

November 4, 2016

CPD Alaska, LLC  
201 Arctic Slope Avenue  
Anchorage, Alaska 99518

Attn: Ms. Carrie Godden

**RE: NOVEMBER 2015 GROUNDWATER MONITORING, 459 WEST BLUFF DRIVE, ANCHORAGE, ALASKA; ADEC FILE NO. 2100.38.321**

This report presents the results of Shannon & Wilson's November 2015 groundwater monitoring activities conducted at the CPD Alaska, LLC (Crowley) facility at 459 West Bluff Drive, Anchorage, Alaska. The 2015 groundwater monitoring activities were conducted by Shannon & Wilson, Inc. on November 6, 2015. Written authorization to proceed with the project was provided by Todd Bullock, on October 27, 2015.

## **SITE AND PROJECT DESCRIPTION**

### **Site Description**

The Crowley facility is a fuel distribution terminal located in the Port of Anchorage, as shown on Figure 1. Elevation varies at the site by approximately 20 feet, generally sloping downward towards the north and west. The site contains 14 active bulk fuel above-ground storage tanks (ASTs), pipelines, a rail loading rack, and office/warehouse/shop buildings. A pipeline linked to the Port of Anchorage valve yard, located 2,000 feet to the north, transfers petroleum products between the tank farm and oceangoing tankers/barges. This pipeline is the primary method of fuel delivery to and from the site. A lined detention pond and runoff basin are located in the northeastern portion of the site. A site plan is included as Figure 2.

### **Background**

A site investigation conducted in 1987 identified soil and groundwater impacts at the site. Twenty-one monitoring wells (MW-1 through MW-21) were installed in 1989 on the site. The monitoring wells were sampled once in 1989, and annually from 1996 through 2009. The results indicate concentrations of gasoline range organics (GRO), diesel range organics (DRO), benzene, and ethylbenzene exceed Alaska Department of Environmental Conservation (ADEC) groundwater cleanup levels.

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In a letter dated May 2010, the ADEC approved a groundwater monitoring program comprising annual sample collection from Monitoring Wells MW-1, MW-6B, MW13A, MW-14, and MW-19R. The remaining wells were decommissioned during the liner installation activities in 2011.

### **Purpose and Objectives**

The purpose of this work was to monitor trends in dissolved phase hydrocarbon concentration gradients and distribution across the site. The project objective consisted of sampling five groundwater monitoring wells: Wells MW-1, MW-6B, MW-13A, MW-14, and MW-19R. These wells have historically contained concentrations of GRO, DRO, RRO, benzene and/or ethylbenzene above the ADEC cleanup levels.

### **FIELD ACTIVITIES**

Groundwater monitoring was performed on November 6, 2015. The water monitoring field effort consisted of depth to water measurements and sample collection at five monitoring wells. Copies of the field notes are included as Attachment 1.

### **Groundwater Sampling**

Groundwater samples were collected from Wells MW-1, MW-6B, MW-13A, MW-14, and MW-19R on November 6, 2015. Depth to water measurements were taken with an electronic water level indicator prior to purging and sampling activities. The wells were purged and sampled using a low-flow groundwater sampling method with a submersible pump and disposable tubing. The wells were sampled when pH, conductivity, and temperature readings taken three to five minutes apart stabilized (0.1 standard unit for pH; and 3 percent for conductivity and temperature). Turbidity readings did not meet stabilization requirements of three successive readings within 10 percent, but all turbidity readings were under 20 NTUs. Depth to water levels and final water quality parameter measurements are summarized in Table 1.

For quality control purposes, one field duplicate sample, designated Sample MW-2, was collected from Well MW-1. The groundwater samples were transferred into laboratory-supplied containers in order from most volatile to least volatile and placed into chilled coolers for delivery to the project laboratory. Purge water from the monitoring wells was contained in one labeled 55-gallon drum and temporarily stored on site.

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### **Groundwater Flow Direction**

The November 2015 depth to water measurements and client-provided well survey data were used to interpret the groundwater flow direction. Groundwater elevations ranged from 32.58 feet above mean sea level (MSL) in Well MW-13A to 51.12 feet above MSL in Well MW-6B. Because of the well casing repair on Well MW-14 that took place in 2012, the elevation data for that well are not included in the groundwater flow calculations. The groundwater data indicate an overall flow direction to the west at a gradient of 2 percent. The groundwater elevations are generally within historical range, and the overall flow direction is consistent with historical data.

Groundwater flow direction at the site is likely affected by multiple factors, including tidal influence, precipitation, and topography. Tidal effects appear to be the governing factor within 150 to 200 feet of Cook Inlet. These apparent tidal influences in the western portions of the property are likely contributing to fluctuations in flow direction and gradient in that area.

### **LABORATORY ANALYSES**

Six groundwater samples, including one field duplicate, were submitted to SGS for analytical testing. The groundwater samples were analyzed for GRO by Alaska Method 101 (AK101), DRO by AK 102, RRO by AK 103, and BTEX by 8021B. Trip blank samples accompanied the analytical sample containers from and to the laboratory during the sampling events, and were tested for GRO and BTEX. The laboratory reports are provided in Attachment 2.

### **INVESTIGATION DERIVED WASTE**

Investigation derived waste (IDW) from this project consisted of one 55-gallon drum of purgewater. Emerald of Alaska (Emerald) picked up the drum on January 12, 2016. A waste manifest by Emerald Alaska is included in Attachment 3.

### **DISCUSSION OF ANALYTICAL RESULTS**

The reported contaminant concentrations in the groundwater were compared to the cleanup levels listed in Table C of 18 AAC 75.345 that will be effective on November 6, 2016. The analytical sample results and cleanup levels are listed in Table 2. Graphs showing the last 10 years concentration data are included as Figure 3. A summary of historical groundwater data for the five monitoring wells is included in Table 3.

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The following parameters exceed the ADEC cleanup levels in the November 2015 samples:

- GRO concentrations in Wells MW-1, MW-13A, and MW-19R;
- DRO concentrations in Wells MW-6B, MW-13A, and MW-14;
- RRO concentration in Well MW-13A;
- Benzene concentrations in each well except Well MW-14;
- Ethylbenzene concentrations in each well; and
- Xylene concentration in Well MW-13A.

As discussed with ADEC, an evaluation of plume stability may facilitate a reduction in sampling scope and/or frequency, with an emphasis on downgradient Wells MW-13A and MW-19R. The Figure 3 graphs demonstrate most constituents of concern appear to be generally stable or decreasing over the last 10 years. GRO, DRO, RRO, and benzene concentrations in monitoring well MW-13A decreased from last year's sampling event, continuing a 5-year trend of decreasing concentrations in that well. Likewise, the DRO concentration in monitoring well MW-19R was below ADEC cleanup levels for the first time in the well's sampling history. Concentrations in monitoring wells MW-1, MW-6B, and MW-14 also appear to be stable or decreasing.

To further evaluate the qualitative trends evident in the Figure 3 graphs, a statistical analysis was conducted for selected well-parameter data sets. The combined Shewhart- Cumulative Sum (CUSUM) control chart methodology was applied to the last 10 years GRO, DRO, and benzene data from downgradient/compliance Wells MW-1 and MW-13A, and to DRO data from Well MW-14. The analysis did not indicate short-term statistical exceedances of control chart limits. The long-term data analysis indicated statistically significant downward trends in multiple parameters, most notably GRO and benzene in Well MW-13A and DRO in Well MW-14, although none of the CUSUM values presently exceed the established control limits (using assigned control variables of  $k=1$  and  $h=5$ ). Note that this methodology is a relatively straightforward approach that does not consider seasonal variation in pooling data for mean and standard deviation statistics, is a parametric analysis that assumes normally-distributed data sets, and is based on a limited number of data points following the eight values used to establish baseline conditions. The control charts used for this analysis are not included with this report, but can be provided upon request.

### **QUALITY ASSURANCE SUMMARY**

SGS follows on-going quality assurance/quality control (QC) procedures to evaluate conformance to applicable ADEC data quality objectives (DQO). Internal laboratory controls to

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assess data quality for this project include surrogates, method blanks, and laboratory control sample/laboratory control sample duplicates (LCS/LCSD) to determine precision, accuracy, and matrix bias. If a DQO was not met, the project laboratory provides a report specific note identifying the problem in the Case Narrative section of their Laboratory Analysis Reports (See Attachment 2).

Shannon & Wilson's analytical data evaluation included a review of laboratory results for field duplicate Samples MW-1 and MW-2 to document the precision of the sampling and analytical process. The primary and duplicate sample results were compared using the calculated RPD values, as shown in Table 4. The RPD was not within the DQO of 30 percent for RRO, but the concentrations were within a factor of two so the data are considered usable.

Laboratory-prepared trip blanks accompanied the sample containers during transport during the sampling event. There were no detections in the trip blank from the November 6, 2015 sampling event.

Shannon & Wilson reviewed the SGS data deliverables and completed the ADEC's Laboratory Data Review Checklists (LDRC) for each work order, which are included in Attachment 2. Quality control discrepancies and the impact to data quality/usability are described in further detail in the LDRC. In our opinion, no non-conformances that would adversely impact data usability were noted.

## **CONCLUSIONS & RECOMENDATIONS**

The November 2015 groundwater monitoring event included analytical groundwater sampling of five wells. The sample results continue recent trends that suggest the plume is stable or shrinking, with qualitatively decreasing trends evident for compliance Well MW-13A. An intra-well statistical analysis conducted to further evaluate the trends generally supported this conclusion, although none of the parameters evaluated exceed the conservative control limits established for the analysis. Based on these findings, it is our opinion that data support reducing the sampling frequency to a biennial basis.

## **CLOSURE/LIMITATIONS**

This report was prepared for the exclusive use of our clients and their representatives in the study of this site. The findings we have presented within this report are based on the limited sampling and analyses that we conducted. They should not be construed as a definite conclusion regarding the site's groundwater conditions. Therefore, the sampling and analyses performed can provide

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you with only 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 are only 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 documents in Attachment 4, "Important Information About Your Geotechnical/Environmental Report", to assist you and others in understanding the use and limitations of our reports. You are advised that various state and federal agencies (ADEC, EPA, etc.) may require the reporting of this information. Shannon & Wilson does not assume the responsibility for reporting these findings and therefore has not, and will not, disclose the results of this study, except with your permission or as required by law.

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

We appreciate the opportunity to be of service. Please call the undersigned at (907) 561-2120 with questions or comments concerning this report.

Sincerely,

SHANNON & WILSON, INC.



Admon Abuamsha  
Environmental Scientist



Encl: Tables 1 through 4  
Figures 1 through 3  
Attachments 1 through 4

**TABLE 1**  
**GROUNDWATER SAMPLING LOG**

|                                     | Monitoring Well Number                   |                      |                  |                  |                  |
|-------------------------------------|--|----------------------|------------------|------------------|------------------|
|                                     | MW-1                                     | MW-6B                | MW-13A           | MW-14            | MW-19R           |
| <b>Water Level Measurement Data</b> |  |                      |                  |                  |                  |
| Date Water Level Measured           | 11/6/2015                                | 11/6/2015            | 11/6/2015        | 11/6/2015        | 11/6/2015        |
| Time Water Level Measured           | 10:34                                    | 10:58                | 10:04            | 10:47            | 10:24            |
| MP Elevation, Feet (MSL)*           | 39.89                                    | 76.4                 | 38.01            | -                | 40.19            |
| Depth to Water Below MP, Feet       | 6.64                                     | 25.28                | 5.43             | 4.46             | 5.54             |
| Groundwater Elevation, Feet         | 33.25                                    | 51.12                | 32.58            | -                | 34.65            |
| <b>Purging/Sampling Data</b>        |  |                      |                  |                  |                  |
| Date Sampled                        | 11/6/2015                                | 11/6/2015            | 11/6/2015        | 11/6/2015        | 11/6/2015        |
| Time Sampled                        | 14:28                                    | 12:16                | 16:48            | 13:22            | 13:30            |
| Depth to Water Below MP, Feet       | 6.64                                     | 25.28                | 5.43             | 4.46             | 5.54             |
| Total Depth of Well Below MP, Feet  | 14.11                                    | 30.21                | 10.67            | 12.64            | 14.36            |
| Water Column in Well, Feet          | 7.47                                     | 4.93                 | 5.24             | 8.18             | 8.82             |
| Gallons per Foot                    | 0.65                                     | 0.65                 | 0.65             | 0.65             | 0.16             |
| Gallons in Well                     | 4.86                                     | 3.20                 | 3.41             | 5.32             | 1.41             |
| Total Gallons Pumped/Bailed         | 2.2                                      | 2.5                  | 1.2              | 2.3              | 2.9              |
| Purging/Sampling Method             | Low-Flow                                 | Low- Flow            | Low- Flow        | Low- Flow        | Low-Flow         |
| Diameter of Well Casing             | 4-inch                                   | 4-inch               | 4-inch           | 4-inch           | 2-inch           |
| <b>Water Quality Data</b>           |  |                      |                  |                  |                  |
| Temperature, °C                     | 8.9                                      | 6.9                  | 8.0              | 6.0              | 8.3              |
| Specific Conductance, µS/cm         | 4,240                                    | 635                  | 439              | 318              | 389              |
| pH, Standard Units                  | 7.03                                     | 6.51                 | 6.61             | 6.85             | 6.56             |
| Turbidity, NTU                      | 13.50                                    | NM                   | 11.50            | 17.40            | 9.99             |
| Remarks                             | Duplicate "MW-2"<br>Sheen in purge water | Sheen in purge water | Hydrocarbon odor | Hydrocarbon odor | Hydrocarbon odor |

## Notes:

Field Personnel: Admon Abuamsha

Water quality parameters were measured with Hanna and Hach water quality instruments.

\* = Previous reports provided by the client indicate that MP elevations were surveyed in 2007 by Karabelnikoff Surveying.

MSL = Mean sea level

MP = Measuring point

µS/cm = Microsiemens per centimeter

NTU = Nephelometric Turbidity Units

mV = Millivolt

- = Well repaired in 2012 with new segment of casing. Measuring point elevation has been altered.

°C = Degrees Celsius

NM = Not Measured



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

| Parameter Tested                     | Method*   | Cleanup Level** |        | Sample ID Number^ and Water Elevation in Feet above Mean Sea Level<br>(See Table 1, Figure 2, and Attachment 2) |                |                |                 |               |                 |            |
|--------------------------------------|-----------|-----------------|--------|---|----------------|----------------|-----------------|---------------|-----------------|------------|
|                                      |           | 2008            | 2016   | Monitoring Wells  |                |                |                 |               |                 | Trip Blank |
|                                      |           |                 |        | MW-1<br>33.25   | MW-2~<br>33.25 | MW-6B<br>51.12 | MW-13A<br>32.58 | MW-14<br>-    | MW-19R<br>34.65 | WTB<br>-   |
| Gasoline Range Organics (GRO) - mg/L | AK101     | 2.2             | 2.2    | <b>3.15 J+</b>  | <b>3.49 J+</b> | 1.15 J+        | <b>3.54 J+</b>  | 1.10 J+       | <b>3.46 J+</b>  | <0.0500    |
| Diesel Range Organics (DRO) - mg/L   | AK102     | 1.5             | 1.5    | 0.695   | 0.531 J        | <b>5.59</b>    | <b>5.76</b>     | <b>1.69</b>   | 1.36            | -          |
| Residual Range Organics (RRO) - mg/L | AK103     | 1.1             | 1.1    | 0.485   | 0.319 J        | 0.794          | <b>1.21</b>     | 0.576         | 0.542           | -          |
| Volatile Organic Compounds (VOCs)    |           |                 |        |   |                |                |                 |               |                 |            |
| Benzene - mg/L                       | EPA 8021B | 0.005           | 0.0046 | <b>0.628</b>  | <b>0.766</b>   | <b>0.0398</b>  | <b>0.112</b>    | 0.00361       | <b>0.0191</b>   | <0.000250  |
| Toluene - mg/L                       | EPA 8021B | 1.0             | 1.1    | 0.0421  | 0.0492         | 0.000640 J     | 0.0138          | 0.00135       | 0.00376         | <0.000500  |
| Ethylbenzene - mg/L                  | EPA 8021B | 0.7             | 0.015  | <b>0.0733</b>   | <b>0.0860</b>  | <b>0.102</b>   | <b>0.361</b>    | <b>0.0550</b> | <b>0.0193</b>   | <0.000500  |
| Xylenes - mg/L                       | EPA 8021B | 10              | 0.19   | 0.0801  | 0.0932         | 0.117          | <b>0.486</b>    | 0.108         | 0.0506          | <0.001500  |

## Notes:

- \* = See Attachment 2 for compounds tested, methods, and laboratory reporting limits
- \*\* = Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 including former 2008 and new November 6, 2016 levels
- ^ = Sample ID number preceded by "17453-007-" on the chain of custody form
- ~ = Duplicate of Sample MW-1
- mg/L = Milligrams per liter
- = Not applicable or sample not tested for this analyte
- 0.205** = Reported concentration equals or exceeds the 2016 regulated cleanup level
- J = Analyte detected, but at a concentration less than the laboratory reporting limit
- J+ = Project result may be biased high due to surrogate failure (See LDRC, Attachment 2)
- QC = Quality control
- <0.000500 = Not detected above the laboratory reporting limit of 0.000500 mg/L



**TABLE 3  
SUMMARY OF HISTORICAL GROUNDWATER DATA**

| Monitoring Well | Sample Date | Groundwater Elevation (feet) MSL | Parameter Tested and Cleanup Level* in mg/L |         |         |                |
|-----------------|-------------|----------------------------------|---|---------|---------|----------------|
|                 |             |                                  | GRO 2.2                                     | DRO 1.5 | RRO 1.1 | Benzene 0.0046 |
| MW-1            | 06/09/04    | 32.32                            | 3.50  | 2.00    | -       | 0.720          |
|                 | 05/11/05    | 32.67                            | 11.0  | 7.00    | -       | 1.30           |
|                 | 05/16/06    | 32.58                            | 16.0  | 5.40    | -       | 1.50           |
|                 | 09/11/07    | 32.95                            | 14.0  | 3.20    | <0.380  | 2.10           |
|                 | 08/21/08~   | 32.87                            | 14.5  | 4.00    | -       | 1.52           |
|                 | 10/07/08    | 33.14                            | -   | -       | -       | -              |
|                 | 08/18/09~   | 32.79                            | 1.99  | 1.31    | <0.385  | 0.656          |
|                 | 09/02/10    | 33.24                            | 2.20  | 1.10    | 0.270   | 0.580          |
|                 | 10/07/11    | 32.58                            | 3.67  | 1.13    | 0.283 J | 0.707          |
|                 | 10/10/2012~ | 34.07                            | 3.56  | 1.80    | 0.549   | 1.12           |
|                 | 10/22/13    | 33.40                            | 2.31  | 0.876   | 0.252 J | 0.663          |
|                 | 10/23/2014~ | 32.81                            | 0.884                                       | 0.418 J | <0.250  | 0.214          |
|                 | 11/6/2015~  | 33.25                            | 3.49 J+                                     | 0.695   | 0.485   | 0.766          |
| MW-6B           | 06/08/04    | 53.06                            | 2.30  | 21.0    | -       | 0.0630         |
|                 | 05/11/05    | 53.00                            | 2.20  | 15.0    | -       | 0.0900         |
|                 | 05/15/06    | 52.58                            | 2.30  | 23.0    | -       | 0.0540         |
|                 | 09/12/07    | 50.37                            | 1.80  | 9.00    | <0.380  | 0.0600         |
|                 | 08/21/08    | 50.94                            | 1.60  | 13.2    | -       | 0.0472         |
|                 | 10/08/08    | 50.75                            | -   | -       | <3.54   | 0.0461         |
|                 | 08/19/09    | 50.30                            | 1.52  | 13.0    | 1.45    | 0.0310         |
|                 | 09/01/10    | 50.62                            | 1.10  | 23.0    | <3.50   | 0.0310         |
|                 | 10/07/11    | 49.87                            | 0.933                                       | 17.6    | 1.85    | 0.0175         |
|                 | 10/10/12    | 52.25                            | 1.27 J+                                     | 7.58    | 0.836   | 0.0232         |
|                 | 10/22/13    | 53.00                            | 2.05  | 7.64    | 0.683   | 0.0540         |
|                 | 10/23/14    | 50.78                            | 1.18  | 6.16    | 0.596   | 0.0446         |
|                 | 11/06/15    | 51.12                            | 1.15 J+                                     | 5.59    | 0.794   | 0.0398         |
| MW-13A          | 06/08/04    | 31.49                            | 19.0  | 20.0    | -       | 0.460          |
|                 | 05/11/05    | 31.53                            | 14.0  | 11.0    | -       | 0.430          |
|                 | 05/16/06    | 31.28                            | 15.0  | 22.0    | -       | 0.330          |
|                 | 09/12/07    | 32.73                            | 13.0  | 7.90    | <0.410  | 0.400          |
|                 | 08/21/08    | 31.61                            | 17.1  | 16.4    | -       | 0.291          |
|                 | 10/09/08    | 32.32                            | -   | -       | <3.54   | 0.293          |
|                 | 08/18/09    | 32.31                            | 9.73  | 10.3    | 1.35    | 0.232          |
|                 | 09/01/10~   | 32.46                            | 8.70  | 18.0    | <1.40   | 0.260          |
|                 | 10/7/2011~  | 31.59                            | 8.62  | 16.7    | 2.98    | 0.248          |
|                 | 10/10/12    | 33.76                            | 6.52  | 10.1    | 1.55    | 0.167          |
|                 | 10/22/13    | 32.77                            | 7.15  | 11.3    | 1.48    | 0.208          |
|                 | 10/23/14    | 32.16                            | 5.56  | 11.2    | 1.47    | 0.154          |
|                 | 11/06/15    | 32.58                            | 3.54 J+                                     | 5.8     | 1.21    | 0.112          |
| MW-14           | 06/08/04    | 33.36                            | 4.70  | 11.0    | -       | 0.011          |
|                 | 05/11/05    | 33.50                            | 5.00  | 11.0    | -       | 0.012          |
|                 | 05/15/06    | 33.81                            | 5.20  | 15.0    | -       | 0.018          |
|                 | 08/21/08    | 32.93                            | 4.38  | 13.4    | -       | 0.00804        |
|                 | 10/08/08    | 33.48                            | -   | -       | 1.65    | 0.00715        |
|                 | 08/19/09    | 33.41                            | 2.38  | 5.25    | 0.596   | 0.0021         |
|                 | 09/01/10    | 33.55                            | 2.70  | 9.00    | <0.780  | 0.0040         |
|                 | 10/07/11    | 32.51                            | 2.64  | 8.44    | 1.18    | 0.00371        |
|                 | 10/26/12    | -                                | 1.56 J+                                     | 2.90    | 0.195 J | 0.00723        |
|                 | 10/22/13    | -                                | 3.06  | 3.98    | 0.332 J | 0.00731        |
|                 | 10/23/14    | -                                | 0.641 J                                     | 1.03    | <0.250  | 0.00498 J      |
|                 | 11/06/15    | -                                | 1.1 J+                                      | 1.69    | 0.576   | 0.00361        |

See Notes on Page 2

**TABLE 3  
SUMMARY OF HISTORICAL GROUNDWATER DATA**

| Monitoring Well | Sample Date | Groundwater Elevation (feet) MSL | Parameter Tested and Cleanup Level* in mg/L |         |         |                |
|-----------------|-------------|----------------------------------|---|---------|---------|----------------|
|                 |             |                                  | GRO 2.2                                     | DRO 1.5 | RRO 1.1 | Benzene 0.0046 |
| MW-19R          | 09/12/07    | 34.49                            | 3.50  | 6.90    | 6.50    | 0.020          |
|                 | 08/21/08    | 34.24                            | 5.16  | 4.19    | -       | 0.00448        |
|                 | 10/08/08    | 34.26                            | -   | -       | 1.09    | 0.00373        |
|                 | 08/18/09    | 35.09                            | 4.01  | 1.92    | <0.385  | 0.00530        |
|                 | 09/02/10    | 34.42                            | 4.80  | 2.80    | <0.350  | 0.00300        |
|                 | 10/07/11    | 33.89                            | 6.05  | 3.92    | 1.07    | 0.00214        |
|                 | 10/10/12    | 35.59                            | 3.25 J+                                     | 2.57    | 0.717   | 0.00159        |
|                 | 10/22/13~   | 35.10                            | 5.04  | 3.01    | 0.348 J | 0.00398        |
|                 | 10/23/14    | 32.49                            | 5.31  | 1.88    | 0.416 J | 0.0186         |
|                 | 11/06/15    | 34.65                            | 3.46 J+                                     | 1.36    | 0.542   | 0.0191         |

Notes:

- mg/L = milligrams per liter
- MSL = Mean sea level
- GRO = Gasoline range organics
- DRO = Diesel range organics
- RRO = Residual range organics
- 3.50** = Reported concentration equals or exceeds the 2016 regulated cleanup level
- = Not applicable or sample not tested for this analyte
- ~ = The higher concentrations between primary and duplicate samples are tabulated
- J = Analyte detected, but at a concentration less than the laboratory reporting limit
- J+ = Project result may be biased high due to surrogate failure (See LDRC, Attachment 2)
- J- = Project result may be biased low due to surrogate failure (See LDRC, Attachment 2)
- <0.380 = Analyte not detected at or above the laboratory reporting limit of 0.380 mg/L
- \* = Groundwater cleanup levels are from Table C, 18 AAC 75.345 (November 2016)

Data prior to 2011 provided by ARCADIS

**TABLE 4**  
**QUALITY CONTROL DATA**

| <b>Parameter Tested</b>              | <b>Primary Sample<br/>MW-1</b> | <b>Duplicate Sample<br/>MW-2</b> | <b>Precision<br/>(RPD)</b> | <b>Precision<br/>QC Limit</b> |
|--------------------------------------|--------------------------------|----------------------------------|----------------------------|-------------------------------|
| Gasoline Range Organics (GRO) - mg/L | 3.150                          | 3.490                            | 10%                        | 30%                           |
| Diesel Range Organics (DRO) - mg/L   | 0.695                          | 0.531J                           | 27%                        | 30%                           |
| Residual Range Organics (RRO) - mg/L | 0.485                          | 0.319 J                          | <b>41%</b>                 | 30%                           |
| Volatile Organic Compounds (VOCs)    |                                |                                  |                            |                               |
| Benzene - mg/L                       | 0.628                          | 0.766                            | 20%                        | 30%                           |
| Toluene - mg/L                       | 0.0421                         | 0.0492                           | 16%                        | 30%                           |
| Ethylbenzene - mg/L                  | 0.0733                         | 0.0860                           | 16%                        | 30%                           |
| Xylenes - mg/L                       | 0.0801                         | 0.0932                           | 15%                        | 30%                           |

## Notes:

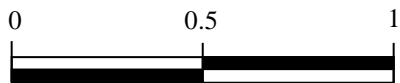
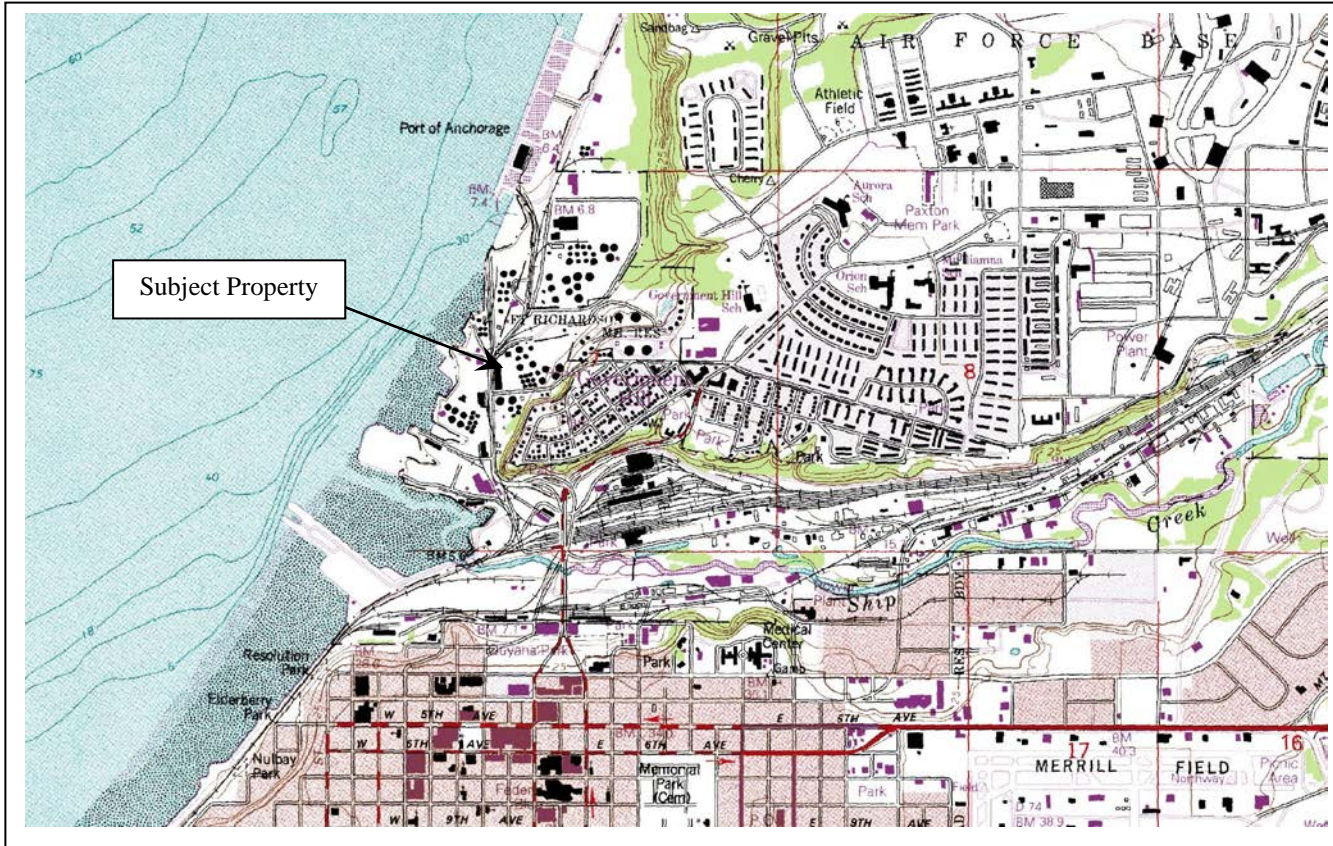
RPD = Relative percent difference

QC = Quality control

NA = RPD not calculated due to non-detectable results

mg/L = Milligrams per liter


**41%** = RPD is greater than the precision QC limit




Approximate scale  
1 inch equals approximately 1/2 mile


Taken from  
Anchorage A-8 NE Quadrangle  
U.S. Geological Survey




|   |                |
|---|----------------|
| 459 West Bluff Drive<br>Anchorage, Alaska   |                |
| <b>VICINITY MAP</b>   |                |
| November 2016   | 32-1-17453-007 |
|  <b>SHANNON &amp; WILSON, INC.</b><br>Geotechnical & Environmental Consultants | <b>Fig. 1</b>  |


**LEGEND**

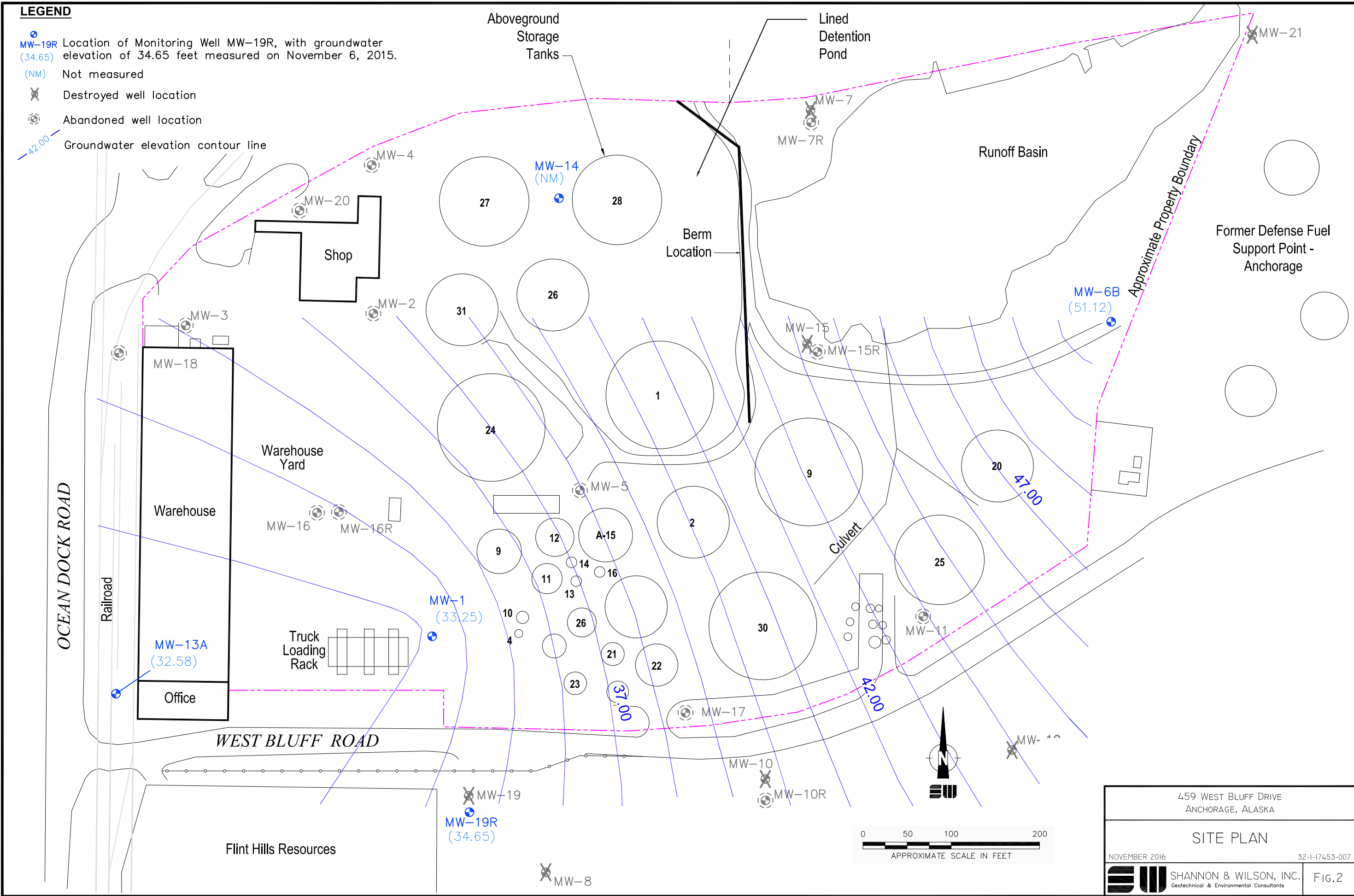
 MW-19R Location of Monitoring Well MW-19R, with groundwater elevation of 34.65 feet measured on November 6, 2015.

 (NM) Not measured

 Destroyed well location

 Abandoned well location

 42.00 Groundwater elevation contour line



OCEAN DOCK ROAD

Railroad

Warehouse  
Office

Warehouse Yard

Truck Loading Rack

WEST BLUFF ROAD

Flint Hills Resources

Aboveground Storage Tanks

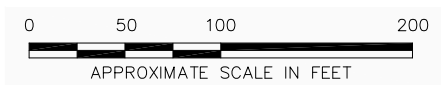
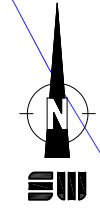
Lined Detention Pond

Berm Location

Runoff Basin

Approximate Property Boundary

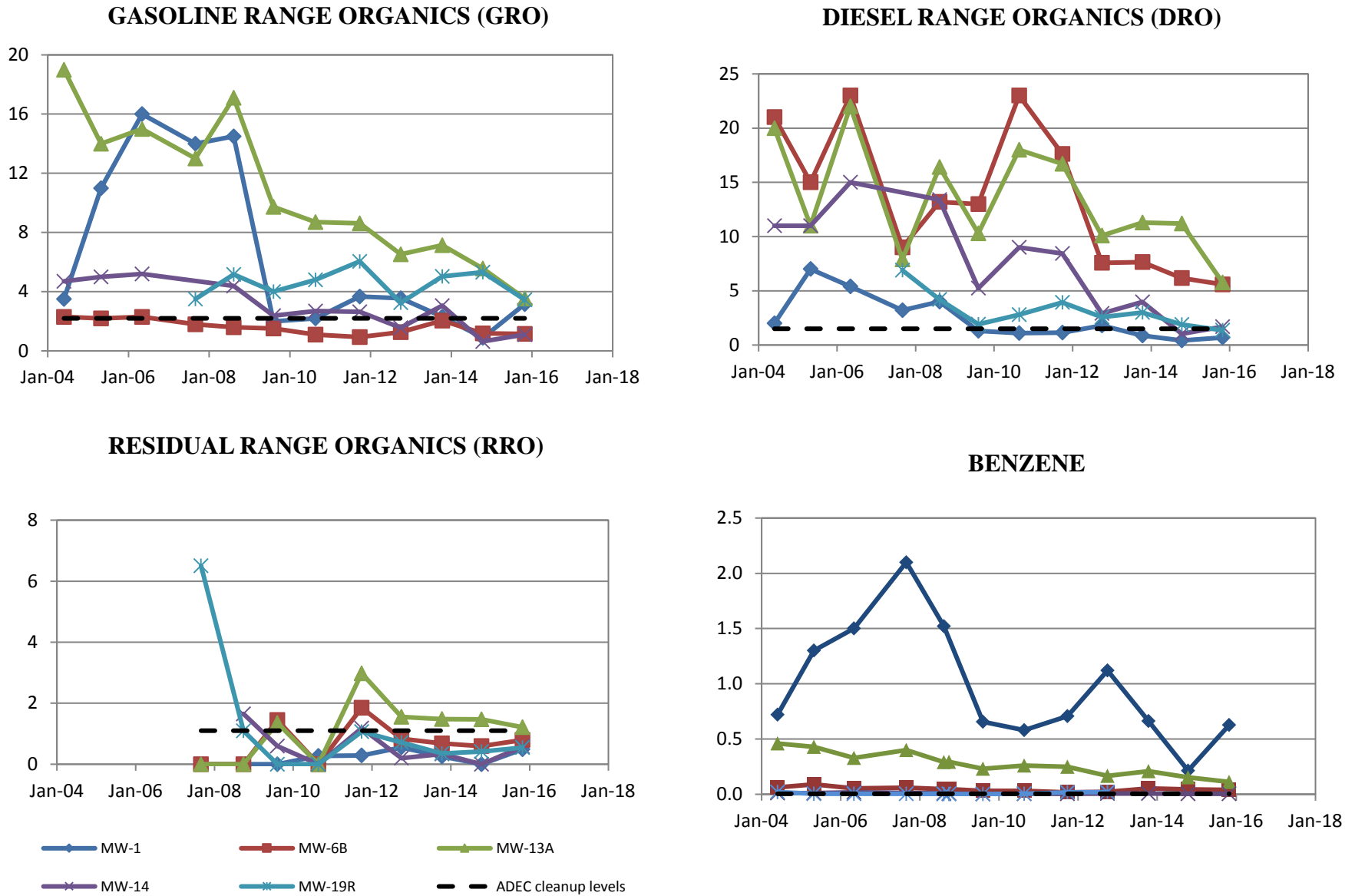
Former Defense Fuel Support Point - Anchorage



|  |                |
|--|----------------|
| 459 WEST BLUFF DRIVE<br>ANCHORAGE, ALASKA  |                |
| SITE PLAN  |                |
| NOVEMBER 2016  | 32-I-17453-007 |
|  SHANNON & WILSON, INC.<br>Geotechnical & Environmental Consultants | FIG. 2         |



**FIGURE 3**  
**GRAPHS OF SELECT CONSITUENTS IN MILLIGRAMS PER LITER**



**ATTACHMENT 1**  
**FIELD NOTES**





# LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Job No: 1753-007 Location: Cowley ATF Weather: Cloudy 35°  
 Well No.: MW-19R  
 Date: 11/6/15 Time Started: 1508 Time Completed: 1614  
 Develop Date: — Develop End Time: — (24 hour break)

## INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 10 24 Date of Depth Measurement: 11/6/15  
 Measuring Point (MP): Top of PVC Casing / Top of Steel Protective Casing / Other: —  
 Diameter of Casing: 10 25 Well Screen Interval: —  
 Total Depth of Well Below MP: 14.36 Product Thickness, if noted: —  
 Depth-to-Water (DTW) Below MP: 5.54  
 Water Column in Well: 8.82 (Total Depth of Well Below MP - DTW Below MP)  
 Gallons per foot: 0.16  
 Gallons in Well: 1.41 (Water Column in Well x Gallons per foot)

## PURGING DATA

Date Purged: 11/6/15 Time Started: 1518 Time Completed: 1557  
 Three Well Volumes: 5.9 (Gallons in Well x 3)  
 Gallons Purged: 2.9 Depth of Pump (generally 2 ft from bottom): 12'  
 Max. Drawdown (generally 0.3 ft): 0.3 Pump Rate: 0.2

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) |
|-------|----------|--------------------|---------------|----------------|------------|--------------------|------------|------------|-----------|-------------|
| 1521  | 0.1      | 0.2                | —             | —              | 7.72       | 605                | —          | 7.10       | —         | 887.3       |
| 1524  | 0.4      | 0.2                | —             | —              | 8.06       | 516                | —          | 6.90       | —         | 727.6       |
| 1527  | 0.6      | 0.2                | 5.84          | 0.3            | 8.00       | 485                | —          | 6.78       | —         | 317.0       |
| 1530  | 0.8      | 0.2                | —             | —              | 8.04       | 468                | —          | 6.72       | —         | 214.6       |
| 1533  | 1.2      | 0.2                | —             | —              | 8.05       | 454                | —          | 6.68       | —         | 152.0       |
| 1536  | 1.4      | 0.2                | —             | —              | 8.08       | 438                | —          | 6.66       | —         | 112.2       |

## SAMPLING DATA

Odor: HC Odor Color: Clear  
 Sample Designation: 1753-007-MW-19R Time / Date: 1557 11-6-15  
 QC Sample Designation: — Time / Date: —  
 QA Sample Designation: — Time / Date: —

Evacuation Method: Bladder Pump / Submersible Pump / Other: —

Sampling Method: Bladder Pump / Submersible Pump / Other: —

Water Quality Instruments Used/Manufacturer/Model Number —

Calibration Info (Time, Ranges, etc) —

Remarks: NA

Sampling Personnel: ARA

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



Shannon & Wilson, Inc.

### LOW-FLOW WATER SAMPLING LOG

Continued from previous page

Job No: 1753-007 Location: Crowley ATF Site: -  
 Well No.: MW-19R  
 Date: 11/6/15

| 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) |  |
|-------|----------|--------------------|---------------|----------------|------------|--------------------|------------|------------|-----------|-------------|--|
| 1539  | 1.7      | 0.2                | 5.75          | 0.21           | 8.17       | 422                |            | 6.63       |           | 69.6        |  |
| 1541  | 1.9      | 0.2                | -             | -              | 8.27       | <del>410</del> 410 |            | 6.61       |           | 41.4        |  |
| 1544  | 2.1      | 0.2                | -             | -              | 8.28       | 408                |            | 6.61       |           | 31.8        |  |
| 1547  | 2.3      | 0.2                | -             | -              | 8.25       | 404                |            | 6.60       |           | 26.9        |  |
| 1550  | 2.5      | 0.2                | -             | -              | 8.31       | 397                |            | 6.58       |           | 16.4        |  |
| 1553  | 2.7      | 0.2                | 5.76          | 0.22           | 8.33       | 395                |            | 6.57       |           | 13.2        |  |
| 1556  | 2.9      | 0.2                | -             | -              | 8.34       | 389                |            | 6.56       |           | 9.99        |  |
| 1557  | SAMPLE   | TIME               |               |                |            |                    |            |            |           |             |  |
|       |          |                    |               |                |            |                    |            |            |           |             |  |
|       |          |                    |               |                |            |                    |            |            |           |             |  |

#### STABILIZATION PARAMETERS

|                 | 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 (May 2010) | 3 to 5             | 100 to 150          | <0.0328        | ±3% or ±0.2 | ±3%                | ±10%         | ±0.1       | ±10       | ±10%           |
| EPA (Jan. 2010) | 5                  | 50                  | <0.3           | ±3%         | ±3%                | ±10% or <0.5 | ±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: 17453-007 Location: Crowley ATF Weather: Cloudy 35°  
 Well No.: MW-13A  
 Date: 11/6/15 Time Started: 1619 Time Completed: 1704  
 Develop Date: \_\_\_\_\_ Develop End Time: \_\_\_\_\_ (24 hour break)

## INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 1004 Date of Depth Measurement: 11/6/15  
 Measuring Point (MP): Top of PVC Casing / Top of Steel Protective Casing / Other: \_\_\_\_\_  
 Diameter of Casing: \_\_\_\_\_ Well Screen Interval: \_\_\_\_\_  
 Total Depth of Well Below MP: 10.67 Product Thickness, if noted: \_\_\_\_\_  
 Depth-to-Water (DTW) Below MP: 5.43  
 Water Column in Well: 5.24 (Total Depth of Well Below MP - DTW Below MP)  
 Gallons per foot: 0.65  
 Gallons in Well: 3.4 (Water Column in Well x Gallons per foot)

## PURGING DATA

Date Purged: 11/6/15 Time Started: 1630 Time Completed: 1647  
 Three Well Volumes: 10.2 (Gallons in Well x 3)  
 Gallons Purged: 1.2 Depth of Pump (generally 2 ft from bottom): ~8'  
 Max. Drawdown (generally 0.3 ft): 0.67 Pump Rate: 0.2

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) |
|-------|----------|--------------------|---------------|----------------|------------|--------------------|------------|------------|-----------|-------------|
| 1633  | 0.1      | 0.2                | -             | -              | 7.25       | 442                |            | 6.60       |           | 126.0       |
| 1636  | 0.3      | 0.2                | -             | -              | 7.36       | 439                |            | 6.61       |           | 80.2        |
| 1639  | 0.5      | 0.2                | 5.80          | 0.37           | 8.17       | 442                |            | 6.61       |           | 28.6        |
| 1641  | 0.7      | 0.2                | -             | -              | 8.08       | 441                |            | 6.62       |           | 16.7        |
| 1644  | 0.9      | 0.2                | -             | -              | 8.03       | 440                |            | 6.61       |           | 14.4        |
| 1647  | 1.2      | 0.2                | 6.10          | 0.67           | 7.98       | 439                |            | 6.61       |           | 11.5        |

## SAMPLING DATA

Odor: HC Odor Color: Clear  
 Sample Designation: 17453-007-MW-13A Time / Date: 1648 11-6-15  
 QC Sample Designation: \_\_\_\_\_ Time / Date: \_\_\_\_\_  
 QA Sample Designation: \_\_\_\_\_ Time / Date: \_\_\_\_\_

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

Water Quality Instruments Used/Manufacturer/Model Number \_\_\_\_\_

Calibration Info (Time, Ranges, etc) \_\_\_\_\_

Remarks: NA

Sampling Personnel: ARA

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



Shannon & Wilson, Inc.

### LOW-FLOW WATER SAMPLING LOG

Job No: 1753-007 Location: Crowley ATF Weather: cloudy 30's  
 Well No.: MW-6B  
 Date: 11/6/15 Time Started: 1057 Time Completed: 1235  
 Develop Date: — Develop End Time: — (24 hour break)

### INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 1058 Date of Depth Measurement: 11/6/15  
 Measuring Point (MP): Top of PVC Casing / Top of Steel Protective Casing / Other: —  
 Diameter of Casing: 4" Well Screen Interval: —  
 Total Depth of Well Below MP: 30.21 Product Thickness, if noted: —  
 Depth-to-Water (DTW) Below MP: 25.28  
 Water Column in Well: 4.93 (Total Depth of Well Below MP - DTW Below MP)  
 Gallons per foot: 0.65  
 Gallons in Well: 3.20 (Water Column in Well x Gallons per foot)

### PURGING DATA

Date Purged: 11/6/15 Time Started: 1115 Time Completed: 1215  
 Three Well Volumes: 9.6 (Gallons in Well x 3)  
 Gallons Purged: 2.5 Depth of Pump (generally 2 ft from bottom): 28'  
 Max. Drawdown (generally 0.3 ft): 0.14 Pump Rate: 0.1

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) |
|-------|----------|--------------------|---------------|----------------|------------|--------------------|------------|------------|-----------|-------------|
| 1118  | 0.1      | 0.1                | —             | —              | 5.66       | 636                | —          | 5.86       | —         | —           |
| 1148  | 0.15     | 0.1                | —             | —              | 5.55       | 631                | —          | 6.39       | —         | —           |
| 1151  | 0.2      | 0.1                | 25.32         | 0.4            | 5.50       | 631                | —          | 6.39       | —         | —           |
| 1154  | 0.3      | 0.3                | —             | —              | 5.98       | 633                | —          | 6.40       | —         | —           |
| 1157  | 0.5      | 0.3                | —             | —              | 6.51       | 644                | —          | 6.42       | —         | —           |
| 1200  | 0.7      | 0.3                | 25.40         | 0.12           | 6.64       | 646                | —          | 6.43       | —         | —           |

### SAMPLING DATA

Odor: Slight HC Odor Color: Clear  
 Sample Designation: 1753-007-MW-6B Time / Date: 1216 11/6/15  
 QC Sample Designation: — Time / Date: —  
 QA Sample Designation: — Time / Date: —

Evacuation Method: Bladder Pump / Submersible Pump / Other: —  
 Sampling Method: Bladder Pump / Submersible Pump / Other: —

Water Quality Instruments Used/Manufacturer/Model Number 451 556  
 Calibration Info (Time, Ranges, etc) Calibrated @ 0830 11/6/15

Remarks: Seen in purge water

Sampling Personnel: ABA

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.

Job No: 1753-007 Location: Cumley ATF Weather: Cloudy 30s  
 Well No.: MW-14  
 Date: 11/6/15 Time Started: 1243 Time Completed: 1339  
 Develop Date: - Develop End Time: - (24 hour break)

## INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 1047 Date of Depth Measurement: 11/6/15  
 Measuring Point (MP): Top of PVC Casing / Top of Steel Protective Casing / Other: \_\_\_\_\_  
 Diameter of Casing: 4" Well Screen Interval: \_\_\_\_\_  
 Total Depth of Well Below MP: 12.64 Product Thickness, if noted: \_\_\_\_\_  
 Depth-to-Water (DTW) Below MP: 4.46  
 Water Column in Well: 8.18 (Total Depth of Well Below MP - DTW Below MP)  
 Gallons per foot: 0.65  
 Gallons in Well: 5.3 (Water Column in Well x Gallons per foot)

## PURGING DATA

Date Purged: 11/6/15 Time Started: 1253 Time Completed: 1322  
 Three Well Volumes: 15.95 (Gallons in Well x 3)  
 Gallons Purged: 2.3 Depth of Pump (generally 2 ft from bottom): ~14  
 Max. Drawdown (generally 0.3 ft): 0.06 Pump Rate: 0.2

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) |
|-------|----------|--------------------|---------------|----------------|------------|--------------------|------------|------------|-----------|-------------|
| 1257  | 0.1      | 0.2                | -             | -              | 4.84       | 309                | -          | 6.83       | -         | 20.8        |
| 1300  | 0.2      | 0.2                | 4.51          | 0.05           | 5.22       | 310                | -          | 6.83       | -         | 39.5        |
| 1303  | 0.4      | 0.2                | -             | -              | 5.46       | 311                | -          | 6.82       | -         | 37.1        |
| 1306  | 0.6      | 0.2                | -             | -              | 5.66       | 313                | -          | 6.73       | -         | 32.16       |
| 1309  | 0.9      | 0.2                | 4.51          | 0.05           | 5.82       | 315                | -          | 6.77       | -         | 27.18       |
| 1312  | 1.2      | 0.2                | -             | -              | 5.87       | 315                | -          | 6.80       | -         | 26.63       |

## SAMPLING DATA

Odor: Slight Sulfur odor Color: Clear  
 Sample Designation: 1753-007-MW-14 Time / Date: 1322 11/6/15  
 QC Sample Designation: - Time / Date: -  
 QA Sample Designation: - Time / Date: -

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

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

Water Quality Instruments Used/Manufacturer/Model Number \_\_\_\_\_

Calibration Info (Time, Ranges, etc) \_\_\_\_\_

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

Sampling Personnel: ARA

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.

Job No: 1753-007 Location: Crowley ATF Weather: Cloudy 30°  
 Well No.: MW-1  
 Date: 11/6/15 Time Started: 1351 Time Completed: 1500  
 Develop Date: \_\_\_\_\_ Develop End Time: \_\_\_\_\_ (24 hour break)

## INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 1034 Date of Depth Measurement: 11/6/15  
 Measuring Point (MP): Top of Steel Protective Casing / Top of PVC Casing / Other: \_\_\_\_\_  
 Diameter of Casing: 5.5 in 4 in Well Screen Interval: \_\_\_\_\_  
 Total Depth of Well Below MP: 14.11 Product Thickness, if noted: \_\_\_\_\_  
 Depth-to-Water (DTW) Below MP: 6.64  
 Water Column in Well: 7.47 (Total Depth of Well Below MP - DTW Below MP)  
 Gallons per foot: 0.65  
 Gallons in Well: 4.86 (Water Column in Well x Gallons per foot)

## PURGING DATA

Date Purged: 11/6/15 Time Started: 1404 Time Completed: 1428  
 Three Well Volumes: \_\_\_\_\_ (Gallons in Well x 3)  
 Gallons Purged: 2.2 Depth of Pump (generally 2 ft from bottom): ~12'  
 Max. Drawdown (generally 0.3 ft): 0.27 Pump Rate: 0.3

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) |
|-------|----------|--------------------|---------------|----------------|------------|--------------------|------------|------------|-----------|-------------|
| 1407  | 0.1      | 0.2                | -             | -              | 8.49       | 4189               |            | 6.58       |           | 55.2        |
| 1410  | 0.3      | 0.2                | -             | -              | 8.80       | 4314               |            | 6.87       |           | 45.4        |
| 1413  | 0.6      | 0.3                | 6.84          | 0.2            | 8.88       | 4324               |            | 6.95       |           | 33.9        |
| 1416  | 0.9      | 0.3                | -             | -              | 8.88       | 4312               |            | 6.98       |           | 27.2        |
| 1419  | 1.3      | 0.3                | 6.91          | 0.27           | 8.90       | 4297               |            | 7.00       |           | 23.7        |
| 1421  | 1.6      | 0.3                | -             | -              | 8.88       | 4277               |            | 7.02       |           | 19.5        |

## SAMPLING DATA

Odor: NA Color: Clear  
 Sample Designation: 1753-007-MW-1 Time / Date: 1428 11-6-15  
 QC Sample Designation: 1753-007-MW-2 Time / Date: 1448 11-6-15  
 QA Sample Designation: \_\_\_\_\_ Time / Date: \_\_\_\_\_

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

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

Water Quality Instruments Used/Manufacturer/Model Number \_\_\_\_\_

Calibration Info (Time, Ranges, etc) \_\_\_\_\_

Remarks: Seen in purge water

Sampling Personnel: ARA

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



**ATTACHMENT 2**

**RESULTS OF ANALYTICAL TESTING BY**

**SGS NORTH AMERICA INC. OF ANCHORAGE, ALASKA**

**AND**

**ADEC LABORATORY DATA REVIEW CHECKLISTS**



## Laboratory Report of Analysis

To: Shannon & Wilson, Inc.  
5430 Fairbanks St Ste #3  
Anchorage, AK 99518  
907-561-2120

Report Number: **1156607**

Client Project: **32-1-17453-007 Crowley GW**

Dear Matt Hemry,

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 Victoria at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

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

Sincerely,  
SGS North America Inc.

---

Victoria Pennick  
Project Manager  
Victoria.Pennick@sgs.com

Date

Print Date: 11/17/2015 11:07:59AM

### Case Narrative

SGS Client: **Shannon & Wilson, Inc.**  
SGS Project: **1156607**  
Project Name/Site: **32-1-17453-007 Crowley GW**  
Project Contact: **Matt Hemry**

Refer to sample receipt form for information on sample condition.

**17453-007-MW-6B (1156607001) PS**

AK101 - Surrogate recovery for 4-bromofluorobenzene (304%) does not meet QC criteria due to matrix interference.

**17453-007-MW-14 (1156607002) PS**

AK101 - Surrogate recovery for 4-bromofluorobenzene (176%) does not meet QC criteria due to matrix interference.

**17453-007-MW-1 (1156607003) PS**

AK101 - Surrogate recovery for 4-bromofluorobenzene (151%) does not meet QC criteria due to matrix interference.

**17453-007-MW-2 (1156607004) PS**

AK101 - Surrogate recovery for 4-bromofluorobenzene (155%) does not meet QC criteria due to matrix interference.

**17453-007-MW-19R (1156607005) PS**

AK101 - Surrogate recovery for 4-bromofluorobenzene (425%) does not meet QC criteria due to matrix interference.

**17453-007-MW-13A (1156607006) PS**

AK101 - Surrogate recovery for 4-bromofluorobenzene (154%) does not meet QC criteria due to matrix interference.

\*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: 11/17/2015 11:07:59AM

## Laboratory Qualifiers

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

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

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

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

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

### Sample Summary

| <u>Client Sample ID</u> | <u>Lab Sample ID</u> | <u>Collected</u> | <u>Received</u> | <u>Matrix</u>                 |
|-------------------------|----------------------|------------------|-----------------|-------------------------------|
| 17453-007-MW-6B         | 1156607001           | 11/06/2015       | 11/09/2015      | Water (Surface, Eff., Ground) |
| 17453-007-MW-14         | 1156607002           | 11/06/2015       | 11/09/2015      | Water (Surface, Eff., Ground) |
| 17453-007-MW-1          | 1156607003           | 11/06/2015       | 11/09/2015      | Water (Surface, Eff., Ground) |
| 17453-007-MW-2          | 1156607004           | 11/06/2015       | 11/09/2015      | Water (Surface, Eff., Ground) |
| 17453-007-MW-19R        | 1156607005           | 11/06/2015       | 11/09/2015      | Water (Surface, Eff., Ground) |
| 17453-007-MW-13A        | 1156607006           | 11/06/2015       | 11/09/2015      | Water (Surface, Eff., Ground) |
| 17453-007-WTB           | 1156607007           | 11/06/2015       | 11/09/2015      | Water (Surface, Eff., Ground) |

| <u>Method</u> | <u>Method Description</u> |
|---------------|---------------------------|
| AK101         | AK101/8021 Combo.         |
| SW8021B       | AK101/8021 Combo.         |
| AK102         | DRO/RRO Low Volume Water  |
| AK103         | DRO/RRO Low Volume Water  |

Print Date: 11/17/2015 11:08:02AM



### Detectable Results Summary

Client Sample ID: **17453-007-MW-6B**

Lab Sample ID: 1156607001

**Semivolatile Organic Fuels**

**Volatile Fuels**

| <u>Parameter</u>        | <u>Result</u> | <u>Units</u> |
|-------------------------|---------------|--------------|
| Diesel Range Organics   | 5.59          | mg/L         |
| Residual Range Organics | 0.794         | mg/L         |
| Benzene                 | 39.8          | ug/L         |
| Ethylbenzene            | 102           | ug/L         |
| Gasoline Range Organics | 1.15          | mg/L         |
| o-Xylene                | 4.29          | ug/L         |
| P & M -Xylene           | 113           | ug/L         |
| Toluene                 | 0.640J        | ug/L         |

Client Sample ID: **17453-007-MW-14**

Lab Sample ID: 1156607002

**Semivolatile Organic Fuels**

**Volatile Fuels**

| <u>Parameter</u>        | <u>Result</u> | <u>Units</u> |
|-------------------------|---------------|--------------|
| Diesel Range Organics   | 1.69          | mg/L         |
| Residual Range Organics | 0.576         | mg/L         |
| Benzene                 | 3.61          | ug/L         |
| Ethylbenzene            | 55.0          | ug/L         |
| Gasoline Range Organics | 1.10          | mg/L         |
| o-Xylene                | 4.21          | ug/L         |
| P & M -Xylene           | 104           | ug/L         |
| Toluene                 | 1.35          | ug/L         |

Client Sample ID: **17453-007-MW-1**

Lab Sample ID: 1156607003

**Semivolatile Organic Fuels**

**Volatile Fuels**

| <u>Parameter</u>        | <u>Result</u> | <u>Units</u> |
|-------------------------|---------------|--------------|
| Diesel Range Organics   | 0.695         | mg/L         |
| Residual Range Organics | 0.485         | mg/L         |
| Benzene                 | 628           | ug/L         |
| Ethylbenzene            | 73.3          | ug/L         |
| Gasoline Range Organics | 3.15          | mg/L         |
| o-Xylene                | 5.97          | ug/L         |
| P & M -Xylene           | 74.1          | ug/L         |
| Toluene                 | 42.1          | ug/L         |

Client Sample ID: **17453-007-MW-2**

Lab Sample ID: 1156607004

**Semivolatile Organic Fuels**

**Volatile Fuels**

| <u>Parameter</u>        | <u>Result</u> | <u>Units</u> |
|-------------------------|---------------|--------------|
| Diesel Range Organics   | 0.531J        | mg/L         |
| Residual Range Organics | 0.319J        | mg/L         |
| Benzene                 | 766           | ug/L         |
| Ethylbenzene            | 86.0          | ug/L         |
| Gasoline Range Organics | 3.49          | mg/L         |
| o-Xylene                | 6.90          | ug/L         |
| P & M -Xylene           | 86.3          | ug/L         |
| Toluene                 | 49.2          | ug/L         |

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### Detectable Results Summary

Client Sample ID: **17453-007-MW-19R**

Lab Sample ID: 1156607005

**Semivolatile Organic Fuels**

**Volatile Fuels**

| <u>Parameter</u>        | <u>Result</u> | <u>Units</u> |
|-------------------------|---------------|--------------|
| Diesel Range Organics   | 1.36          | mg/L         |
| Residual Range Organics | 0.542         | mg/L         |
| Benzene                 | 19.1          | ug/L         |
| Ethylbenzene            | 19.3          | ug/L         |
| Gasoline Range Organics | 3.46          | mg/L         |
| o-Xylene                | 2.81          | ug/L         |
| P & M -Xylene           | 47.8          | ug/L         |
| Toluene                 | 3.76          | ug/L         |

Client Sample ID: **17453-007-MW-13A**

Lab Sample ID: 1156607006

**Semivolatile Organic Fuels**

**Volatile Fuels**

| <u>Parameter</u>        | <u>Result</u> | <u>Units</u> |
|-------------------------|---------------|--------------|
| Diesel Range Organics   | 5.76          | mg/L         |
| Residual Range Organics | 1.21          | mg/L         |
| Benzene                 | 112           | ug/L         |
| Ethylbenzene            | 361           | ug/L         |
| Gasoline Range Organics | 3.54          | mg/L         |
| o-Xylene                | 10.7          | ug/L         |
| P & M -Xylene           | 475           | ug/L         |
| Toluene                 | 13.8          | ug/L         |



Results of 17453-007-MW-6B

Client Sample ID: 17453-007-MW-6B
Client Project ID: 32-1-17453-007 Crowley GW
Lab Sample ID: 1156607001
Lab Project ID: 1156607

Collection Date: 11/06/15 12:16
Received Date: 11/09/15 10:44
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Semivolatile Organic Fuels

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

Batch Information

Analytical Batch: XFC12205
Analytical Method: AK102
Analyst: NLL
Analytical Date/Time: 11/13/15 11:34
Container ID: 1156607001-D
Prep Batch: XXX34610
Prep Method: SW3520C
Prep Date/Time: 11/11/15 09:09
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

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

Batch Information

Analytical Batch: XFC12205
Analytical Method: AK103
Analyst: NLL
Analytical Date/Time: 11/13/15 11:34
Container ID: 1156607001-D
Prep Batch: XXX34610
Prep Method: SW3520C
Prep Date/Time: 11/11/15 09:09
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL



Results of 17453-007-MW-6B

Client Sample ID: 17453-007-MW-6B
Client Project ID: 32-1-17453-007 Crowley GW
Lab Sample ID: 1156607001
Lab Project ID: 1156607

Collection Date: 11/06/15 12:16
Received Date: 11/09/15 10:44
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 1.15, 0.100, 0.0310, mg/L, 1, 11/11/15 15:02

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 304, \*, 50-150, %, 1, 11/11/15 15:02

Batch Information

Analytical Batch: VFC12817
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 11/11/15 15:02
Container ID: 1156607001-A

Prep Batch: VXX28257
Prep Method: SW5030B
Prep Date/Time: 11/11/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 97.1, 77-115, %, 1, 11/11/15 15:02

Batch Information

Analytical Batch: VFC12817
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 11/11/15 15:02
Container ID: 1156607001-A

Prep Batch: VXX28257
Prep Method: SW5030B
Prep Date/Time: 11/11/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of 17453-007-MW-14

Client Sample ID: 17453-007-MW-14
Client Project ID: 32-1-17453-007 Crowley GW
Lab Sample ID: 1156607002
Lab Project ID: 1156607

Collection Date: 11/06/15 13:22
Received Date: 11/09/15 10:44
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Semivolatile Organic Fuels

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

Batch Information

Analytical Batch: XFC12205
Analytical Method: AK102
Analyst: NLL
Analytical Date/Time: 11/13/15 11:54
Container ID: 1156607002-D
Prep Batch: XXX34610
Prep Method: SW3520C
Prep Date/Time: 11/11/15 09:09
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

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

Batch Information

Analytical Batch: XFC12205
Analytical Method: AK103
Analyst: NLL
Analytical Date/Time: 11/13/15 11:54
Container ID: 1156607002-D
Prep Batch: XXX34610
Prep Method: SW3520C
Prep Date/Time: 11/11/15 09:09
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL



Results of 17453-007-MW-14

Client Sample ID: 17453-007-MW-14
Client Project ID: 32-1-17453-007 Crowley GW
Lab Sample ID: 1156607002
Lab Project ID: 1156607

Collection Date: 11/06/15 13:22
Received Date: 11/09/15 10:44
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 1.10, 0.100, 0.0310, mg/L, 1, 11/11/15 15:21

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 176, \*, 50-150, %, 1, 11/11/15 15:21

Batch Information

Analytical Batch: VFC12817
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 11/11/15 15:21
Container ID: 1156607002-A

Prep Batch: VXX28257
Prep Method: SW5030B
Prep Date/Time: 11/11/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 93.3, 77-115, %, 1, 11/11/15 15:21

Batch Information

Analytical Batch: VFC12817
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 11/11/15 15:21
Container ID: 1156607002-A

Prep Batch: VXX28257
Prep Method: SW5030B
Prep Date/Time: 11/11/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of 17453-007-MW-1

Client Sample ID: 17453-007-MW-1
Client Project ID: 32-1-17453-007 Crowley GW
Lab Sample ID: 1156607003
Lab Project ID: 1156607

Collection Date: 11/06/15 14:28
Received Date: 11/09/15 10:44
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Semivolatile Organic Fuels

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

Batch Information

Analytical Batch: XFC12205
Analytical Method: AK102
Analyst: NLL
Analytical Date/Time: 11/13/15 12:15
Container ID: 1156607003-D
Prep Batch: XXX34610
Prep Method: SW3520C
Prep Date/Time: 11/11/15 09:09
Prep Initial Wt./Vol.: 275 mL
Prep Extract Vol: 1 mL

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

Batch Information

Analytical Batch: XFC12205
Analytical Method: AK103
Analyst: NLL
Analytical Date/Time: 11/13/15 12:15
Container ID: 1156607003-D
Prep Batch: XXX34610
Prep Method: SW3520C
Prep Date/Time: 11/11/15 09:09
Prep Initial Wt./Vol.: 275 mL
Prep Extract Vol: 1 mL





Results of 17453-007-MW-1

Client Sample ID: 17453-007-MW-1
Client Project ID: 32-1-17453-007 Crowley GW
Lab Sample ID: 1156607003
Lab Project ID: 1156607

Collection Date: 11/06/15 14:28
Received Date: 11/09/15 10:44
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 3.15, 0.100, 0.0310, mg/L, 1, 11/11/15 15:40

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 151, \*, 50-150, %, 1, 11/11/15 15:40

Batch Information

Analytical Batch: VFC12817
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 11/11/15 15:40
Container ID: 1156607003-A

Prep Batch: VXX28257
Prep Method: SW5030B
Prep Date/Time: 11/11/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 96.9, 77-115, %, 1, 11/11/15 15:40

Batch Information

Analytical Batch: VFC12817
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 11/11/15 15:40
Container ID: 1156607003-A

Prep Batch: VXX28257
Prep Method: SW5030B
Prep Date/Time: 11/11/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VFC12820
Analytical Method: SW8021B
Analyst: KAS
Analytical Date/Time: 11/12/15 12:48
Container ID: 1156607003-B

Prep Batch: VXX28263
Prep Method: SW5030B
Prep Date/Time: 11/12/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of 17453-007-MW-2

Client Sample ID: 17453-007-MW-2
Client Project ID: 32-1-17453-007 Crowley GW
Lab Sample ID: 1156607004
Lab Project ID: 1156607

Collection Date: 11/06/15 14:48
Received Date: 11/09/15 10:44
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Semivolatile Organic Fuels

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

Batch Information

Analytical Batch: XFC12205
Analytical Method: AK102
Analyst: NLL
Analytical Date/Time: 11/13/15 12:35
Container ID: 1156607004-D
Prep Batch: XXX34610
Prep Method: SW3520C
Prep Date/Time: 11/11/15 09:09
Prep Initial Wt./Vol.: 275 mL
Prep Extract Vol: 1 mL

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

Batch Information

Analytical Batch: XFC12205
Analytical Method: AK103
Analyst: NLL
Analytical Date/Time: 11/13/15 12:35
Container ID: 1156607004-D
Prep Batch: XXX34610
Prep Method: SW3520C
Prep Date/Time: 11/11/15 09:09
Prep Initial Wt./Vol.: 275 mL
Prep Extract Vol: 1 mL



Results of 17453-007-MW-2

Client Sample ID: 17453-007-MW-2
Client Project ID: 32-1-17453-007 Crowley GW
Lab Sample ID: 1156607004
Lab Project ID: 1156607

Collection Date: 11/06/15 14:48
Received Date: 11/09/15 10:44
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 3.49, 0.100, 0.0310, mg/L, 1, 11/11/15 15:59

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 155, \*, 50-150, %, 1, 11/11/15 15:59

Batch Information

Analytical Batch: VFC12817
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 11/11/15 15:59
Container ID: 1156607004-A

Prep Batch: VXX28257
Prep Method: SW5030B
Prep Date/Time: 11/11/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 97.6, 77-115, %, 1, 11/11/15 15:59

Batch Information

Analytical Batch: VFC12817
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 11/11/15 15:59
Container ID: 1156607004-A

Prep Batch: VXX28257
Prep Method: SW5030B
Prep Date/Time: 11/11/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VFC12820
Analytical Method: SW8021B
Analyst: KAS
Analytical Date/Time: 11/12/15 13:07
Container ID: 1156607004-B

Prep Batch: VXX28263
Prep Method: SW5030B
Prep Date/Time: 11/12/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of 17453-007-MW-19R

Client Sample ID: 17453-007-MW-19R
Client Project ID: 32-1-17453-007 Crowley GW
Lab Sample ID: 1156607005
Lab Project ID: 1156607

Collection Date: 11/06/15 15:57
Received Date: 11/09/15 10:44
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Semivolatile Organic Fuels

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

Batch Information

Analytical Batch: XFC12205
Analytical Method: AK102
Analyst: NLL
Analytical Date/Time: 11/13/15 12:56
Container ID: 1156607005-D
Prep Batch: XXX34610
Prep Method: SW3520C
Prep Date/Time: 11/11/15 09:09
Prep Initial Wt./Vol.: 275 mL
Prep Extract Vol: 1 mL

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

Batch Information

Analytical Batch: XFC12205
Analytical Method: AK103
Analyst: NLL
Analytical Date/Time: 11/13/15 12:56
Container ID: 1156607005-D
Prep Batch: XXX34610
Prep Method: SW3520C
Prep Date/Time: 11/11/15 09:09
Prep Initial Wt./Vol.: 275 mL
Prep Extract Vol: 1 mL



Results of 17453-007-MW-19R

Client Sample ID: 17453-007-MW-19R
Client Project ID: 32-1-17453-007 Crowley GW
Lab Sample ID: 1156607005
Lab Project ID: 1156607

Collection Date: 11/06/15 15:57
Received Date: 11/09/15 10:44
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 3.46, 1.00, 0.310, mg/L, 10, 11/12/15 14:23

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 425, \*, 50-150, %, 1, 11/11/15 16:18

Batch Information

Analytical Batch: VFC12817
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 11/11/15 16:18
Container ID: 1156607005-A

Prep Batch: VXX28257
Prep Method: SW5030B
Prep Date/Time: 11/11/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VFC12820
Analytical Method: AK101
Analyst: KAS
Analytical Date/Time: 11/12/15 14:23
Container ID: 1156607005-B

Prep Batch: VXX28263
Prep Method: SW5030B
Prep Date/Time: 11/12/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 84.6, 77-115, %, 1, 11/11/15 16:18

Batch Information

Analytical Batch: VFC12817
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 11/11/15 16:18
Container ID: 1156607005-A

Prep Batch: VXX28257
Prep Method: SW5030B
Prep Date/Time: 11/11/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VFC12820
Analytical Method: SW8021B
Analyst: KAS
Analytical Date/Time: 11/12/15 14:23
Container ID: 1156607005-B

Prep Batch: VXX28263
Prep Method: SW5030B
Prep Date/Time: 11/12/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of 17453-007-MW-13A

Client Sample ID: 17453-007-MW-13A
Client Project ID: 32-1-17453-007 Crowley GW
Lab Sample ID: 1156607006
Lab Project ID: 1156607

Collection Date: 11/06/15 16:48
Received Date: 11/09/15 10:44
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Semivolatile Organic Fuels

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

Batch Information

Analytical Batch: XFC12205
Analytical Method: AK102
Analyst: NLL
Analytical Date/Time: 11/13/15 13:16
Container ID: 1156607006-D
Prep Batch: XXX34610
Prep Method: SW3520C
Prep Date/Time: 11/11/15 09:09
Prep Initial Wt./Vol.: 275 mL
Prep Extract Vol: 1 mL

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

Batch Information

Analytical Batch: XFC12205
Analytical Method: AK103
Analyst: NLL
Analytical Date/Time: 11/13/15 13:16
Container ID: 1156607006-D
Prep Batch: XXX34610
Prep Method: SW3520C
Prep Date/Time: 11/11/15 09:09
Prep Initial Wt./Vol.: 275 mL
Prep Extract Vol: 1 mL

## Results of 17453-007-MW-13A

Client Sample ID: **17453-007-MW-13A**  
 Client Project ID: **32-1-17453-007 Crowley GW**  
 Lab Sample ID: 1156607006  
 Lab Project ID: 1156607

Collection Date: 11/06/15 16:48  
 Received Date: 11/09/15 10:44  
 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 | 3.54               | 0.100         | 0.0310    | mg/L         | 1         |                         | 11/11/15 16:37       |

### Surrogates

|                             |       |        |  |   |   |  |                |
|-----------------------------|-------|--------|--|---|---|--|----------------|
| 4-Bromofluorobenzene (surr) | 154 * | 50-150 |  | % | 1 |  | 11/11/15 16:37 |
|-----------------------------|-------|--------|--|---|---|--|----------------|

## Batch Information

Analytical Batch: VFC12817  
 Analytical Method: AK101  
 Analyst: CRD  
 Analytical Date/Time: 11/11/15 16:37  
 Container ID: 1156607006-A

Prep Batch: VXX28257  
 Prep Method: SW5030B  
 Prep Date/Time: 11/11/15 08:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

| <u>Parameter</u> | <u>Result Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable Limits</u> | <u>Date Analyzed</u> |
|------------------|--------------------|---------------|-----------|--------------|-----------|-------------------------|----------------------|
| Benzene          | 112                | 0.500         | 0.150     | ug/L         | 1         |                         | 11/11/15 16:37       |
| Ethylbenzene     | 361                | 10.0          | 3.10      | ug/L         | 10        |                         | 11/12/15 13:26       |
| o-Xylene         | 10.7               | 1.00          | 0.310     | ug/L         | 1         |                         | 11/11/15 16:37       |
| P & M -Xylene    | 475                | 2.00          | 0.620     | ug/L         | 1         |                         | 11/11/15 16:37       |
| Toluene          | 13.8               | 1.00          | 0.310     | ug/L         | 1         |                         | 11/11/15 16:37       |

### Surrogates

|                            |      |        |  |   |   |  |                |
|----------------------------|------|--------|--|---|---|--|----------------|
| 1,4-Difluorobenzene (surr) | 88.3 | 77-115 |  | % | 1 |  | 11/11/15 16:37 |
|----------------------------|------|--------|--|---|---|--|----------------|

## Batch Information

Analytical Batch: VFC12817  
 Analytical Method: SW8021B  
 Analyst: CRD  
 Analytical Date/Time: 11/11/15 16:37  
 Container ID: 1156607006-A

Prep Batch: VXX28257  
 Prep Method: SW5030B  
 Prep Date/Time: 11/11/15 08:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Analytical Batch: VFC12820  
 Analytical Method: SW8021B  
 Analyst: KAS  
 Analytical Date/Time: 11/12/15 13:26  
 Container ID: 1156607006-B

Prep Batch: VXX28263  
 Prep Method: SW5030B  
 Prep Date/Time: 11/12/15 08:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL



Results of 17453-007-WTB

Client Sample ID: 17453-007-WTB
Client Project ID: 32-1-17453-007 Crowley GW
Lab Sample ID: 1156607007
Lab Project ID: 1156607

Collection Date: 11/06/15 12:00
Received Date: 11/09/15 10:44
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 0.0500 U, 0.100, 0.0310, mg/L, 1, 11/11/15 11:34

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 95.8, 50-150, %, 1, 11/11/15 11:34

Batch Information

Analytical Batch: VFC12817
Analytical Method: AK101
Analyst: CRD
Analytical Date/Time: 11/11/15 11:34
Container ID: 1156607007-A

Prep Batch: VXX28257
Prep Method: SW5030B
Prep Date/Time: 11/11/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 90.8, 77-115, %, 1, 11/11/15 11:34

Batch Information

Analytical Batch: VFC12817
Analytical Method: SW8021B
Analyst: CRD
Analytical Date/Time: 11/11/15 11:34
Container ID: 1156607007-A

Prep Batch: VXX28257
Prep Method: SW5030B
Prep Date/Time: 11/11/15 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



## Method Blank

Blank ID: MB for HBN 1725049 [VXX/28257]  
 Blank Lab ID: 1303850

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1156607001, 1156607002, 1156607003, 1156607004, 1156607005, 1156607006, 1156607007

## 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) | 97             | 50-150        |           | %            |

## Batch Information

Analytical Batch: VFC12817  
 Analytical Method: AK101  
 Instrument: Agilent 7890A PID/FID  
 Analyst: CRD  
 Analytical Date/Time: 11/11/2015 10:00:00AM

Prep Batch: VXX28257  
 Prep Method: SW5030B  
 Prep Date/Time: 11/11/2015 8:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 11/17/2015 11:08:06AM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1156607 [VXX28257]  
 Blank Spike Lab ID: 1303853  
 Date Analyzed: 11/11/2015 10:56

Spike Duplicate ID: LCSD for HBN 1156607 [VXX28257]  
 Spike Duplicate Lab ID: 1303854  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1156607001, 1156607002, 1156607003, 1156607004, 1156607005, 1156607006, 1156607007

## 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               | 1.07   | 107     | 1.00                   | 1.10   | 110     | ( 60-120 ) | 2.20    | (< 20 ) |

### Surrogates

|                             |        |     |     |        |     |     |            |      |  |
|-----------------------------|--------|-----|-----|--------|-----|-----|------------|------|--|
| 4-Bromofluorobenzene (surr) | 0.0500 | 102 | 102 | 0.0500 | 106 | 106 | ( 50-150 ) | 3.50 |  |
|-----------------------------|--------|-----|-----|--------|-----|-----|------------|------|--|

## Batch Information

Analytical Batch: **VFC12817**  
 Analytical Method: **AK101**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **CRD**

Prep Batch: **VXX28257**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **11/11/2015 08:00**  
 Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL  
 Dupe Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

Print Date: 11/17/2015 11:08:07AM

## Method Blank

Blank ID: MB for HBN 1725049 [VXX/28257]  
 Blank Lab ID: 1303850

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1156607001, 1156607002, 1156607003, 1156607004, 1156607005, 1156607006, 1156607007

## Results by SW8021B

| <u>Parameter</u>           | <u>Results</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> |
|----------------------------|----------------|---------------|-----------|--------------|
| Benzene                    | 0.250U         | 0.500         | 0.150     | ug/L         |
| Ethylbenzene               | 0.500U         | 1.00          | 0.310     | ug/L         |
| o-Xylene                   | 0.500U         | 1.00          | 0.310     | ug/L         |
| P & M -Xylene              | 1.00U          | 2.00          | 0.620     | ug/L         |
| Toluene                    | 0.500U         | 1.00          | 0.310     | ug/L         |
| <b>Surrogates</b>          |                |               |           |              |
| 1,4-Difluorobenzene (surr) | 92             | 77-115        |           | %            |

## Batch Information

Analytical Batch: VFC12817  
 Analytical Method: SW8021B  
 Instrument: Agilent 7890A PID/FID  
 Analyst: CRD  
 Analytical Date/Time: 11/11/2015 10:00:00AM

Prep Batch: VXX28257  
 Prep Method: SW5030B  
 Prep Date/Time: 11/11/2015 8:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 11/17/2015 11:08:08AM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1156607 [VXX28257]  
 Blank Spike Lab ID: 1303851  
 Date Analyzed: 11/11/2015 10:38

Spike Duplicate ID: LCSD for HBN 1156607 [VXX28257]  
 Spike Duplicate Lab ID: 1303852  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1156607001, 1156607002, 1156607003, 1156607004, 1156607005, 1156607006, 1156607007

## Results by SW8021B

| Parameter                  | Blank Spike (ug/L) |        |         | Spike Duplicate (ug/L) |        |         | CL         | RPD (%) | RPD CL  |
|----------------------------|--------------------|--------|---------|------------------------|--------|---------|------------|---------|---------|
|                            | Spike              | Result | Rec (%) | Spike                  | Result | Rec (%) |            |         |         |
| Benzene                    | 100                | 100    | 100     | 100                    | 97.2   | 97      | ( 80-120 ) | 2.90    | (< 20 ) |
| Ethylbenzene               | 100                | 107    | 107     | 100                    | 105    | 105     | ( 75-125 ) | 1.60    | (< 20 ) |
| o-Xylene                   | 100                | 106    | 106     | 100                    | 104    | 104     | ( 80-120 ) | 1.90    | (< 20 ) |
| P & M -Xylene              | 200                | 214    | 107     | 200                    | 211    | 105     | ( 75-130 ) | 1.60    | (< 20 ) |
| Toluene                    | 100                | 103    | 103     | 100                    | 100    | 100     | ( 75-120 ) | 2.90    | (< 20 ) |
| <b>Surrogates</b>          |                    |        |         |                        |        |         |            |         |         |
| 1,4-Difluorobenzene (surr) | 50                 | 94.7   | 95      | 50                     | 93.8   | 94      | ( 77-115 ) | 0.87    |         |

## Batch Information

Analytical Batch: **VFC12817**  
 Analytical Method: **SW8021B**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **CRD**

Prep Batch: **VXX28257**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **11/11/2015 08:00**  
 Spike Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL  
 Dupe Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL

## Method Blank

Blank ID: MB for HBN 1725096 [VXX/28263]  
 Blank Lab ID: 1304073

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1156607003, 1156607004, 1156607005, 1156607006

## Results by AK101

| <u>Parameter</u>            | <u>Results</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> |
|-----------------------------|----------------|---------------|-----------|--------------|
| Gasoline Range Organics     | 0.0386J        | 0.100         | 0.0310    | mg/L         |
| <b>Surrogates</b>           |                |               |           |              |
| 4-Bromofluorobenzene (surr) | 70             | 50-150        |           | %            |

## Batch Information

Analytical Batch: VFC12820  
 Analytical Method: AK101  
 Instrument: Agilent 7890A PID/FID  
 Analyst: KAS  
 Analytical Date/Time: 11/12/2015 9:02:00AM

Prep Batch: VXX28263  
 Prep Method: SW5030B  
 Prep Date/Time: 11/12/2015 8:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 11/17/2015 11:08:11AM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1156607 [VXX28263]  
 Blank Spike Lab ID: 1304076  
 Date Analyzed: 11/12/2015 09:59

Spike Duplicate ID: LCSD for HBN 1156607 [VXX28263]  
 Spike Duplicate Lab ID: 1304077  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1156607003, 1156607004, 1156607005, 1156607006

## 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               | 1.14   | 114     | 1.00                   | 1.11   | 111     | ( 60-120 ) | 2.40    | (< 20 ) |

### Surrogates

|                             |        |     |     |        |     |     |            |      |  |
|-----------------------------|--------|-----|-----|--------|-----|-----|------------|------|--|
| 4-Bromofluorobenzene (surr) | 0.0500 | 105 | 105 | 0.0500 | 106 | 106 | ( 50-150 ) | 0.85 |  |
|-----------------------------|--------|-----|-----|--------|-----|-----|------------|------|--|

## Batch Information

Analytical Batch: **VFC12820**  
 Analytical Method: **AK101**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **KAS**

Prep Batch: **VXX28263**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **11/12/2015 08:00**  
 Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL  
 Dupe Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

## Method Blank

Blank ID: MB for HBN 1725096 [VXX/28263]  
 Blank Lab ID: 1304073

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1156607003, 1156607004, 1156607005, 1156607006

## Results by SW8021B

| <u>Parameter</u>           | <u>Results</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> |
|----------------------------|----------------|---------------|-----------|--------------|
| Benzene                    | 0.250U         | 0.500         | 0.150     | ug/L         |
| Ethylbenzene               | 0.500U         | 1.00          | 0.310     | ug/L         |
| <b>Surrogates</b>          |                |               |           |              |
| 1,4-Difluorobenzene (surr) | 91.4           | 77-115        |           | %            |

## Batch Information

Analytical Batch: VFC12820  
 Analytical Method: SW8021B  
 Instrument: Agilent 7890A PID/FID  
 Analyst: KAS  
 Analytical Date/Time: 11/12/2015 9:02:00AM

Prep Batch: VXX28263  
 Prep Method: SW5030B  
 Prep Date/Time: 11/12/2015 8:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 11/17/2015 11:08:14AM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1156607 [VXX28263]  
 Blank Spike Lab ID: 1304074  
 Date Analyzed: 11/12/2015 09:40

Spike Duplicate ID: LCSD for HBN 1156607 [VXX28263]  
 Spike Duplicate Lab ID: 1304075  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1156607003, 1156607004, 1156607005, 1156607006

## Results by SW8021B

| Parameter                  | Blank Spike (ug/L) |        |         | Spike Duplicate (ug/L) |        |         | CL         | RPD (%) | RPD CL  |
|----------------------------|--------------------|--------|---------|------------------------|--------|---------|------------|---------|---------|
|                            | Spike              | Result | Rec (%) | Spike                  | Result | Rec (%) |            |         |         |
| Benzene                    | 100                | 104    | 104     | 100                    | 108    | 108     | ( 80-120 ) | 4.50    | (< 20 ) |
| Ethylbenzene               | 100                | 107    | 107     | 100                    | 110    | 110     | ( 75-125 ) | 2.30    | (< 20 ) |
| <b>Surrogates</b>          |                    |        |         |                        |        |         |            |         |         |
| 1,4-Difluorobenzene (surr) | 50                 | 93.2   | 93      | 50                     | 96.6   | 97      | ( 77-115 ) | 3.60    |         |

## Batch Information

Analytical Batch: **VFC12820**  
 Analytical Method: **SW8021B**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **KAS**

Prep Batch: **VXX28263**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **11/12/2015 08:00**  
 Spike Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL  
 Dupe Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL



## Method Blank

Blank ID: MB for HBN 1725004 [XXX/34610]  
 Blank Lab ID: 1303630

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1156607001, 1156607002, 1156607003, 1156607004, 1156607005, 1156607006

## Results by AK102

| <u>Parameter</u>      | <u>Results</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> |
|-----------------------|----------------|---------------|-----------|--------------|
| Diesel Range Organics | 0.300U         | 0.600         | 0.180     | mg/L         |
| <b>Surrogates</b>     |                |               |           |              |
| 5a Androstane (surr)  | 86.5           | 60-120        |           | %            |

## Batch Information

Analytical Batch: XFC12205  
 Analytical Method: AK102  
 Instrument: HP 7890A FID SV E F  
 Analyst: NLL  
 Analytical Date/Time: 11/13/2015 7:27:00AM

Prep Batch: XXX34610  
 Prep Method: SW3520C  
 Prep Date/Time: 11/11/2015 9:09:34AM  
 Prep Initial Wt./Vol.: 250 mL  
 Prep Extract Vol: 1 mL

Print Date: 11/17/2015 11:08:16AM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1156607 [XXX34610]  
 Blank Spike Lab ID: 1303631  
 Date Analyzed: 11/13/2015 07:47

Spike Duplicate ID: LCSD for HBN 1156607  
 [XXX34610]  
 Spike Duplicate Lab ID: 1303632  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1156607001, 1156607002, 1156607003, 1156607004, 1156607005, 1156607006

## Results by AK102

| Parameter             | Blank Spike (mg/L) |        |         | Spike Duplicate (mg/L) |        |         | CL         | RPD (%) | RPD CL  |
|-----------------------|--------------------|--------|---------|------------------------|--------|---------|------------|---------|---------|
|                       | Spike              | Result | Rec (%) | Spike                  | Result | Rec (%) |            |         |         |
| Diesel Range Organics | 20                 | 18.0   | 90      | 20                     | 18.8   | 94      | ( 75-125 ) | 4.20    | (< 20 ) |

### Surrogates

|                      |     |     |     |     |     |     |            |      |  |
|----------------------|-----|-----|-----|-----|-----|-----|------------|------|--|
| 5a Androstane (surr) | 0.4 | 102 | 102 | 0.4 | 106 | 106 | ( 60-120 ) | 3.90 |  |
|----------------------|-----|-----|-----|-----|-----|-----|------------|------|--|

## Batch Information

Analytical Batch: **XFC12205**  
 Analytical Method: **AK102**  
 Instrument: **HP 7890A FID SV E F**  
 Analyst: **NLL**

Prep Batch: **XXX34610**  
 Prep Method: **SW3520C**  
 Prep Date/Time: **11/11/2015 09:09**  
 Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL  
 Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

Print Date: 11/17/2015 11:08:17AM

## Method Blank

Blank ID: MB for HBN 1725004 [XXX/34610]  
 Blank Lab ID: 1303630

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1156607001, 1156607002, 1156607003, 1156607004, 1156607005, 1156607006

## Results by AK103

| <u>Parameter</u>         | <u>Results</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> |
|--------------------------|----------------|---------------|-----------|--------------|
| Residual Range Organics  | 0.250U         | 0.500         | 0.150     | mg/L         |
| <b>Surrogates</b>        |                |               |           |              |
| n-Triacontane-d62 (surr) | 94.9           | 60-120        |           | %            |

## Batch Information

Analytical Batch: XFC12205  
 Analytical Method: AK103  
 Instrument: HP 7890A FID SV E F  
 Analyst: NLL  
 Analytical Date/Time: 11/13/2015 7:27:00AM

Prep Batch: XXX34610  
 Prep Method: SW3520C  
 Prep Date/Time: 11/11/2015 9:09:34AM  
 Prep Initial Wt./Vol.: 250 mL  
 Prep Extract Vol: 1 mL

Print Date: 11/17/2015 11:08:19AM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1156607 [XXX34610]  
 Blank Spike Lab ID: 1303631  
 Date Analyzed: 11/13/2015 07:47

Spike Duplicate ID: LCSD for HBN 1156607  
 [XXX34610]  
 Spike Duplicate Lab ID: 1303632  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1156607001, 1156607002, 1156607003, 1156607004, 1156607005, 1156607006

## Results by AK103

| Parameter                | Blank Spike (mg/L) |        |         | Spike Duplicate (mg/L) |        |         | CL         | RPD (%) | RPD CL  |
|--------------------------|--------------------|--------|---------|------------------------|--------|---------|------------|---------|---------|
|                          | Spike              | Result | Rec (%) | Spike                  | Result | Rec (%) |            |         |         |
| Residual Range Organics  | 20                 | 19.2   | 96      | 20                     | 19.2   | 96      | ( 60-120 ) | 0.03    | (< 20 ) |
| <b>Surrogates</b>        |                    |        |         |                        |        |         |            |         |         |
| n-Triacontane-d62 (surr) | 0.4                | 93.2   | 93      | 0.4                    | 97.7   | 98      | ( 60-120 ) | 4.80    |         |

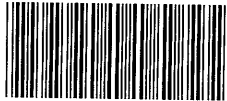
## Batch Information

Analytical Batch: **XFC12205**  
 Analytical Method: **AK103**  
 Instrument: **HP 7890A FID SV E F**  
 Analyst: **NLL**

Prep Batch: **XXX34610**  
 Prep Method: **SW3520C**  
 Prep Date/Time: **11/11/2015 09:09**  
 Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL  
 Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

Print Date: 11/17/2015 11:08:20AM

# 1156607



## SHANNON & WILSON, INC.

Geotechnical and Environmental Consultants

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# CHAIN-OF-CUSTODY RECORD

Laboratory SGS Page 1 of 1  
Attn: Tori

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

| Sample Identity | Lab No. | Time | Date Sampled | Comp. Grab | GRO (AK 101) | BTEX (EPA 8016) | DRO (AK 102) | PRO (AK 103) | Total Number of Containers | Remarks/Matrix |
|-----------------|---------|------|--------------|------------|--------------|-----------------|--------------|--------------|----------------------------|----------------|
| 1753-007-MW-6B  | ① A-E   | 1216 | 11-6-15      | X          | X            | X               |              |              | 5                          | Groundwater    |
| 1753-007-MW-14  | ② A-E   | 1322 | }            | X          | }            | }               | }            | }            | }                          |                |
| 1753-007-MW-1   | ③ A-E   | 1428 |              | X          |              |                 |              |              |                            |                |
| 1753-007-MW-2   | ④ A-E   | 1448 |              | X          |              |                 |              |              |                            |                |
| 1753-007-MW-19R | ⑤ A-E   | 1557 |              | X          |              |                 |              |              |                            |                |
| 1753-007-MW-13A | ⑥ A-E   | 1648 |              | X          |              |                 |              |              |                            |                |
| WTB             | ⑦ A-C   | 1200 |              |            |              |                 |              | 1            | Water Trip Blank           |                |

| Project Information  |   | Sample Receipt           |                  |
|--|---|--------------------------|------------------|
| Project Number: <u>321-17453-007</u>   | Total Number of Containers: _____                             | COC Seals/Intact? Y/N/NA | Delivery Method: |
| Project Name: <u>Crowley GW</u>  | Received Good Cond./Cold                                      |                          |                  |
| Contact: <u>Matt Henry</u>   | Sampler: <u>Admon Abuamsha</u> (attach shipping bill, if any) |                          |                  |
| Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |   |                          |                  |

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

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

| Relinquished By: 1  | Relinquished By: 2   | Relinquished By: 3  |
|---|--|---|
| Signature: <u>Admon Abuamsha</u><br>Printed Name: <u>Admon Abuamsha</u><br>Date: <u>11/9/15</u><br>Company: <u>Shannon &amp; Wilson</u> | Signature: _____<br>Printed Name: _____<br>Date: _____<br>Company: _____ | Signature: _____<br>Printed Name: _____<br>Date: _____<br>Company: _____  |
| Received By: 1  | Received By: 2   | Received By: 3  |
| Signature: _____<br>Printed Name: _____<br>Date: _____<br>Company: _____  | Signature: _____<br>Printed Name: _____<br>Date: _____<br>Company: _____ | Signature: <u>D. Chera</u><br>Printed Name: <u>D. Chera</u><br>Date: <u>11/9/15</u><br>Company: <u>SGS Anch</u> |



1156607



1 1 5 6 6 0 7

SAMPLE RECEIPT FORM

| Review Criteria:   | Yes                                 | N/A                                 | No                                  | Comments/Action Taken:  |
|--|-------------------------------------|-------------------------------------|-------------------------------------|---|
| Were <b>custody seals</b> intact? Note # & location, if applicable.<br>COC accompanied samples?  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <i>Exemption permitted if sampler hand carries/delivers.</i>  |
| <b>Temperature blank</b> compliant* (i.e., 0-6°C after CF)?<br><i>If &gt;6°C, were samples collected &lt;8 hours ago?</i><br><i>If &lt;0°C, were all sample containers ice free?</i><br>Cooler ID: <u>1</u> @ <u>1.7</u> w/ Therm.ID: <u>D2</u><br>Cooler ID: _____ @ _____ w/ Therm.ID: _____<br>Cooler ID: _____ @ _____ w/ Therm.ID: _____<br>Cooler ID: _____ @ _____ w/ Therm.ID: _____<br>Cooler ID: _____ @ _____ w/ Therm.ID: _____<br>If samples are received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank <u>nor</u> cooler temp can be obtained, note "ambient" or "chilled." | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <i>Exemption permitted if chilled &amp; collected &lt;8 hrs ago.</i><br><br><i>Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.</i> |
| Delivery method (specify all that apply): <input checked="" type="checkbox"/> Client (hand carried)<br><input type="checkbox"/> USPS <input type="checkbox"/> Lynden <input type="checkbox"/> AK Air <input type="checkbox"/> Alert Courier<br><input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> RAVN <input type="checkbox"/> C&D Delivery<br><input type="checkbox"/> Carfile <input type="checkbox"/> Pen Air <input type="checkbox"/> Warp Speed <input type="checkbox"/> Other: _____<br>→ For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |   |
|  | Yes                                 | N/A                                 | No                                  |   |
| Were samples received within hold time?<br>Do samples <b>match COC*</b> (i.e., sample IDs, dates/times collected)?<br>Were analyses requested unambiguous?   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <i>Note: Refer to form F-083 "Sample Guide" for hold times.</i><br><i>Note: If times differ &lt;1hr, record details and login per COC.</i>  |
| Were samples in <b>good condition</b> (no leaks/cracks/breakage)?<br>Packing material used (specify all that apply): <input checked="" type="checkbox"/> Bubble Wrap<br><input type="checkbox"/> Separate plastic bags <input type="checkbox"/> Vermiculite <input type="checkbox"/> Other:  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |   |
| Were <b>proper containers</b> (type/mass/volume/preservative*) used?<br>Were <b>Trip Blanks</b> (i.e., VOAs, LL-Hg) in cooler with samples?<br>Were all VOA vials <b>free of headspace</b> (i.e., bubbles ≤6 mm)?<br>Were all soil VOAs <b>field extracted</b> with MeOH+BFB?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> <i>Exemption permitted for metals (e.g., 200.8/6020A).</i>   |
| For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was <b>pH verified and compliant</b> ?<br>If pH was adjusted, were bottles flagged (i.e., stickers)?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Samples 3 and 4 for the DRO/RRO analysis were preserved at the lab with 2mL each of HCl. Lot #: LW09-0463-12-08</b>  |
| For <b>special handling</b> (e.g., "MI" soils, foreign soils, lab filter for dissolved..., lab extract for volatiles, Ref Lab, limited volume), were bottles/paperwork flagged (e.g., sticker)?  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |   |
| For <b>RUSH/SHORT Hold Time</b> , were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |   |
| For <b>SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP</b> , were containers / paperwork flagged accordingly?   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |   |
| <b>For any question answered "No,"</b> has the PM been notified and the problem resolved (or paperwork put in their bin)?  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | SRF Completed by: D.C 11/09/2015<br>PM notified:  |
| Was <b>PEER REVIEW</b> of <i>sample numbering/labeling completed</i> ?   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | Peer Reviewed by: EDJ   |
| Additional notes (if applicable):<br><br><b>Sample IDs should be "17453-..." per A Abuamsha 11/9/15 VLP</b>  |                                     |                                     |                                     |   |
| <i>Note to Client: Any "no" answer above indicates non-compliance with standard procedures and may impact data quality.</i>  |                                     |                                     |                                     |   |



## 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> |
|---------------------|---------------------|----------------------------|---------------------|---------------------|----------------------------|
| 1156607001-A        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607001-B        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607001-C        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607001-D        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607001-E        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607002-A        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607002-B        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607002-C        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607002-D        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607002-E        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607003-A        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607003-B        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607003-C        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607003-D        | HCL to pH < 2       | PA                         |                     |                     |                            |
| 1156607003-E        | HCL to pH < 2       | PA                         |                     |                     |                            |
| 1156607004-A        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607004-B        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607004-C        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607004-D        | HCL to pH < 2       | PA                         |                     |                     |                            |
| 1156607004-E        | HCL to pH < 2       | PA                         |                     |                     |                            |
| 1156607005-A        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607005-B        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607005-C        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607005-D        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607005-E        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607006-A        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607006-B        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607006-C        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607006-D        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607006-E        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607007-A        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607007-B        | HCL to pH < 2       | OK                         |                     |                     |                            |
| 1156607007-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.

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

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

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

## LABORATORY DATA REVIEW CHECKLIST

**CS Report Name:** November 2015 Groundwater Monitoring, 459 West Bluff Drive, Anchorage, Alaska

**Date:** January 2016

**Laboratory Report Date:** November 17, 2015

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

**Completed by:** Admon Abuamsha

**Title:** Environmental Scientist

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

**Work Order Number:** 1156607

**ADEC File Number:** 2100.38.321

**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
- 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? **NA** / Yes / No

### 2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)? **Yes** / No
- b. Correct analyses requested? **Yes** / No

### 3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ( $4^{\circ} \pm 2^{\circ} \text{C}$ )? **Yes** / **No**  
Comments: *Temperature 1.7° C*
- b. Sample preservation acceptable - acidified waters, Methanol-preserved VOC soil (GRO, BTEX, VOCs, etc.)? NA **Yes** / No



- c. Sample condition documented - broken, leaking (soil MeOH), zero headspace (VOC vials)? **Yes** / No

Comments:

- d. If there were any discrepancies, were they documented (e.g., incorrect sample containers/preservation, sample temperatures outside range, insufficient sample size, missing samples)? NA **Yes** / No

Comments: *The preservation for DRO samples 17453-007-MW-1 and 17453-007-MW-2 was not compliant and was preserved at the lab with 2 mL each of HCL.*

*The laboratory considers a temperature of 0 to 6° C as being compliant. Therefore, the laboratory does not consider the 1.7° C temperature blank reading as being a discrepancy.*

- e. Data quality or usability affected? Explain.

Comments: *Samples 17453-007-MW-1 and 17453-007-MW-2 were extracted within 5 days of sample collection and did not contain large concentrations of microbes; therefore we do not consider the data quality or usability affected.*

*Because the sample temperature for the cooler was below 2° C but above freezing, we do not consider the data quality or usability affected by the cool temperature.*

#### 4. Case Narrative

- a. Present and understandable? **Yes** / No

- b. Discrepancies, errors or QC failures noted by the lab? *None Noted* / **Yes**

Comments: *For Method AK 101, surrogate recovery of 4-bromofluorobenzene does not meet QC criteria (biased high) for samples 17453-007-MW-1, 17453-007-MW-2, 17453-007-MW-6B, 17453-007-MW-13A, 17453-007-MW-14, and 17453-007-MW-19R due to matrix interference.*

- c. Were corrective actions documented? *None Noted* / Yes

Comments: *Corrective actions were not noted.*

- d. What is the effect on data quality/usability, according to the case narrative? NA / **No** / Yes

Comments: *The case narrative does not discuss data quality/usability.*

#### 5. Sample Results

- a. Correct analyses performed/reported as requested on COC? **Yes** / No

Comments:

- b. All applicable holding times met? **Yes** / No

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

## 6. QC Samples

### a. Method Blank

- i. One method blank reported per matrix, analysis, and 20 samples? **Yes** / No
- ii. All method blank results less than LOQ? **Yes** / No
- iii. If above LOQ, what samples are affected? **NA**
- iv. Do the affected sample(s) have data flags? **NA** / Yes / No  
If so, are the data flags clearly defined? **NA** / Yes / No  
Comments:
- v. Data quality or usability affected? Explain. *N/A; Data quality not affected.*

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

- i. Organics - One LCS/LCSD reported per matrix, analysis, and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846) *NA* / **Yes** / No
- ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples? **NA** / Yes / No
- 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  
Comments:
- iv. Precision – All relative percent differences (RPDs) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages) **Yes** / No  
Comments:
- v. If %R or RPD is outside of acceptable limits, what samples are affected?  
Comments: *None of the project samples were affected.*

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

vii. Data quality or usability affected? Explain.  
Comments: *N/A; data quality not affected.*

**c. Surrogates - Organics Only**

- i. Are surrogate recoveries reported for organic analyses, field, QC, and laboratory samples? **NA** / **Yes** / No
- 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) **NA** / Yes / **No**  
Comments: *For Method AK 101, surrogate recovery of 4-bromofluorobenzene was biased high for samples 17453-007-MW-1, 17453-007-MW-2, 17453-007-MW-6B, 17453-007-MW-13A, 17453-007-MW-14, and 17453-007-MW-19R due to matrix interference.*

- iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined? **NA** / **Yes** / No  
Comments: *GRO results for samples 17453-007-MW-1, 17453-007-MW-2, 17453-007-MW-6B, 17453-007-MW-13A, 17453-007-MW-14, and 17453-007-MW-19R are flagged “J+” to indicate potential high bias.*

iv. Data quality or usability affected? Explain.  
Comments: *The flagged data are considered estimates biased high, as indicated by the “J+” flag.*

**d. Trip Blank - Volatile analyses only (GRO, BTEX, VOCs, etc.) [soil and water]**

- i. One trip blank reported per matrix, analysis and cooler? **NA** / **Yes** / No  
Comments:
- ii. Is the cooler used to transport the trip blank and volatile samples clearly indicated on the COC? **NA** / **Yes** / No (if no explain):  
Comments:
- iii. All results less than LOQ? **NA** / **Yes** / No
- iv. If above LOQ, what samples are affected?  
Comments: *No samples above LOQ*
- v. Data quality or usability affected? Explain. **NA**

**e. Field Duplicate**

i. One field duplicate submitted per matrix, analysis and 10 project samples?  
**Yes** / No

ii. Were the field duplicates submitted blind to the lab? NA **Yes** / No

iii. Precision – All relative percent differences (RPDs) less than specified DQOs?  
(Recommended: 30% for water, 50% for soil) NA / **Yes** / **No**  
Comment: *The RPD for RRO is 41 percent.*

iv. Data quality or usability affected? Explain.  
Comment: *Refer to Table 4 for summary of QC data. Data quality not affected because RRO concentrations are in the same order of magnitude in both samples.*

**f. Decontamination or Equipment Blank** (if not applicable, a comment stating why must be entered below)

**NA** / Yes / No

Comment: *Limited scope of sampling and disposable tubing was used*

i. All results less than LOQ? **NA** / Yes / No

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

iii. Data quality or usability affected? Explain. **NA**

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

a. Are they defined and appropriate? **NA** / Yes / No

Comment: *No further qualifiers needed.*

**ATTACHMENT 3**  
**WASTE MANIFEST**

# NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

|  |  |   |   |  |                            |                   |
|--|--|---|---|--|----------------------------|-------------------|
| <b>NON-HAZARDOUS WASTE MANIFEST</b>  |  | 1. Generator's US EPA ID No.<br><b>C E S Q G</b>  |   | Manifest Document No. <b>101081</b>                | 2. Page 1 of 1             |                   |
| 3. Generator's Name and Mailing Address<br><b>CROWLEY MARINE SERVICES<br/>201 ARCTIC SLOPE AVENUE<br/>ANCHORAGE, AK 99518</b>  |  | Site Address<br><b>CROWLEY MARINE SERVICES<br/>459 WEST BLUFF DRIVE<br/>ANCHORAGE, AK 99501</b> |   | <b>DAN WEGGERS</b>                                 |                            |                   |
| 4. Generator's Phone<br><b>(907) 258-2306</b>  |  | 6. US EPA ID Number<br><b>AKR000004184</b>  |   | A. State Transporter's ID<br><b>(907) 258-1558</b> |                            |                   |
| 5. Transporter 1 Company Name<br><b>NRC ALASKA LLC</b>   |  | 8. US EPA ID Number   |   | B. Transporter 1 Phone                             |                            |                   |
| 7. Transporter 2 Company Name  |  | 10. US EPA ID Number  |   | C. State Transporter's ID                          |                            |                   |
| 9. Designated Facility Name and Site Address<br><b>NRC ALASKA LLC<br/>2020 VIKING DRIVE<br/>ANCHORAGE, AK 99501</b>  |  | 10. US EPA ID Number<br><b>AKR000004184</b>   |   | D. Transporter 2 Phone                             |                            |                   |
|  |  |   |   | E. State Facility's ID                             |                            |                   |
|  |  |   |   | F. Facility's Phone<br><b>(907) 258-1558</b>       |                            |                   |
| 11. WASTE DESCRIPTION<br><br><b>MATERIAL NOT REGULATED BY D.O.T.</b>   |  |   | Containers                                |  | 13. Total Quantity         | 14. Unit Wt./Vol. |
|  |  |   | No.                                       | Type   |                            |                   |
|  |  |   | 1   | DM   | 150                        | P                 |
| b.   |  |   |   |  |                            |                   |
| c.   |  |   |   |  |                            |                   |
| d.   |  |   |   |  |                            |                   |
| G. Additional Descriptions for Materials Listed Above<br><b>1) EA0302 IDW DECON WATER/GROUNDWATER</b>  |  |   | H. Handling Codes for Wastes Listed Above |  |                            |                   |
| 15. Special Handling Instructions and Additional Information<br><b>I certify that this material is not regulated nor mixed with waste regulated as a Hazardous waste under 40CFR261 or TSCA regulated waste under 40CFR761. All used oil meets the definition under 40CFR279. Generator agrees to indemnify and hold harmless NRC ALASKA or its subsidiary for any damages, costs, attorneys and expert fees arising from or related to the above certification.</b> |  |   |   |  |                            |                   |
| <b>16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.</b>   |  |   |   |  |                            |                   |
| Printed/Typed Name<br><b>For CPD<br/>Jake Tracy</b>  |  |   | Signature<br><i>Jake Tracy</i>            |  | Date<br><b>1   12   16</b> |                   |
| 17. Transporter 1 Acknowledgement of Receipt of Materials  |  |   | Signature<br><i>Koy C. Trisdale Jr</i>    |  | Date<br><b>1   12   16</b> |                   |
| 18. Transporter 2 Acknowledgement of Receipt of Materials  |  |   | Signature                                 |  | Date                       |                   |
| 19. Discrepancy Indication Space   |  |   | Signature                                 |  | Date                       |                   |
| 20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.  |  |   |   |  |                            |                   |
| Printed/Typed Name   |  |   | Signature                                 |  | Date<br>Month Day Year     |                   |

GENERATOR INFORMATION

TRANSPORTER FACILITY

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



Date: November 2016  
To: CPD Alaska, LLC  
Re: 459 West Bluff Drive, Anchorage, Alaska

## **Important Information About Your Geotechnical/Environmental Report**

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

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

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

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

### **SUBSURFACE CONDITIONS CAN CHANGE.**

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

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

### **MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.**

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



## **A REPORT'S CONCLUSIONS ARE PRELIMINARY.**

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

## **THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.**

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

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

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

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

## **READ RESPONSIBILITY CLAUSES CLOSELY.**

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

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