: 0.94 (Water Column in Well x Gallons per foot)

**PURGING DATA**

Date Purged: 6/25/18 Time Started: 15:42 Time Completed: 16:25  
 Three Well Volumes: 2.82 (Gallons in Well x 3)  
 Gallons Purged: 2.8 Depth of Pump (generally 2 ft from bottom): 19.57  
 Max. Drawdown (generally 0.3 ft): 0.18 Pump Rate: 0.4 L/min  
 Well Purged Dry: Yes  No  (If yes, use Well Purged Dry Log)

Time:	Gallons:	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
15:45	0.2	0.4	18.57	0.0	7.14	1.167	—	6.47	—	19.43
15:48	0.5	0.4	18.72	0.15	6.63	1.125	—	6.19	—	5.44 ✓
15:51	0.9	0.4	18.75	0.18	6.32	1.102 ✓	—	6.33 ✓	—	3.90 ✓
15:54	1.3	0.4	18.65	0.08	6.62 ✓	1.105 ✓	—	6.23 ✓	—	3.24 ✓
15:57	1.6	0.4	18.65	0.08	6.66 ✓	1.108	—	6.27 ✓	—	2.55 ✓
16:00	1.9	0.4	18.65	0.08	6.61 ✓	1.116	—	6.36	—	5.84 ✓

**SAMPLING DATA**

Odor: Diesel / Hydrocarbons Color: clear  
 Sample Designation: 100236-B2MW Time / Date: 16:10 6/25/18  
 QC Sample Designation: 100236-B12MW Time / Date: 16:20 6/25/18  
 QA Sample Designation: — Time / Date: —

Evacuation Method: Submersible Pump / Other: \_\_\_\_\_  
 Sampling Method: Submersible Pump / Other: \_\_\_\_\_

Water Quality Instruments Used/Manufacturer/Model Number Hanon DTC #6, YSI 556, turbidimeter #3  
 Calibration Info (Time, Ranges, etc) Calibrated 10:00

Remarks: \_\_\_\_\_

Sampling Personnel: JJK

WELL CASING VOLUMES (GAL/FT): 1" = 0.04 2" = 0.16 4" = 0.65  
 ANNULAR SPACE VOLUME (GAL/FT): 4" casing and 2" well = 0.23

## LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Continued from previous page

Job No: 100236  
 Well No.: B2MW  
 Date: 6/25/18

Location: Garrett's Pond Site: 724 W. International

Time:	Gallons:	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C) ✓	Sp. Cond (µS/cm)	DO (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU) ✓
16:03	2.2	0.4	18.65	0.08	6.65 ✓	1.122 ✓	-	6.45 ✓	-	4.98 ✓
16:08	2.5	0.4	18.65	0.08	6.65 ✓	1.123 ✓	-	6.47 ✓	-	4.92 ✓
16:09	2.8	0.4	18.65	0.08	6.66 ✓	1.124 ✓	-	6.48 ✓	-	4.71 ✓

	Interval (minutes)	Pump Rate (mL/min):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
ADEC (ay 2010)	3 to 5	100 to 150	<0.0328	±3% or ±0.2	±3%	±10%	±0.1	±10	±10%
EPA (an. 2010)	5	50	<0.3	±3%	±3%	±10%	±0.1	±10	±10% or <5 NTU

EPA guidance requires all parameters to stabilize for 3 consecutive readings before sampling. If not stable within 2 hours, collect sample.  
 ADEC guidance requires 3 parameters (4 if using temperature) to stabilize for 3 consecutive readings before sampling.

FIELD ACTIVITIES DAILY LOG

Date 6/25/18

Sheet 1 of 1

Project No. 100236

Project Name: Garrett's Tesoro

Field activity subject: GW Sampling

Description of daily activities and events:

11:00 - arrive on site

meet ADEC personnel - Grant Lidren, Chelsy Passmore

11:30 - take DTW for wells B3MW, B1MW R2, B2MW

- Scout for purge drum - none are usable.

- meet Garrett, discuss work being performed

12:00 - sample wells (Dyp from B2MW)

16:45 - drop purge drum on site on NE corner by intl airport rd.

17:00 - drop samples off at SGS.

Visitors on site: ADEC - Grant Lidren, Chelsy Passmore  
Garrett Melson

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

Weather conditions: 50°F cloudy

Important telephone calls:

Personnel on site: JJK  
Signature: [Signature]

Date: 6/25/18

**ATTACHMENT 3**  
**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)433-3226

Report Number: **1183159**

Client Project: **100236 Garrett's Tesoro**

Dear Jake Kesler,

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

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

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

Sincerely,  
SGS North America Inc.

---

Jillian Vlahovich  
Project Manager  
Jillian.Vlahovich@sgs.com

Date

Print Date: 07/06/2018 1:55:22PM

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

Member of SGS Group

## Case Narrative

SGS Client: **Shannon & Wilson, Inc.**  
SGS Project: **1183159**  
Project Name/Site: **100236 Garrett's Tesoro**  
Project Contact: **Jake Kesler**

Refer to sample receipt form for information on sample condition.

**LCS for HBN 1781683 [VXX/32498 (1455832) LCS**

8260C - LCS recovery for bromomethane (152%) does not meet QC criteria. This analyte was not detected in associated samples.

**LCS for HBN 1781776 [VXX/32514 (1456204) LCS**

8260C - LCS recovery for bromomethane (153%) does not meet QC criteria. This analyte was not detected in associated samples.

**LCSD for HBN 1781683 [VXX/3249 (1455833) LCSD**

8260C - LCSD recovery for bromomethane (180%) does not meet QC criteria. This analyte was not detected in associated samples.

**LCSD for HBN 1781776 [VXX/3251 (1456205) LCSD**

8260C - LCSD recovery for bromomethane (170%) does not meet QC criteria. This analyte was not detected in associated samples.

\*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: 07/06/2018 1:55:23PM

## Laboratory Qualifiers

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

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 (Provisionally Certified as of 06/11/2018 for Mercury by EPA245.1, Beryllium and Copper by EPA200.8) & Microbiology & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

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

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



### Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
100236-B2MW	1183159001	06/25/2018	06/25/2018	Water (Surface, Eff., Ground)
100236-B12MW	1183159002	06/25/2018	06/25/2018	Water (Surface, Eff., Ground)
100236-B3MW	1183159003	06/25/2018	06/25/2018	Water (Surface, Eff., Ground)
100236-B1MWR2	1183159004	06/25/2018	06/25/2018	Water (Surface, Eff., Ground)
100236-WTB1	1183159005	06/25/2018	06/25/2018	Water (Surface, Eff., Ground)
100236-WTB2	1183159006	06/25/2018	06/25/2018	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
AK101	Gasoline Range Organics (W)
SW8260C	Volatile Organic Compounds (W) FULL

Print Date: 07/06/2018 1:55:25PM

### Detectable Results Summary

Client Sample ID: **100236-B2MW**

Lab Sample ID: 1183159001

**Volatile Fuels**

**Volatile GC/MS**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	234	mg/L
1,2,4-Trimethylbenzene	1280	ug/L
1,2-Dichloroethane	290J	ug/L
Benzene	57200	ug/L
Ethylbenzene	3370	ug/L
o-Xylene	4490	ug/L
P & M -Xylene	10000	ug/L
Toluene	36900	ug/L
Xylenes (total)	14500	ug/L

Client Sample ID: **100236-B12MW**

Lab Sample ID: 1183159002

**Volatile Fuels**

**Volatile GC/MS**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	241	mg/L
1,2,4-Trimethylbenzene	1250	ug/L
1,2-Dichloroethane	300J	ug/L
Benzene	59500	ug/L
Ethylbenzene	3570	ug/L
o-Xylene	4550	ug/L
P & M -Xylene	10200	ug/L
Toluene	37900	ug/L
Xylenes (total)	14800	ug/L

Client Sample ID: **100236-B3MW**

Lab Sample ID: 1183159003

**Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	0.0539J	mg/L

Client Sample ID: **100236-B1MWR2**

Lab Sample ID: 1183159004

**Volatile Fuels**

**Volatile GC/MS**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	163	mg/L
1,2,4-Trimethylbenzene	1860	ug/L
1,2-Dichloroethane	180J	ug/L
1,3,5-Trimethylbenzene	480J	ug/L
Benzene	8840	ug/L
Ethylbenzene	6960	ug/L
n-Propylbenzene	350J	ug/L
o-Xylene	5800	ug/L
P & M -Xylene	20200	ug/L
Toluene	33100	ug/L
Xylenes (total)	26000	ug/L

## Results of 100236-B2MW

Client Sample ID: **100236-B2MW**  
 Client Project ID: **100236 Garrett's Tesoro**  
 Lab Sample ID: 1183159001  
 Lab Project ID: 1183159

Collection Date: 06/25/18 16:10  
 Received Date: 06/25/18 17:19  
 Matrix: Water (Surface, Eff., Ground)  
 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	234	20.0	6.20	mg/L	200		07/05/18 15:29
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	94.5	50-150		%	200		07/05/18 15:29

## Batch Information

Analytical Batch: VFC14248  
 Analytical Method: AK101  
 Analyst: ST  
 Analytical Date/Time: 07/05/18 15:29  
 Container ID: 1183159001-C

Prep Batch: VXX32559  
 Prep Method: SW5030B  
 Prep Date/Time: 07/04/18 08:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL



Results of 100236-B2MW

Client Sample ID: 100236-B2MW
Client Project ID: 100236 Garrett's Tesoro
Lab Sample ID: 1183159001
Lab Project ID: 1183159

Collection Date: 06/25/18 16:10
Received Date: 06/25/18 17:19
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

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



**Results of 100236-B2MW**

Client Sample ID: **100236-B2MW**  
 Client Project ID: **100236 Garrett's Tesoro**  
 Lab Sample ID: 1183159001  
 Lab Project ID: 1183159

Collection Date: 06/25/18 16:10  
 Received Date: 06/25/18 17:19  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

**Results by Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloroform	500 U	1000	310	ug/L	1000		06/27/18 18:59
Chloromethane	500 U	1000	310	ug/L	1000		06/27/18 18:59
cis-1,2-Dichloroethene	500 U	1000	310	ug/L	1000		06/27/18 18:59
cis-1,3-Dichloropropene	250 U	500	150	ug/L	1000		06/27/18 18:59
Dibromochloromethane	250 U	500	150	ug/L	1000		06/27/18 18:59
Dibromomethane	500 U	1000	310	ug/L	1000		06/27/18 18:59
Dichlorodifluoromethane	500 U	1000	310	ug/L	1000		06/27/18 18:59
Ethylbenzene	3370	1000	310	ug/L	1000		06/27/18 18:59
Freon-113	5000 U	10000	3100	ug/L	1000		06/27/18 18:59
Hexachlorobutadiene	500 U	1000	310	ug/L	1000		06/27/18 18:59
Isopropylbenzene (Cumene)	500 U	1000	310	ug/L	1000		06/27/18 18:59
Methylene chloride	2500 U	5000	1000	ug/L	1000		06/27/18 18:59
Methyl-t-butyl ether	5000 U	10000	3100	ug/L	1000		06/27/18 18:59
Naphthalene	500 U	1000	310	ug/L	1000		06/27/18 18:59
n-Butylbenzene	500 U	1000	310	ug/L	1000		06/27/18 18:59
n-Propylbenzene	500 U	1000	310	ug/L	1000		06/27/18 18:59
o-Xylene	4490	1000	310	ug/L	1000		06/27/18 18:59
P & M -Xylene	10000	2000	620	ug/L	1000		06/27/18 18:59
sec-Butylbenzene	500 U	1000	310	ug/L	1000		06/27/18 18:59
Styrene	500 U	1000	310	ug/L	1000		06/27/18 18:59
tert-Butylbenzene	500 U	1000	310	ug/L	1000		06/27/18 18:59
Tetrachloroethene	500 U	1000	310	ug/L	1000		06/27/18 18:59
Toluene	36900	1000	310	ug/L	1000		06/27/18 18:59
trans-1,2-Dichloroethene	500 U	1000	310	ug/L	1000		06/27/18 18:59
trans-1,3-Dichloropropene	500 U	1000	310	ug/L	1000		06/27/18 18:59
Trichloroethene	500 U	1000	310	ug/L	1000		06/27/18 18:59
Trichlorofluoromethane	500 U	1000	310	ug/L	1000		06/27/18 18:59
Vinyl acetate	5000 U	10000	3100	ug/L	1000		06/27/18 18:59
Vinyl chloride	75.0 U	150	50.0	ug/L	1000		06/27/18 18:59
Xylenes (total)	14500	3000	1000	ug/L	1000		06/27/18 18:59
<b>Surrogates</b>							
1,2-Dichloroethane-D4 (surr)	102	81-118		%	1000		06/27/18 18:59
4-Bromofluorobenzene (surr)	101	85-114		%	1000		06/27/18 18:59
Toluene-d8 (surr)	98.4	89-112		%	1000		06/27/18 18:59

## Results of 100236-B2MW

Client Sample ID: **100236-B2MW**  
Client Project ID: **100236 Garrett's Tesoro**  
Lab Sample ID: 1183159001  
Lab Project ID: 1183159

Collection Date: 06/25/18 16:10  
Received Date: 06/25/18 17:19  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

## Results by Volatile GC/MS

### Batch Information

Analytical Batch: VMS17947  
Analytical Method: SW8260C  
Analyst: FDR  
Analytical Date/Time: 06/27/18 18:59  
Container ID: 1183159001-D

Prep Batch: VXX32498  
Prep Method: SW5030B  
Prep Date/Time: 06/27/18 00:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL



Results of **100236-B12MW**

Client Sample ID: **100236-B12MW**  
Client Project ID: **100236 Garrett's Tesoro**  
Lab Sample ID: 1183159002  
Lab Project ID: 1183159

Collection Date: 06/25/18 16:20  
Received Date: 06/25/18 17:19  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

Results by **Volatile 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>
Gasoline Range Organics	241		20.0	6.20	mg/L	200		07/05/18 15:47
<b>Surrogates</b>								
4-Bromofluorobenzene (surr)	94.8		50-150		%	200		07/05/18 15:47

Batch Information

Analytical Batch: VFC14248  
Analytical Method: AK101  
Analyst: ST  
Analytical Date/Time: 07/05/18 15:47  
Container ID: 1183159002-C

Prep Batch: VXX32559  
Prep Method: SW5030B  
Prep Date/Time: 07/04/18 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL



Results of 100236-B12MW

Client Sample ID: 100236-B12MW
Client Project ID: 100236 Garrett's Tesoro
Lab Sample ID: 1183159002
Lab Project ID: 1183159

Collection Date: 06/25/18 16:20
Received Date: 06/25/18 17:19
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

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

Print Date: 07/06/2018 1:55:26PM

J flagging is activated





**Results of 100236-B12MW**

Client Sample ID: **100236-B12MW**  
 Client Project ID: **100236 Garrett's Tesoro**  
 Lab Sample ID: 1183159002  
 Lab Project ID: 1183159

Collection Date: 06/25/18 16:20  
 Received Date: 06/25/18 17:19  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

**Results by Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloroform	500 U	1000	310	ug/L	1000		06/27/18 19:16
Chloromethane	500 U	1000	310	ug/L	1000		06/27/18 19:16
cis-1,2-Dichloroethene	500 U	1000	310	ug/L	1000		06/27/18 19:16
cis-1,3-Dichloropropene	250 U	500	150	ug/L	1000		06/27/18 19:16
Dibromochloromethane	250 U	500	150	ug/L	1000		06/27/18 19:16
Dibromomethane	500 U	1000	310	ug/L	1000		06/27/18 19:16
Dichlorodifluoromethane	500 U	1000	310	ug/L	1000		06/27/18 19:16
Ethylbenzene	3570	1000	310	ug/L	1000		06/27/18 19:16
Freon-113	5000 U	10000	3100	ug/L	1000		06/27/18 19:16
Hexachlorobutadiene	500 U	1000	310	ug/L	1000		06/27/18 19:16
Isopropylbenzene (Cumene)	500 U	1000	310	ug/L	1000		06/27/18 19:16
Methylene chloride	2500 U	5000	1000	ug/L	1000		06/27/18 19:16
Methyl-t-butyl ether	5000 U	10000	3100	ug/L	1000		06/27/18 19:16
Naphthalene	500 U	1000	310	ug/L	1000		06/27/18 19:16
n-Butylbenzene	500 U	1000	310	ug/L	1000		06/27/18 19:16
n-Propylbenzene	500 U	1000	310	ug/L	1000		06/27/18 19:16
o-Xylene	4550	1000	310	ug/L	1000		06/27/18 19:16
P & M -Xylene	10200	2000	620	ug/L	1000		06/27/18 19:16
sec-Butylbenzene	500 U	1000	310	ug/L	1000		06/27/18 19:16
Styrene	500 U	1000	310	ug/L	1000		06/27/18 19:16
tert-Butylbenzene	500 U	1000	310	ug/L	1000		06/27/18 19:16
Tetrachloroethene	500 U	1000	310	ug/L	1000		06/27/18 19:16
Toluene	37900	1000	310	ug/L	1000		06/27/18 19:16
trans-1,2-Dichloroethene	500 U	1000	310	ug/L	1000		06/27/18 19:16
trans-1,3-Dichloropropene	500 U	1000	310	ug/L	1000		06/27/18 19:16
Trichloroethene	500 U	1000	310	ug/L	1000		06/27/18 19:16
Trichlorofluoromethane	500 U	1000	310	ug/L	1000		06/27/18 19:16
Vinyl acetate	5000 U	10000	3100	ug/L	1000		06/27/18 19:16
Vinyl chloride	75.0 U	150	50.0	ug/L	1000		06/27/18 19:16
Xylenes (total)	14800	3000	1000	ug/L	1000		06/27/18 19:16
<b>Surrogates</b>							
1,2-Dichloroethane-D4 (surr)	101	81-118		%	1000		06/27/18 19:16
4-Bromofluorobenzene (surr)	100	85-114		%	1000		06/27/18 19:16
Toluene-d8 (surr)	98.6	89-112		%	1000		06/27/18 19:16

## Results of 100236-B12MW

Client Sample ID: **100236-B12MW**  
Client Project ID: **100236 Garrett's Tesoro**  
Lab Sample ID: 1183159002  
Lab Project ID: 1183159

Collection Date: 06/25/18 16:20  
Received Date: 06/25/18 17:19  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

## Results by Volatile GC/MS

### Batch Information

Analytical Batch: VMS17947  
Analytical Method: SW8260C  
Analyst: FDR  
Analytical Date/Time: 06/27/18 19:16  
Container ID: 1183159002-D

Prep Batch: VXX32498  
Prep Method: SW5030B  
Prep Date/Time: 06/27/18 00:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL



**Results of 100236-B3MW**

Client Sample ID: **100236-B3MW**  
Client Project ID: **100236 Garrett's Tesoro**  
Lab Sample ID: 1183159003  
Lab Project ID: 1183159

Collection Date: 06/25/18 12:54  
Received Date: 06/25/18 17:19  
Matrix: Water (Surface, Eff., Ground)  
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	0.0539 J	0.100	0.0310	mg/L	1		07/05/18 16:06
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	91	50-150		%	1		07/05/18 16:06

**Batch Information**

Analytical Batch: VFC14248  
Analytical Method: AK101  
Analyst: ST  
Analytical Date/Time: 07/05/18 16:06  
Container ID: 1183159003-C

Prep Batch: VXX32559  
Prep Method: SW5030B  
Prep Date/Time: 07/04/18 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL



Results of 100236-B3MW

Client Sample ID: 100236-B3MW
Client Project ID: 100236 Garrett's Tesoro
Lab Sample ID: 1183159003
Lab Project ID: 1183159

Collection Date: 06/25/18 12:54
Received Date: 06/25/18 17:19
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

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



**Results of 100236-B3MW**

Client Sample ID: **100236-B3MW**  
 Client Project ID: **100236 Garrett's Tesoro**  
 Lab Sample ID: 1183159003  
 Lab Project ID: 1183159

Collection Date: 06/25/18 12:54  
 Received Date: 06/25/18 17:19  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

**Results by Volatile GC/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloroform	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
Chloromethane	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
cis-1,2-Dichloroethene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
cis-1,3-Dichloropropene	0.250 U	0.500	0.150	ug/L	1		06/28/18 11:25
Dibromochloromethane	0.250 U	0.500	0.150	ug/L	1		06/28/18 11:25
Dibromomethane	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
Dichlorodifluoromethane	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
Freon-113	5.00 U	10.0	3.10	ug/L	1		06/28/18 11:25
Hexachlorobutadiene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
Isopropylbenzene (Cumene)	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
Methylene chloride	2.50 U	5.00	1.00	ug/L	1		06/28/18 11:25
Methyl-t-butyl ether	5.00 U	10.0	3.10	ug/L	1		06/28/18 11:25
Naphthalene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
n-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
n-Propylbenzene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
o-Xylene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		06/28/18 11:25
sec-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
Styrene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
tert-Butylbenzene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
Tetrachloroethene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
Toluene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
trans-1,2-Dichloroethene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
trans-1,3-Dichloropropene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
Trichloroethene	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
Trichlorofluoromethane	0.500 U	1.00	0.310	ug/L	1		06/28/18 11:25
Vinyl acetate	5.00 U	10.0	3.10	ug/L	1		06/28/18 11:25
Vinyl chloride	0.0750 U	0.150	0.0500	ug/L	1		06/28/18 11:25
Xylenes (total)	1.50 U	3.00	1.00	ug/L	1		06/28/18 11:25
<b>Surrogates</b>							
1,2-Dichloroethane-D4 (surr)	107	81-118		%	1		06/28/18 11:25
4-Bromofluorobenzene (surr)	103	85-114		%	1		06/28/18 11:25
Toluene-d8 (surr)	98.2	89-112		%	1		06/28/18 11:25

## Results of 100236-B3MW

Client Sample ID: **100236-B3MW**  
Client Project ID: **100236 Garrett's Tesoro**  
Lab Sample ID: 1183159003  
Lab Project ID: 1183159

Collection Date: 06/25/18 12:54  
Received Date: 06/25/18 17:19  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

## Results by Volatile GC/MS

### Batch Information

Analytical Batch: VMS17955  
Analytical Method: SW8260C  
Analyst: FDR  
Analytical Date/Time: 06/28/18 11:25  
Container ID: 1183159003-D

Prep Batch: VXX32514  
Prep Method: SW5030B  
Prep Date/Time: 06/28/18 00:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL



Results of **100236-B1MWR2**

Client Sample ID: **100236-B1MWR2**  
Client Project ID: **100236 Garrett's Tesoro**  
Lab Sample ID: 1183159004  
Lab Project ID: 1183159

Collection Date: 06/25/18 14:47  
Received Date: 06/25/18 17:19  
Matrix: Water (Surface, Eff., Ground)  
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	163	10.0	3.10	mg/L	100		07/05/18 16:24
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	101	50-150		%	100		07/05/18 16:24

Batch Information

Analytical Batch: VFC14248  
Analytical Method: AK101  
Analyst: ST  
Analytical Date/Time: 07/05/18 16:24  
Container ID: 1183159004-A

Prep Batch: VXX32559  
Prep Method: SW5030B  
Prep Date/Time: 07/04/18 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL



Results of 100236-B1MWR2

Client Sample ID: 100236-B1MWR2
Client Project ID: 100236 Garrett's Tesoro
Lab Sample ID: 1183159004
Lab Project ID: 1183159

Collection Date: 06/25/18 14:47
Received Date: 06/25/18 17:19
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

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





Results of 100236-B1MWR2

Client Sample ID: 100236-B1MWR2
Client Project ID: 100236 Garrett's Tesoro
Lab Sample ID: 1183159004
Lab Project ID: 1183159

Collection Date: 06/25/18 14:47
Received Date: 06/25/18 17:19
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

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

## Results of 100236-B1MWR2

Client Sample ID: **100236-B1MWR2**  
Client Project ID: **100236 Garrett's Tesoro**  
Lab Sample ID: 1183159004  
Lab Project ID: 1183159

Collection Date: 06/25/18 14:47  
Received Date: 06/25/18 17:19  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

## Results by Volatile GC/MS

### Batch Information

Analytical Batch: VMS17947  
Analytical Method: SW8260C  
Analyst: FDR  
Analytical Date/Time: 06/27/18 19:49  
Container ID: 1183159004-D

Prep Batch: VXX32498  
Prep Method: SW5030B  
Prep Date/Time: 06/27/18 00:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

## Results of 100236-WTB1

Client Sample ID: **100236-WTB1**  
 Client Project ID: **100236 Garrett's Tesoro**  
 Lab Sample ID: 1183159005  
 Lab Project ID: 1183159

Collection Date: 06/25/18 11:00  
 Received Date: 06/25/18 17:19  
 Matrix: Water (Surface, Eff., Ground)  
 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	0.0500 U	0.100	0.0310	mg/L	1		07/03/18 17:50
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	89.6	50-150		%	1		07/03/18 17:50

## Batch Information

Analytical Batch: VFC14245  
 Analytical Method: AK101  
 Analyst: ST  
 Analytical Date/Time: 07/03/18 17:50  
 Container ID: 1183159005-A

Prep Batch: VXX32556  
 Prep Method: SW5030B  
 Prep Date/Time: 07/03/18 08:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL



Results of 100236-WTB2

Client Sample ID: 100236-WTB2
Client Project ID: 100236 Garrett's Tesoro
Lab Sample ID: 1183159006
Lab Project ID: 1183159

Collection Date: 06/25/18 11:15
Received Date: 06/25/18 17:19
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

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



Results of 100236-WTB2

Client Sample ID: 100236-WTB2
Client Project ID: 100236 Garrett's Tesoro
Lab Sample ID: 1183159006
Lab Project ID: 1183159

Collection Date: 06/25/18 11:15
Received Date: 06/25/18 17:19
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

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

## Results of 100236-WTB2

Client Sample ID: **100236-WTB2**  
Client Project ID: **100236 Garrett's Tesoro**  
Lab Sample ID: 1183159006  
Lab Project ID: 1183159

Collection Date: 06/25/18 11:15  
Received Date: 06/25/18 17:19  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

## Results by Volatile GC/MS

### Batch Information

Analytical Batch: VMS17947  
Analytical Method: SW8260C  
Analyst: FDR  
Analytical Date/Time: 06/27/18 14:13  
Container ID: 1183159006-A

Prep Batch: VXX32498  
Prep Method: SW5030B  
Prep Date/Time: 06/27/18 00:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

## Method Blank

Blank ID: MB for HBN 1781683 [VXX/32498]  
 Blank Lab ID: 1455831

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1183159001, 1183159002, 1183159004, 1183159006

## Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,1,1,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,1-Trichloroethane	0.500U	1.00	0.310	ug/L
1,1,2,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,2-Trichloroethane	0.200U	0.400	0.120	ug/L
1,1-Dichloroethane	0.500U	1.00	0.310	ug/L
1,1-Dichloroethene	0.500U	1.00	0.310	ug/L
1,1-Dichloropropene	0.500U	1.00	0.310	ug/L
1,2,3-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,3-Trichloropropane	0.500U	1.00	0.310	ug/L
1,2,4-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,2-Dibromo-3-chloropropane	5.00U	10.0	3.10	ug/L
1,2-Dibromoethane	0.0375U	0.0750	0.0180	ug/L
1,2-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,2-Dichloroethane	0.250U	0.500	0.150	ug/L
1,2-Dichloropropane	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,3-Dichloropropane	0.250U	0.500	0.150	ug/L
1,4-Dichlorobenzene	0.250U	0.500	0.150	ug/L
2,2-Dichloropropane	0.500U	1.00	0.310	ug/L
2-Butanone (MEK)	5.00U	10.0	3.10	ug/L
2-Chlorotoluene	0.500U	1.00	0.310	ug/L
2-Hexanone	5.00U	10.0	3.10	ug/L
4-Chlorotoluene	0.500U	1.00	0.310	ug/L
4-Isopropyltoluene	0.500U	1.00	0.310	ug/L
4-Methyl-2-pentanone (MIBK)	5.00U	10.0	3.10	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Bromobenzene	0.500U	1.00	0.310	ug/L
Bromochloromethane	0.500U	1.00	0.310	ug/L
Bromodichloromethane	0.250U	0.500	0.150	ug/L
Bromoform	0.500U	1.00	0.310	ug/L
Bromomethane	2.50U	5.00	1.50	ug/L
Carbon disulfide	5.00U	10.0	3.10	ug/L
Carbon tetrachloride	0.500U	1.00	0.310	ug/L
Chlorobenzene	0.250U	0.500	0.150	ug/L
Chloroethane	0.500U	1.00	0.310	ug/L
Chloroform	0.500U	1.00	0.310	ug/L

Print Date: 07/06/2018 1:55:28PM

## Method Blank

Blank ID: MB for HBN 1781683 [VXX/32498]

Blank Lab ID: 1455831

QC for Samples:

1183159001, 1183159002, 1183159004, 1183159006

Matrix: Water (Surface, Eff., Ground)

## Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Chloromethane	0.500U	1.00	0.310	ug/L
cis-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
cis-1,3-Dichloropropene	0.250U	0.500	0.150	ug/L
Dibromochloromethane	0.250U	0.500	0.150	ug/L
Dibromomethane	0.500U	1.00	0.310	ug/L
Dichlorodifluoromethane	0.500U	1.00	0.310	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Freon-113	5.00U	10.0	3.10	ug/L
Hexachlorobutadiene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Methylene chloride	2.50U	5.00	1.00	ug/L
Methyl-t-butyl ether	5.00U	10.0	3.10	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
n-Propylbenzene	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
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
Styrene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Tetrachloroethene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
trans-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
trans-1,3-Dichloropropene	0.500U	1.00	0.310	ug/L
Trichloroethene	0.500U	1.00	0.310	ug/L
Trichlorofluoromethane	0.500U	1.00	0.310	ug/L
Vinyl acetate	5.00U	10.0	3.10	ug/L
Vinyl chloride	0.0750U	0.150	0.0500	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
<b>Surrogates</b>				
1,2-Dichloroethane-D4 (surr)	107	81-118		%
4-Bromofluorobenzene (surr)	103	85-114		%
Toluene-d8 (surr)	99.1	89-112		%

Print Date: 07/06/2018 1:55:28PM





**Method Blank**

Blank ID: MB for HBN 1781683 [VXX/32498]  
Blank Lab ID: 1455831

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1183159001, 1183159002, 1183159004, 1183159006

**Results by SW8260C**

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
------------------	----------------	---------------	-----------	--------------

**Batch Information**

Analytical Batch: VMS17947  
Analytical Method: SW8260C  
Instrument: Agilent 7890-75MS  
Analyst: FDR  
Analytical Date/Time: 6/27/2018 9:37:00AM

Prep Batch: VXX32498  
Prep Method: SW5030B  
Prep Date/Time: 6/27/2018 12:00:00AM  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 07/06/2018 1:55:28PM

## Leaching Blank

Blank ID: LB for HBN 1781600 [TCLP/9475]  
 Blank Lab ID: 1455473

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1183159001, 1183159002, 1183159004, 1183159006

## Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,1-Dichloroethene	25.0U	50.0	15.5	ug/L
1,2-Dichloroethane	12.5U	25.0	7.50	ug/L
1,4-Dichlorobenzene	12.5U	25.0	7.50	ug/L
2-Butanone (MEK)	250U	500	155	ug/L
Benzene	10.0U	20.0	6.00	ug/L
Carbon tetrachloride	25.0U	50.0	15.5	ug/L
Chlorobenzene	12.5U	25.0	7.50	ug/L
Chloroform	25.0U	50.0	15.5	ug/L
Hexachlorobutadiene	25.0U	50.0	15.5	ug/L
Tetrachloroethene	25.0U	50.0	15.5	ug/L
Trichloroethene	25.0U	50.0	15.5	ug/L
Vinyl chloride	3.75U	7.50	2.50	ug/L
<b>Surrogates</b>				
1,2-Dichloroethane-D4 (surr)	107	81-118		%
4-Bromofluorobenzene (surr)	103	85-114		%
Toluene-d8 (surr)	98.9	89-112		%

## Batch Information

Analytical Batch: VMS17947  
 Analytical Method: SW8260C  
 Instrument: Agilent 7890-75MS  
 Analyst: FDR  
 Analytical Date/Time: 6/27/2018 3:39:00PM

Prep Batch: VXX32498  
 Prep Method: SW5030B  
 Prep Date/Time: 6/27/2018 12:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL



**Blank Spike Summary**

Blank Spike ID: LCS for HBN 1183159 [VXX32498]  
 Blank Spike Lab ID: 1455832  
 Date Analyzed: 06/27/2018 09:54

Spike Duplicate ID: LCSD for HBN 1183159 [VXX32498]  
 Spike Duplicate Lab ID: 1455833  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183159001, 1183159002, 1183159004, 1183159006

**Results by SW8260C**

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,1,1,2-Tetrachloroethane	30	27.5	92	30	26.0	87	( 78-124 )	5.60	(< 20 )
1,1,1-Trichloroethane	30	28.5	95	30	28.5	95	( 74-131 )	0.04	(< 20 )
1,1,2,2-Tetrachloroethane	30	30.7	102	30	29.8	100	( 71-121 )	2.80	(< 20 )
1,1,2-Trichloroethane	30	30.0	100	30	28.7	96	( 80-119 )	4.40	(< 20 )
1,1-Dichloroethane	30	30.0	100	30	30.1	100	( 77-125 )	0.37	(< 20 )
1,1-Dichloroethene	30	31.1	104	30	32.2	107	( 71-131 )	3.50	(< 20 )
1,1-Dichloropropene	30	29.5	98	30	29.5	98	( 79-125 )	0.14	(< 20 )
1,2,3-Trichlorobenzene	30	28.3	94	30	25.6	85	( 69-129 )	9.80	(< 20 )
1,2,3-Trichloropropane	30	29.1	97	30	28.5	95	( 73-122 )	2.20	(< 20 )
1,2,4-Trichlorobenzene	30	29.0	97	30	27.0	90	( 69-130 )	7.00	(< 20 )
1,2,4-Trimethylbenzene	30	31.1	104	30	30.1	100	( 79-124 )	3.30	(< 20 )
1,2-Dibromo-3-chloropropane	30	28.5	95	30	27.3	91	( 62-128 )	4.10	(< 20 )
1,2-Dibromoethane	30	28.8	96	30	28.0	93	( 77-121 )	2.90	(< 20 )
1,2-Dichlorobenzene	30	29.9	100	30	29.2	97	( 80-119 )	2.20	(< 20 )
1,2-Dichloroethane	30	28.1	94	30	28.0	94	( 73-128 )	0.14	(< 20 )
1,2-Dichloropropane	30	30.7	102	30	30.2	101	( 78-122 )	1.50	(< 20 )
1,3,5-Trimethylbenzene	30	31.3	104	30	30.3	101	( 75-124 )	3.10	(< 20 )
1,3-Dichlorobenzene	30	30.5	102	30	29.5	98	( 80-119 )	3.20	(< 20 )
1,3-Dichloropropane	30	30.3	101	30	28.9	96	( 80-119 )	4.60	(< 20 )
1,4-Dichlorobenzene	30	30.2	101	30	29.6	99	( 79-118 )	2.10	(< 20 )
2,2-Dichloropropane	30	29.5	98	30	29.2	97	( 60-139 )	1.10	(< 20 )
2-Butanone (MEK)	90	83.6	93	90	82.8	92	( 56-143 )	1.00	(< 20 )
2-Chlorotoluene	30	31.7	106	30	30.9	103	( 79-122 )	2.70	(< 20 )
2-Hexanone	90	90.4	100	90	86.0	96	( 57-139 )	5.00	(< 20 )
4-Chlorotoluene	30	31.4	105	30	30.4	101	( 78-122 )	3.20	(< 20 )
4-Isopropyltoluene	30	30.9	103	30	30.0	100	( 77-127 )	3.00	(< 20 )
4-Methyl-2-pentanone (MIBK)	90	88.6	99	90	83.8	93	( 67-130 )	5.60	(< 20 )
Benzene	30	29.5	98	30	28.8	96	( 79-120 )	2.40	(< 20 )
Bromobenzene	30	29.4	98	30	28.7	96	( 80-120 )	2.20	(< 20 )
Bromochloromethane	30	29.0	97	30	29.4	98	( 78-123 )	1.40	(< 20 )
Bromodichloromethane	30	29.3	98	30	29.2	98	( 79-125 )	0.07	(< 20 )
Bromoform	30	27.4	91	30	26.2	87	( 66-130 )	4.70	(< 20 )
Bromomethane	30	45.7	152	* 30	53.9	180	* ( 53-141 )	16.50	(< 20 )
Carbon disulfide	45	47.6	106	45	50.8	113	( 64-133 )	6.50	(< 20 )

Print Date: 07/06/2018 1:55:30PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1183159 [VXX32498]  
 Blank Spike Lab ID: 1455832  
 Date Analyzed: 06/27/2018 09:54

Spike Duplicate ID: LCSD for HBN 1183159  
 [VXX32498]  
 Spike Duplicate Lab ID: 1455833  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183159001, 1183159002, 1183159004, 1183159006

## Results by SW8260C

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Carbon tetrachloride	30	27.9	93	30	28.0	93	( 72-136 )	0.25	(< 20 )
Chlorobenzene	30	28.0	93	30	26.8	89	( 82-118 )	4.50	(< 20 )
Chloroethane	30	38.3	128	30	39.1	130	( 60-138 )	2.20	(< 20 )
Chloroform	30	29.3	98	30	29.3	98	( 79-124 )	0.07	(< 20 )
Chloromethane	30	32.8	109	30	35.7	119	( 50-139 )	8.40	(< 20 )
cis-1,2-Dichloroethene	30	28.7	96	30	28.7	96	( 78-123 )	0.04	(< 20 )
cis-1,3-Dichloropropene	30	29.0	97	30	28.9	97	( 75-124 )	0.24	(< 20 )
Dibromochloromethane	30	28.3	94	30	27.4	91	( 74-126 )	3.20	(< 20 )
Dibromomethane	30	29.1	97	30	29.2	98	( 79-123 )	0.55	(< 20 )
Dichlorodifluoromethane	30	28.7	96	30	30.4	101	( 32-152 )	5.90	(< 20 )
Ethylbenzene	30	30.3	101	30	29.1	97	( 79-121 )	4.10	(< 20 )
Freon-113	45	45.7	101	45	47.3	105	( 70-136 )	3.60	(< 20 )
Hexachlorobutadiene	30	28.7	96	30	27.6	92	( 66-134 )	3.90	(< 20 )
Isopropylbenzene (Cumene)	30	30.8	103	30	29.6	99	( 72-131 )	4.10	(< 20 )
Methylene chloride	30	27.1	90	30	27.4	91	( 74-124 )	1.10	(< 20 )
Methyl-t-butyl ether	45	42.0	93	45	42.5	95	( 71-124 )	1.30	(< 20 )
Naphthalene	30	28.2	94	30	26.1	87	( 61-128 )	7.70	(< 20 )
n-Butylbenzene	30	31.5	105	30	30.1	100	( 75-128 )	4.60	(< 20 )
n-Propylbenzene	30	33.0	110	30	31.9	106	( 76-126 )	3.30	(< 20 )
o-Xylene	30	29.8	99	30	28.3	94	( 78-122 )	5.30	(< 20 )
P & M -Xylene	60	60.9	102	60	58.1	97	( 80-121 )	4.80	(< 20 )
sec-Butylbenzene	30	31.6	105	30	30.6	102	( 77-126 )	3.10	(< 20 )
Styrene	30	29.6	99	30	28.0	94	( 78-123 )	5.20	(< 20 )
tert-Butylbenzene	30	30.9	103	30	29.6	99	( 78-124 )	4.30	(< 20 )
Tetrachloroethene	30	28.3	94	30	26.4	88	( 74-129 )	7.10	(< 20 )
Toluene	30	27.9	93	30	26.5	88	( 80-121 )	5.00	(< 20 )
trans-1,2-Dichloroethene	30	29.2	97	30	29.2	97	( 75-124 )	0.07	(< 20 )
trans-1,3-Dichloropropene	30	29.4	98	30	28.5	95	( 73-127 )	3.10	(< 20 )
Trichloroethene	30	29.3	98	30	28.9	96	( 79-123 )	1.50	(< 20 )
Trichlorofluoromethane	30	31.1	104	30	33.2	111	( 65-141 )	6.70	(< 20 )
Vinyl acetate	30	29.3	98	30	29.8	99	( 54-146 )	1.60	(< 20 )
Vinyl chloride	30	30.6	102	30	32.1	107	( 58-137 )	4.90	(< 20 )
Xylenes (total)	90	90.7	101	90	86.4	96	( 79-121 )	5.00	(< 20 )

Print Date: 07/06/2018 1:55:30PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1183159 [VXX32498]  
 Blank Spike Lab ID: 1455832  
 Date Analyzed: 06/27/2018 09:54

Spike Duplicate ID: LCSD for HBN 1183159 [VXX32498]  
 Spike Duplicate Lab ID: 1455833  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183159001, 1183159002, 1183159004, 1183159006

## Results by SW8260C

Parameter	Blank Spike (%)			Spike Duplicate (%)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
<b>Surrogates</b>									
1,2-Dichloroethane-D4 (surr)	30	99.1	99	30	101	101	( 81-118 )	2.30	
4-Bromofluorobenzene (surr)	30	102	102	30	102	102	( 85-114 )	0.23	
Toluene-d8 (surr)	30	97.5	98	30	95.6	96	( 89-112 )	2.00	

## Batch Information

Analytical Batch: **VMS17947**  
 Analytical Method: **SW8260C**  
 Instrument: **Agilent 7890-75MS**  
 Analyst: **FDR**

Prep Batch: **VXX32498**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **06/27/2018 00:00**  
 Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL  
 Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

Print Date: 07/06/2018 1:55:30PM



### Method Blank

Blank ID: MB for HBN 1781776 [VXX/32514]

Blank Lab ID: 1456203

QC for Samples:

1183159003

Matrix: Water (Surface, Eff., Ground)

### Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,1,1,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,1-Trichloroethane	0.500U	1.00	0.310	ug/L
1,1,2,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,2-Trichloroethane	0.200U	0.400	0.120	ug/L
1,1-Dichloroethane	0.500U	1.00	0.310	ug/L
1,1-Dichloroethene	0.500U	1.00	0.310	ug/L
1,1-Dichloropropene	0.500U	1.00	0.310	ug/L
1,2,3-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,3-Trichloropropane	0.500U	1.00	0.310	ug/L
1,2,4-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,2-Dibromo-3-chloropropane	5.00U	10.0	3.10	ug/L
1,2-Dibromoethane	0.0375U	0.0750	0.0180	ug/L
1,2-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,2-Dichloroethane	0.250U	0.500	0.150	ug/L
1,2-Dichloropropane	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,3-Dichloropropane	0.250U	0.500	0.150	ug/L
1,4-Dichlorobenzene	0.250U	0.500	0.150	ug/L
2,2-Dichloropropane	0.500U	1.00	0.310	ug/L
2-Butanone (MEK)	5.00U	10.0	3.10	ug/L
2-Chlorotoluene	0.500U	1.00	0.310	ug/L
2-Hexanone	5.00U	10.0	3.10	ug/L
4-Chlorotoluene	0.500U	1.00	0.310	ug/L
4-Isopropyltoluene	0.500U	1.00	0.310	ug/L
4-Methyl-2-pentanone (MIBK)	5.00U	10.0	3.10	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Bromobenzene	0.500U	1.00	0.310	ug/L
Bromochloromethane	0.500U	1.00	0.310	ug/L
Bromodichloromethane	0.250U	0.500	0.150	ug/L
Bromoform	0.500U	1.00	0.310	ug/L
Bromomethane	2.50U	5.00	1.50	ug/L
Carbon disulfide	5.00U	10.0	3.10	ug/L
Carbon tetrachloride	0.500U	1.00	0.310	ug/L
Chlorobenzene	0.250U	0.500	0.150	ug/L
Chloroethane	0.500U	1.00	0.310	ug/L
Chloroform	0.500U	1.00	0.310	ug/L

Print Date: 07/06/2018 1:55:31PM

## Method Blank

Blank ID: MB for HBN 1781776 [VXX/32514]

Blank Lab ID: 1456203

QC for Samples:

1183159003

Matrix: Water (Surface, Eff., Ground)

## Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Chloromethane	0.500U	1.00	0.310	ug/L
cis-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
cis-1,3-Dichloropropene	0.250U	0.500	0.150	ug/L
Dibromochloromethane	0.250U	0.500	0.150	ug/L
Dibromomethane	0.500U	1.00	0.310	ug/L
Dichlorodifluoromethane	0.500U	1.00	0.310	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Freon-113	5.00U	10.0	3.10	ug/L
Hexachlorobutadiene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Methylene chloride	2.50U	5.00	1.00	ug/L
Methyl-t-butyl ether	5.00U	10.0	3.10	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
n-Propylbenzene	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
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
Styrene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Tetrachloroethene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
trans-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
trans-1,3-Dichloropropene	0.500U	1.00	0.310	ug/L
Trichloroethene	0.500U	1.00	0.310	ug/L
Trichlorofluoromethane	0.500U	1.00	0.310	ug/L
Vinyl acetate	5.00U	10.0	3.10	ug/L
Vinyl chloride	0.0750U	0.150	0.0500	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
<b>Surrogates</b>				
1,2-Dichloroethane-D4 (surr)	105	81-118		%
4-Bromofluorobenzene (surr)	102	85-114		%
Toluene-d8 (surr)	99.6	89-112		%

Print Date: 07/06/2018 1:55:31PM

## Method Blank

Blank ID: MB for HBN 1781776 [VXX/32514]  
Blank Lab ID: 1456203

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1183159003

## Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
------------------	----------------	---------------	-----------	--------------

### Batch Information

Analytical Batch: VMS17955  
Analytical Method: SW8260C  
Instrument: Agilent 7890-75MS  
Analyst: FDR  
Analytical Date/Time: 6/28/2018 9:11:00AM

Prep Batch: VXX32514  
Prep Method: SW5030B  
Prep Date/Time: 6/28/2018 12:00:00AM  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 07/06/2018 1:55:31PM



## Leaching Blank

Blank ID: LB for HBN 1781671 [TCLP/9477]  
 Blank Lab ID: 1455768

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1183159003

## Results by SW8260C

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,1-Dichloroethene	25.0U	50.0	15.5	ug/L
1,2-Dichloroethane	12.5U	25.0	7.50	ug/L
1,4-Dichlorobenzene	12.5U	25.0	7.50	ug/L
2-Butanone (MEK)	250U	500	155	ug/L
Benzene	10.0U	20.0	6.00	ug/L
Carbon tetrachloride	25.0U	50.0	15.5	ug/L
Chlorobenzene	12.5U	25.0	7.50	ug/L
Chloroform	25.0U	50.0	15.5	ug/L
Hexachlorobutadiene	25.0U	50.0	15.5	ug/L
Tetrachloroethene	25.0U	50.0	15.5	ug/L
Trichloroethene	25.0U	50.0	15.5	ug/L
Vinyl chloride	3.75U	7.50	2.50	ug/L
<b>Surrogates</b>				
1,2-Dichloroethane-D4 (surr)	115	81-118		%
4-Bromofluorobenzene (surr)	102	85-114		%
Toluene-d8 (surr)	99.1	89-112		%

## Batch Information

Analytical Batch: VMS17955  
 Analytical Method: SW8260C  
 Instrument: Agilent 7890-75MS  
 Analyst: FDR  
 Analytical Date/Time: 6/28/2018 4:46:00PM

Prep Batch: VXX32514  
 Prep Method: SW5030B  
 Prep Date/Time: 6/28/2018 12:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1183159 [VXX32514]  
 Blank Spike Lab ID: 1456204  
 Date Analyzed: 06/28/2018 09:28

Spike Duplicate ID: LCSD for HBN 1183159  
 [VXX32514]  
 Spike Duplicate Lab ID: 1456205  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183159003

## Results by SW8260C

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,1,1,2-Tetrachloroethane	30	27.6	92	30	26.4	88	( 78-124 )	4.60	(< 20 )
1,1,1-Trichloroethane	30	28.5	95	30	28.9	97	( 74-131 )	1.50	(< 20 )
1,1,2,2-Tetrachloroethane	30	31.3	104	30	29.9	100	( 71-121 )	4.60	(< 20 )
1,1,2-Trichloroethane	30	30.0	100	30	29.0	97	( 80-119 )	3.50	(< 20 )
1,1-Dichloroethane	30	30.5	102	30	30.7	102	( 77-125 )	0.72	(< 20 )
1,1-Dichloroethene	30	31.5	105	30	32.5	108	( 71-131 )	3.10	(< 20 )
1,1-Dichloropropene	30	29.7	99	30	30.1	100	( 79-125 )	1.20	(< 20 )
1,2,3-Trichlorobenzene	30	29.4	98	30	26.2	88	( 69-129 )	11.20	(< 20 )
1,2,3-Trichloropropane	30	30.4	101	30	28.7	96	( 73-122 )	6.00	(< 20 )
1,2,4-Trichlorobenzene	30	29.5	98	30	27.5	92	( 69-130 )	7.10	(< 20 )
1,2,4-Trimethylbenzene	30	31.4	105	30	30.8	103	( 79-124 )	1.90	(< 20 )
1,2-Dibromo-3-chloropropane	30	29.2	97	30	26.5	88	( 62-128 )	9.50	(< 20 )
1,2-Dibromoethane	30	28.9	96	30	28.1	94	( 77-121 )	3.10	(< 20 )
1,2-Dichlorobenzene	30	30.1	100	30	29.7	99	( 80-119 )	1.40	(< 20 )
1,2-Dichloroethane	30	28.3	95	30	28.7	96	( 73-128 )	1.10	(< 20 )
1,2-Dichloropropane	30	30.9	103	30	31.1	104	( 78-122 )	0.65	(< 20 )
1,3,5-Trimethylbenzene	30	32.0	107	30	31.3	104	( 75-124 )	2.10	(< 20 )
1,3-Dichlorobenzene	30	30.4	101	30	29.8	99	( 80-119 )	2.00	(< 20 )
1,3-Dichloropropane	30	30.3	101	30	29.3	98	( 80-119 )	3.60	(< 20 )
1,4-Dichlorobenzene	30	30.5	102	30	29.6	99	( 79-118 )	2.90	(< 20 )
2,2-Dichloropropane	30	29.1	97	30	29.3	98	( 60-139 )	0.65	(< 20 )
2-Butanone (MEK)	90	89.3	99	90	80.7	90	( 56-143 )	10.20	(< 20 )
2-Chlorotoluene	30	32.0	107	30	31.4	105	( 79-122 )	1.90	(< 20 )
2-Hexanone	90	94.8	105	90	85.1	95	( 57-139 )	10.80	(< 20 )
4-Chlorotoluene	30	31.5	105	30	31.3	104	( 78-122 )	0.86	(< 20 )
4-Isopropyltoluene	30	31.3	104	30	30.1	100	( 77-127 )	3.60	(< 20 )
4-Methyl-2-pentanone (MIBK)	90	93.0	103	90	85.2	95	( 67-130 )	8.70	(< 20 )
Benzene	30	29.2	97	30	29.2	98	( 79-120 )	0.24	(< 20 )
Bromobenzene	30	29.7	99	30	29.3	98	( 80-120 )	1.10	(< 20 )
Bromochloromethane	30	29.2	97	30	29.8	99	( 78-123 )	2.20	(< 20 )
Bromodichloromethane	30	29.3	98	30	29.7	99	( 79-125 )	1.30	(< 20 )
Bromoform	30	27.1	90	30	26.2	87	( 66-130 )	3.50	(< 20 )
Bromomethane	30	45.8	153	* 30	51.0	170	* ( 53-141 )	10.70	(< 20 )
Carbon disulfide	45	47.7	106	45	50.9	113	( 64-133 )	6.40	(< 20 )

Print Date: 07/06/2018 1:55:32PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1183159 [VXX32514]  
 Blank Spike Lab ID: 1456204  
 Date Analyzed: 06/28/2018 09:28

Spike Duplicate ID: LCSD for HBN 1183159  
 [VXX32514]  
 Spike Duplicate Lab ID: 1456205  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183159003

## Results by SW8260C

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Carbon tetrachloride	30	27.9	93	30	28.3	94	( 72-136 )	1.30	(< 20 )
Chlorobenzene	30	28.1	94	30	27.3	91	( 82-118 )	2.80	(< 20 )
Chloroethane	30	38.9	130	30	38.5	128	( 60-138 )	0.83	(< 20 )
Chloroform	30	29.5	98	30	29.8	99	( 79-124 )	0.94	(< 20 )
Chloromethane	30	32.4	108	30	34.9	116	( 50-139 )	7.60	(< 20 )
cis-1,2-Dichloroethene	30	28.9	97	30	29.0	97	( 78-123 )	0.34	(< 20 )
cis-1,3-Dichloropropene	30	29.0	97	30	29.3	98	( 75-124 )	1.10	(< 20 )
Dibromochloromethane	30	27.8	93	30	27.5	92	( 74-126 )	1.30	(< 20 )
Dibromomethane	30	29.4	98	30	29.6	99	( 79-123 )	0.64	(< 20 )
Dichlorodifluoromethane	30	28.3	94	30	29.0	97	( 32-152 )	2.40	(< 20 )
Ethylbenzene	30	30.5	102	30	29.7	99	( 79-121 )	2.80	(< 20 )
Freon-113	45	47.0	104	45	48.0	107	( 70-136 )	2.00	(< 20 )
Hexachlorobutadiene	30	28.8	96	30	27.5	92	( 66-134 )	4.50	(< 20 )
Isopropylbenzene (Cumene)	30	31.2	104	30	30.2	101	( 72-131 )	3.20	(< 20 )
Methylene chloride	30	27.2	91	30	27.6	92	( 74-124 )	1.50	(< 20 )
Methyl-t-butyl ether	45	42.2	94	45	42.9	95	( 71-124 )	1.60	(< 20 )
Naphthalene	30	29.5	98	30	26.0	87	( 61-128 )	12.60	(< 20 )
n-Butylbenzene	30	32.7	109	30	30.5	102	( 75-128 )	7.00	(< 20 )
n-Propylbenzene	30	33.5	112	30	32.5	108	( 76-126 )	3.30	(< 20 )
o-Xylene	30	29.5	98	30	28.7	96	( 78-122 )	2.70	(< 20 )
P & M -Xylene	60	60.8	101	60	59.1	99	( 80-121 )	2.80	(< 20 )
sec-Butylbenzene	30	32.5	108	30	31.7	106	( 77-126 )	2.20	(< 20 )
Styrene	30	29.6	99	30	29.0	97	( 78-123 )	1.90	(< 20 )
tert-Butylbenzene	30	31.4	105	30	30.6	102	( 78-124 )	2.70	(< 20 )
Tetrachloroethene	30	28.9	96	30	27.5	92	( 74-129 )	4.90	(< 20 )
Toluene	30	28.5	95	30	27.3	91	( 80-121 )	4.10	(< 20 )
trans-1,2-Dichloroethene	30	29.4	98	30	29.4	98	( 75-124 )	0.14	(< 20 )
trans-1,3-Dichloropropene	30	28.8	96	30	28.4	95	( 73-127 )	1.50	(< 20 )
Trichloroethene	30	29.6	99	30	29.4	98	( 79-123 )	0.92	(< 20 )
Trichlorofluoromethane	30	31.8	106	30	32.7	109	( 65-141 )	2.70	(< 20 )
Vinyl acetate	30	29.5	98	30	29.3	98	( 54-146 )	0.68	(< 20 )
Vinyl chloride	30	30.6	102	30	31.4	105	( 58-137 )	2.40	(< 20 )
Xylenes (total)	90	90.3	100	90	87.8	98	( 79-121 )	2.80	(< 20 )

Print Date: 07/06/2018 1:55:32PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1183159 [VXX32514]  
 Blank Spike Lab ID: 1456204  
 Date Analyzed: 06/28/2018 09:28

Spike Duplicate ID: LCSD for HBN 1183159 [VXX32514]  
 Spike Duplicate Lab ID: 1456205  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183159003

## Results by SW8260C

Parameter	Blank Spike (%)			Spike Duplicate (%)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
<b>Surrogates</b>									
1,2-Dichloroethane-D4 (surr)	30	99.4	99	30	103	103	( 81-118 )	3.70	
4-Bromofluorobenzene (surr)	30	101	101	30	102	102	( 85-114 )	1.10	
Toluene-d8 (surr)	30	98.8	99	30	97.6	98	( 89-112 )	1.20	

## Batch Information

Analytical Batch: **VMS17955**  
 Analytical Method: **SW8260C**  
 Instrument: **Agilent 7890-75MS**  
 Analyst: **FDR**

Prep Batch: **VXX32514**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **06/28/2018 00:00**  
 Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL  
 Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

Print Date: 07/06/2018 1:55:32PM

## Method Blank

Blank ID: MB for HBN 1782015 [VXX/32556]

Blank Lab ID: 1457313

QC for Samples:

1183159005

Matrix: Water (Surface, Eff., Ground)

## Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.0500U	0.100	0.0310	mg/L
<b>Surrogates</b>				
4-Bromofluorobenzene (surr)	88	50-150		%

## Batch Information

Analytical Batch: VFC14245

Analytical Method: AK101

Instrument: Agilent 7890A PID/FID

Analyst: ST

Analytical Date/Time: 7/3/2018 5:32:00PM

Prep Batch: VXX32556

Prep Method: SW5030B

Prep Date/Time: 7/3/2018 8:00:00AM

Prep Initial Wt./Vol.: 5 mL

Prep Extract Vol: 5 mL

Print Date: 07/06/2018 1:55:33PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1183159 [VXX32556]  
 Blank Spike Lab ID: 1457316  
 Date Analyzed: 07/03/2018 16:01

Spike Duplicate ID: LCSD for HBN 1183159 [VXX32556]  
 Spike Duplicate Lab ID: 1457317  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183159005

## Results by AK101

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	1.00	0.942	94	1.00	0.928	93	( 60-120 )	1.60	(< 20 )

### Surrogates

4-Bromofluorobenzene (surr)	0.0500	90.4	90	0.0500	90.8	91	( 50-150 )	0.46	
-----------------------------	--------	------	----	--------	------	----	------------	------	--

## Batch Information

Analytical Batch: **VFC14245**  
 Analytical Method: **AK101**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX32556**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **07/03/2018 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

Print Date: 07/06/2018 1:55:34PM

## Method Blank

Blank ID: MB for HBN 1782046 [VXX/32559]  
 Blank Lab ID: 1457447

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1183159001, 1183159002, 1183159003, 1183159004

## Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.0365J	0.100	0.0310	mg/L
<b>Surrogates</b>				
4-Bromofluorobenzene (surr)	87.7	50-150		%

## Batch Information

Analytical Batch: VFC14248  
 Analytical Method: AK101  
 Instrument: Agilent 7890A PID/FID  
 Analyst: ST  
 Analytical Date/Time: 7/5/2018 7:05:00AM

Prep Batch: VXX32559  
 Prep Method: SW5030B  
 Prep Date/Time: 7/4/2018 8:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 07/06/2018 1:55:35PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1183159 [VXX32559]  
 Blank Spike Lab ID: 1457448  
 Date Analyzed: 07/05/2018 14:17

Spike Duplicate ID: LCSD for HBN 1183159 [VXX32559]  
 Spike Duplicate Lab ID: 1457449  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1183159001, 1183159002, 1183159003, 1183159004

## Results by AK101

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	1.00	1.08	108	1.00	1.01	101	( 60-120 )	6.90	(< 20 )

### Surrogates

4-Bromofluorobenzene (surr)	0.0500	94.8	95	0.0500	92.7	93	( 50-150 )	2.20	
-----------------------------	--------	------	----	--------	------	----	------------	------	--

## Batch Information

Analytical Batch: **VFC14248**  
 Analytical Method: **AK101**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX32559**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **07/04/2018 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

Print Date: 07/06/2018 1:55:37PM



1183159



**SHANNON & WILSON, INC.**  
Geotechnical and Environmental Consultants

400 N. 34th Street, Suite 100  
Seattle, WA 98103  
(206) 632-8020

2355 Hill Road  
Fairbanks, AK 99709  
(907) 479-0600

3990 Collins Way, Suite 100  
Lake Oswego, OR 97035  
(503) 223-6147

5430 Fairbanks Street, Suite 3  
Anchorage, AK 99518  
(907) 561-2120

1921 Bannock Street, Suite 200  
Denver, CO 80204  
(303) 825-3800

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

**CHAIN OF CUSTODY**

**RECORD**

Page 1 of 1

Laboratory SGS  
Attn: Debra

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

Sample Identity	Lab No.	Time	Date Sampled	Comp. Grab	Total Containers	Remarks/Matrix
100236-B2MW	DA-F	16:10	6/25/18	X	6	Groundwater
100236-B12MW	DA-F	16:20	↓	X	6	↓
100236-B3MW	DA-F	12:54	↓	X	6	↓
100236-B1MWR2	DA-F	14:47	↓	X	6	↓
100236-WTB1	DA-C	11:00	↓	X	1	Trip blank
100236-WTB2	DA-C	11:15	↓	X	1	Trip blank

Project Information	Sample Receipt	Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Project Number: <u>100236</u>	Total Number of Containers	Signature: <u>[Signature]</u>	Signature: _____	Signature: _____
Project Name: <u>Garrett's Reservoir</u>	COC Seals/Intact? Y/N/NA	Time: <u>17:19</u>	Time: _____	Time: _____
Contact: <u>JJK</u>	Received Good Cond./Cold	Date: <u>6/25/18</u>	Date: _____	Date: _____
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method:	Printed Name: <u>Jake Koster</u>	Printed Name: _____	Printed Name: _____
Sampler: <u>JJK</u>	(attach shipping bill, if any)	Company: <u>S+W</u>	Company: _____	Company: _____
<b>Instructions</b>		<b>Received By: 1.</b>	<b>Received By: 2.</b>	<b>Received By: 3.</b>
Requested Turnaround Time: <u>Standard</u>		Signature: _____	Signature: _____	Signature: <u>[Signature]</u>
Special Instructions:		Time: _____	Time: _____	Time: <u>17:19</u>
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report		Printed Name: _____	Printed Name: _____	Printed Name: <u>Nicole Warner</u>
Yellow - w/shipment - for consignee files		Company: _____	Company: _____	Company: <u>SGS</u>
Pink - Shannon & Wilson - Job File				



SGS Workorder #:

1183159



1 1 8 3 1 5 9

<b>Review Criteria</b>	Condition (Yes, No, N/A)	<b>Exceptions Noted below</b>
------------------------	--------------------------	-------------------------------

<b>Chain of Custody / Temperature Requirements</b>	<input checked="" type="checkbox"/>	Exemption permitted if sampler hand carries/delivers.
--	-------------------------------------	---

Were Custody Seals intact? Note # & location	n/a	
--	-----	--

COC accompanied samples?	<input checked="" type="checkbox"/>	
--------------------------	-------------------------------------	--

<input checked="" type="checkbox"/>	**Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required
-------------------------------------	--

Temperature blank compliant* (i.e., 0-6 °C after CF)?	n/a	Cooler ID:		@		°C	Therm. ID:	
	n/a	Cooler ID:		@		°C	Therm. ID:	
	n/a	Cooler ID:		@		°C	Therm. ID:	
	n/a	Cooler ID:		@		°C	Therm. ID:	
	n/a	Cooler ID:		@		°C	Therm. ID:	

*If >6°C, were samples collected <8 hours ago?	<input checked="" type="checkbox"/>	
--	-------------------------------------	--

If <0°C, were sample containers ice free?	n/a	
---	-----	--

If samples 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".

Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.

<b>Holding Time / Documentation / Sample Condition Requirements</b>	Note: Refer to form F-083 "Sample Guide" for specific holding times.
---	--

Were samples received within holding time?	<input checked="" type="checkbox"/>	
--	-------------------------------------	--

Do samples <b>match COC</b> ** (i.e., sample IDs, dates/times collected)?	<input checked="" type="checkbox"/>	
---	-------------------------------------	--

\*\*Note: If times differ <1hr, record details & login per COC.

Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	<input checked="" type="checkbox"/>	
---	-------------------------------------	--

	n/a	***Exemption permitted for metals (e.g.200.8/6020A).
--	-----	--

Were proper containers (type/mass/volume/preservative***)used?	<input checked="" type="checkbox"/>	
--	-------------------------------------	--

<b>Volatile / LL-Hg Requirements</b>	
--------------------------------------	--

Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	<input checked="" type="checkbox"/>	
--	-------------------------------------	--

Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	<input checked="" type="checkbox"/>	
---	-------------------------------------	--

Were all soil VOAs field extracted with MeOH+BFB?	n/a	
---	-----	--

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

Additional notes (if applicable):



## Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1183159001-A	HCL to pH < 2	OK			
1183159001-B	HCL to pH < 2	OK			
1183159001-C	HCL to pH < 2	OK			
1183159001-D	HCL to pH < 2	OK			
1183159001-E	HCL to pH < 2	OK			
1183159001-F	HCL to pH < 2	OK			
1183159002-A	HCL to pH < 2	OK			
1183159002-B	HCL to pH < 2	OK			
1183159002-C	HCL to pH < 2	OK			
1183159002-D	HCL to pH < 2	OK			
1183159002-E	HCL to pH < 2	OK			
1183159002-F	HCL to pH < 2	OK			
1183159003-A	HCL to pH < 2	OK			
1183159003-B	HCL to pH < 2	OK			
1183159003-C	HCL to pH < 2	OK			
1183159003-D	HCL to pH < 2	OK			
1183159003-E	HCL to pH < 2	OK			
1183159003-F	HCL to pH < 2	OK			
1183159004-A	HCL to pH < 2	OK			
1183159004-B	HCL to pH < 2	OK			
1183159004-C	HCL to pH < 2	OK			
1183159004-D	HCL to pH < 2	OK			
1183159004-E	HCL to pH < 2	OK			
1183159004-F	HCL to pH < 2	OK			
1183159005-A	HCL to pH < 2	OK			
1183159005-B	HCL to pH < 2	OK			
1183159005-C	HCL to pH < 2	OK			
1183159006-A	HCL to pH < 2	OK			
1183159006-B	HCL to pH < 2	OK			
1183159006-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 that an inappropriate container was submitted.

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

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

DM - The container was received damaged.

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

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

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

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

## LABORATORY DATA REVIEW CHECKLIST

**Completed by:** Jake Kesler

**Title:** Environmental Staff

**Date:** August 2018

**CS Report Name:** Garrett's Tesoro, 724 West International Airport Rd, Anchorage, Alaska

**Laboratory Report Date:** July 6, 2018

**Consultant Firm:** Shannon & Wilson, Inc.

**Laboratory Name:** SGS North America, Inc.

**Laboratory Report Number:** 1183159

**ADEC File Number:** 2100.26.078

**ADEC RecKey Number:** NA

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

### 1. Laboratory

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

Comments:

- b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS-approved? **Yes** / No / **NA** (please explain)

Comments:

### 2. Chain of Custody (COC)

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

- 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 (0° to 6° C)? **Yes** / No / NA (please explain)

Comments: *Yes, temperature blank recorded at 2.1° 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:

- 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: *No discrepancies noted.*

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

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:

- 8260C - LCS recoveries for bromomethane (152%-153%) do not meet QC criteria. This analyte was not detected in associated samples
- 8260C - LCSD recoveries for bromomethane (170%-180%) do not meet QC criteria. This analyte was not detected in associated samples

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

Comments:

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

Comments: *The case narrative does not comment 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:

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

Comments: *No soils were included in this project.*

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

Comments:

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

Comments: *Due to elevated sample results, the LOQs for various VOCs are elevated due to sample dilution.*

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

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: *LCS/LCSD recoveries for bromomethane are greater than laboratory limits.*

- 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%, VOCs 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: *All samples are affected.*

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

Comments: *Bromomethane was not detected in the project samples therefore data quality is 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? Please explain. **Yes** / No / **NA** (please explain)

Comments:

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

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

Comments:

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

Comments: *Only one cooler was used to 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? **NA**

Comments: *All were below LOQ.*

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:

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. **NA**

Comments:

**f. Decontamination or Equipment Blank** (if not applicable)

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

Comments: *The use of a decontamination or equipment blank was not included in our ADEC-approved work plan.*

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

Comments:

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

Comments:

iii. Data quality or usability affected? Please explain. **NA**

Comments:

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

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

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



**ATTACHMENT 4**  
**IMPORTANT INFORMATION ABOUT YOUR**  
**GEOTECHNICAL/ENVIRONMENTAL REPORT**



Date: August 2018  
To: Mr. Nelson Garrett

## **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