

FES

3538 International Street  
Fairbanks, Alaska 99701

Phone: (907) 452-1006  
FAX: (907) 452-2692  
Email: FES@Alaska.com

---

**FAIRBANKS ENVIRONMENTAL SERVICES**



DATE: November 26, 2014

TO: Mr. Russell Grandel, Alaska Railroad Corporation

FROM: Michael Boese, Fairbanks Environmental Services

RE: 2014 Groundwater Monitoring Report  
Hurricane Siding  
Alaska Railroad Milepost 281.5, Alaska  
ADEC Hazard ID – 23545 / File ID – 2258.26.008

## EXECUTIVE SUMMARY

On September 26, 2014, Fairbanks Environmental Services (FES) collected groundwater samples from four groundwater monitoring wells at the Alaska Railroad Corporation (ARRC) Hurricane Siding site to assess petroleum hydrocarbon concentrations. The site is located near milepost 171 of the Parks Highway, Alaska (Figure 1).

Groundwater samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), gasoline range organics (GRO), diesel range organics (DRO), residual range organics (RRO) and natural attenuation indicator parameters iron and sulfate. One well, RSE-3, exceeded Alaska Department of Environmental Conservation (ADEC) Table C groundwater cleanup level for DRO. All other laboratory results were below ADEC cleanup levels. Natural attenuation indicator parameters suggest that anaerobic biodegradation of petroleum hydrocarbons has occurred via iron and sulfate reduction.

A limited removal to excavate soils with concentrations greater than 10,000 milligrams per kilogram (mg/Kg) identified during previous investigations is planned for 2015. The groundwater monitoring program will be continued to document impacts.

## 1.0 INTRODUCTION

### 1.1 Site Description

The Hurricane Siding is located at railroad milepost 281.5, which is located west of milepost 171 of the George Parks Highway (Figure 1). A tool shed, an abandoned concrete foundation, an aboveground storage tank (AST), and the Hurricane Section House are located onsite (Figure 2). The project area is located immediately west of the ARRC mainline at 62.9775 N and 149.6403 W.

## 1.2 Previous Investigations

In 1990, two underground storage tanks (USTs) were removed from the ARRC Hurricane Siding site including one 500-gallon gasoline UST and one 7,500-gallon diesel UST. At that time, laboratory analytical data indicated that elevated concentrations of total petroleum hydrocarbons (TPH) remained at the south end of the diesel UST excavation area (ARRC, 1990).

During the 2009 investigation, both GRO and DRO were detected in soil samples west and southwest of the former diesel UST excavation area (Clarus Technologies 2010) at concentrations in excess of ADEC Method Two migration to groundwater cleanup levels for the Under 40 Inch Zone (300 mg/Kg and 250 mg/Kg, respectively). Laboratory results from soil borings indicated GRO concentrations as high as 936 mg/Kg in the vadose zone (2 to 3 feet below ground surface [bgs]), and as high as 736 mg/Kg at the groundwater interface (5 to 6 feet bgs). DRO concentrations as high as 84,400 mg/Kg were detected in the vadose zone, and as high as 6,920 mg/Kg at the groundwater interface. 2009 soil boring locations are shown on Figures 2 and 3.

In 2011, four additional soil borings were installed and sampled, and they were subsequently converted to monitoring wells (RSE-1, RSE-2, RSE-3, and RSE-4) in order to further delineate petroleum contamination in groundwater at the site. Although no soil results exceeded ADEC Method Two cleanup levels during the 2011 investigation, the DRO concentrations in the groundwater sample from downgradient monitoring well RSE-4 slightly exceeded the ADEC Table C groundwater cleanup level of 1.5 milligrams per liter (mg/L) (Restoration Science and Engineering 2012).

In September 2012, groundwater samples were collected from monitoring wells RSE-1 through RSE-4 to update groundwater conditions at the site. Groundwater flow direction remained to the north-northwest. Although DRO was detected in wells RSE-3 and RSE-4, all analytes (BTEX, GRO, DRO, and RRO) were below Table C cleanup levels (FES 2012). However, both DRO and RRO exceeded cleanup levels in one well, RSE-3, during the subsequent annual groundwater monitoring event in June 2013 (FES, 2013).

## 2.0 WORK PERFORMED

### 2.1 Water Level Measurements and Vertical Survey

Prior to purging and sampling, the depth to water was measured in each of the four wells. The depths were measured to within 0.01 foot from the top of the well casings using an oil/water interface probe. Groundwater elevations from September 26, 2014, are shown on Figure 2. Note that the elevations are based on a vertical well survey performed the same day. Approximately 1 inch of casing was cut off the top of well RSE-2 due to frost jacking (casing was pushing up against the monument lid).

### 2.2 Groundwater Sample Collection

Four existing monitoring wells (RSE-1, RSE-2, RSE-3, and RSE-4; shown on Figure 2) were sampled by Mike Boese, an ADEC-qualified person, using low-flow techniques. The wells were purged and sampled with disposable tubing and a peristaltic pump. Tubing intake was set at approximately 1.5 feet below the top of the water column.

Groundwater parameters were collected with a YSI Model 556 multi-parameter instrument equipped with a flow through cell. Analytical samples were collected after the temperature, pH, dissolved oxygen,

oxidation-reduction (redox) potential, and conductivity parameters had stabilized per the requirements in ADEC's field sampling guidance.

Groundwater samples were collected by disconnecting the flow through cell and pumping directly into sample containers at a low flow rate to minimize sample aeration. One groundwater sample was collected from each well. In addition, a field duplicate sample (denoted RSE-X) was collected from well RSE-3. Water samples were placed in a cooler containing frozen gel ice and maintained at 4 degrees Celsius and submitted to SGS North America (SGS) in Anchorage, Alaska. Samples were analyzed for BTEX, GRO, DRO, and RRO using SW8021B, AK101, AK102, and AK103, respectively. A trip blank accompanied project samples to the laboratory and was analyzed for BTEX and GRO. Samples were also analyzed for natural attenuation indicator parameters iron (field-filtered) by 6020A and sulfate by 300.0. Filtered iron samples were used to estimate ferrous iron concentrations.

### 3.0 GROUNDWATER RESULTS

Field parameters, including depth to groundwater and relative casing elevation, are summarized in Table 1. Laboratory results from September 2014 are summarized in Table 2, and historical results for GRO, DRO, and RRO are summarized in Table 3.

Depth to groundwater observed at the site varied between approximately 1.5 to 4 feet bgs. Relative groundwater elevations were used to determine flow direction. Groundwater contours are displayed in Figure 2; inferred groundwater flow is to the north-northwest with a gradient of approximately 0.009. This direction and gradient are consistent with historical data (Restoration Science and Engineering 2012 and FES 2012 & 2013). No floating product was identified.

All groundwater samples had results below Table C cleanup levels except for DRO in well RSE-3. The DRO result in RSE-3 was above the cleanup level but less than concentration detected in 2013. RRO was also detected in RSE-3 below the groundwater cleanup level; RRO was not detected in other wells. GRO, benzene, toluene, and xylenes were not detected in any well. If detected, ethylbenzene concentrations were three orders of magnitude below the respective cleanup level.

Natural attenuation parameters indicate that anaerobic biodegradation of petroleum hydrocarbons has occurred at the site via iron and sulfate reduction. Elevated ferrous iron concentrations (indicative of iron reduction) and/or reduced sulfate concentrations (indicative of sulfate reduction) were detected in both wells that historically contained petroleum hydrocarbons (RSE-3 and RSE-4) relative to background concentrations measured in RSE-2.

### 4.0 INVESTIGATION-DERIVED WASTE

Purge water from monitoring wells was filtered through a 5-gallon bucket containing granular activated carbon (GAC) and discharged to the gravel pad within the project area. Purge water from wells RSE-3 and RSE-4 had a light to moderate petroleum odor but no sheen.

## 5.0 DATA QUALITY SUMMARY

Groundwater samples were collected and analyzed in accordance with the approved Work Plan (FES 2014).

All project samples were analyzed by SGS of Anchorage, Alaska. The laboratory is approved by the State of Alaska through the Contaminated Sites Program for the contaminant methods employed. All samples were shipped in a single sample data group (SDG) and assigned the SGS report number 1144811. A copy of the laboratory report is included in Appendix A.

The chemical data were evaluated in order to assess whether they met data quality objectives and were acceptable for project use. The findings of the review are documented in the ADEC Checklist (Appendix B). Overall, the review process deemed the groundwater data acceptable for project use. No data were qualified or rejected pursuant to FES's data quality review, and all analytical data may be used for project purposes.

## 6.0 CONCLUSION AND RECOMMENDATIONS

DRO exceeded the ADEC groundwater cleanup level in one well, RSE-3, during the September 2014 sampling event. All other analytes were below their respective cleanup levels. Changes noted in natural attenuation parameter concentrations indicate that anaerobic biodegradation of hydrocarbons has occurred at the site.

Based on results from the 2009 and 2011 soil investigations, elevated concentrations of petroleum hydrocarbons are present in soil in the area southwest of the former UST (Clarus 2010). Although groundwater results indicate that anaerobic biodegradation has occurred at the site, natural attenuation is not likely a feasible remedy to treat the contaminant source.

A limited excavation of residual source area contaminated soils located near 2009 boring B5 (shown on Figures 2 and 3) to remove soils in excess of the ADEC Ingestion and Inhalation Pathway Soil Cleanup Levels (10,250 mg/kg for DRO) would be expected to reduce further potential contaminant migration to groundwater. Additional groundwater sampling is recommended following the excavation to evaluate the impact of the removal action on groundwater.

## 7.0 REFERENCES

Alaska Department of Environmental Conservation (ADEC), 2012. *Oil and Other Hazardous Substances Pollution Control, 18 AAC 75*. April 8.

Alaska Railroad Corporation (ARRC), 1990. *Underground Storage Tank Removal, Alaska Railroad Hurricane Section, MP 281*. December 12

Clarus Technologies LLC (Clarus), 2010. *Hurricane Phase II Investigation Report*. April 2.

Fairbanks Environmental Services (FES), 2013. *2013 Groundwater Monitoring Work Plan, Hurricane Siding, Alaska Railroad Milepost 281.5, Alaska*. May 9.

FES, 2012. *Final Groundwater Monitoring Report, Hurricane Siding, Alaska Railroad Milepost 281.5, Alaska*. October 24.

Restoration Science & Engineering, LLC, 2012. *Site Characterization Report, ARRC Hurricane Siding, Alaska Railroad Milepost 281.5, Hurricane, Alaska*. January.

### **Attachments**

Table 1 – 2014 Field Parameters

Table 2 – 2014 Groundwater Results

Table 3 – Historical Groundwater Results

Figure 1 – Vicinity Map

Figure 2 – Site Map

Figure 3 – DRO and RRO Results

Appendix A – SGS Report 1144811

Appendix B – ADEC Laboratory Review Checklist

**Table 1 - 2014 Field Parameters  
ARRC Hurricane Siding**

Well	Date	Sheen or Odor?	Relative Elevation of TOC <sup>1</sup>	Depth to Groundwater (feet BTOC)	Temperature (Degrees Celsius)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	pH	Potential (mV)
RSE-1	9/26/2014	None	99.36	3.90	8.52	0.510	0.35	5.72	3.8
RSE-2	9/26/2014	None	99.25	4.14 <sup>2</sup>	6.43	0.220	0.74	5.88	71.0
RSE-3	9/26/2014	Moderate Odor	98.56	3.82	7.99	0.122	0.25	6.10	12.9
RSE-4	9/26/2014	Light Odor	95.90	1.27	8.09	0.084	0.45	5.89	54.3

<sup>1</sup> - Well casing elevations were re-surveyed on 9/26/2014 as part of the field effort; the NW corner of a utility box was used as benchmark (100.00 feet).

<sup>2</sup> - Approximately 1 inch was cut off of well RSE-2 prior to the measurement. The casing had apparently jacked and was pushing against the monument lid.

BTOC - below top of casing

mg/L - milligrams per liter

mS/cm - milliSiemens per centimeter

mV - millivolts

TOC - top of casing

Table 2 - 2014 Groundwater Results  
ARRC Hurricane Siding

Client Sample Id Location Lab Sample Id Sample Type Collection Date Matrix:			Cleanup Level <sup>1</sup>	RSE-1 RSE-1 1144811001 Primary 9/26/2014 Groundwater	RSE-2 RSE-2 1144811002 Primary 9/26/2014 Groundwater	RSE-3 RSE-3 1144811003 Primary 9/26/2014 Groundwater	RSE-4 RSE-4 1144811004 Primary 9/26/2014 Groundwater	RSE-X RSE-3 1144811005 Field Duplicate 9/26/2014 Groundwater	Trip Blank Trip Blank 1132384006 Trip Blank 9/26/2014 Water
Analyte	Analysis	Units		Result [LOD]	Result [LOD]	Result [LOD]	Result [LOD]	Result [LOD]	Result [LOD]
Benzene	SW8021B	µg/L	5	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]	ND [0.25]
Toluene	SW8021B	µg/L	1,000	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]
Ethylbenzene	SW8021B	µg/L	700	ND [0.5]	ND [0.5]	0.850 [0.5] J	0.340 [0.5] J	0.850 [0.5] J	ND [0.5]
o-Xylene	SW8021B	µg/L	10,000 <sup>2</sup>	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]	ND [0.5]
p & m -Xylene	SW8021B	µg/L		ND [1.0]	ND [1.0]	ND [1.0]	ND [1.0]	ND [1.0]	ND [1.0]
Gasoline Range Organics	AK101	mg/L	2.2	ND [0.05]	ND [0.05]	ND [0.05]	ND [0.05]	ND [0.05]	ND [0.05]
Diesel Range Organics	AK102	mg/L	1.5	ND [0.310]	ND [0.308]	<b>1.88 [0.318]</b>	0.580 [0.326] J	<b>1.57 [0.324]</b>	-
Residual Range Organics	AK103	mg/L	1.1	ND [0.259]	ND [0.256]	0.330 [0.265] J	ND [0.272]	0.252 [0.270] J	-
Iron	6020A	mg/L	NA	ND [0.25]	ND [0.25]	6.36 [0.25]	0.737 [0.25]	6.61 [0.25]	-
Sulfate	300.0	mg/L	NA	0.621 [0.05]	2.13 [0.05]	0.463 [0.05]	1.34 [0.05]	0.501 [0.05]	-

<sup>1</sup> - Groundwater cleanup level is from Table C of 18AAC75.345.

<sup>2</sup> - Cleanup level is for total Xylenes.

J - Result is an estimated value because it was reported below the Limit of Quantitation

LOD - Limit of Detection

µg/L - micrograms per liter

mg/L - milligrams per liter

NA - not applicable

ND - analyte was not detected at the Detection Limit

**Table 3 - Historical Groundwater Results  
ARRC Hurricane Siding**

Well ID	Sample Date	Sample Type	Contaminant Concentrations		
			GRO (mg/L)	DRO (mg/L)	RRO (mg/L)
<i>ADEC Cleanup Levels Table C <sup>1</sup></i>			<i>2.2</i>	<i>1.5</i>	<i>1.1</i>
RSE-1	9/9/2011	Primary	ND (0.06)	0.203 J	ND (0.3)
RSE-1	9/14/2012	Primary/Duplicate	ND (0.062)/ND (0.062)	ND (0.41)/ND (0.434)	ND (0.34)/ND (0.362)
RSE-1	6/12/2013	Primary	ND (0.062)	0.323 J	0.567
RSE-1	9/26/2014	Primary	ND (0.05)	ND (0.310)	ND (0.259)
RSE-2	9/9/2011	Primary	ND (0.06)	0.311 J	ND (0.3)
RSE-2	9/14/2012	Primary	ND (0.062)	ND (0.36)	ND (0.3)
RSE-2	6/13/2013	Primary	ND (0.062)	0.237 J	0.388
RSE-2	9/26/2014	Primary	ND (0.05)	ND (0.308)	ND (0.256)
RSE-3	9/9/2011	Primary/Duplicate	ND (0.06)/ND (0.06)	0.498 J/0.431 J	ND (0.3)/ND (0.3)
RSE-3	9/14/2012	Primary	ND (0.062)	0.779	ND (0.3)
RSE-3	6/13/2013	Primary	ND (0.062)	<b>5.51</b>	<b>1.34</b>
RSE-3	9/26/2014	Primary/Duplicate	ND (0.05)/ND (0.05)	<b>1.88/1.57</b>	0.330 J/0.252 J
RSE-4	9/9/2011	Primary	0.0833 J	<b>1.52</b>	ND (0.3)
RSE-4	9/14/2012	Primary	0.0456 J	0.601 J	ND (0.338)
RSE-4	6/12/2013	Primary/Duplicate	0.0341 J/ND (0.062)	0.425 J/0.385 J	0.252 J/0.188 J
RSE-4	9/26/2014	Primary	ND (0.05)	0.580 J	ND (0.272)

Notes:

Results in yellow highlights exceed the cleanup level.

<sup>1</sup> - Groundwater cleanup level is from Table C of 18AAC75.345.

All ND results are reported as Result(LOD)Qualifier

ADEC - Alaska Department of Environmental Conservation

DRO - diesel range organics

GRO - gasoline range organics

J - Result is considered an estimated value because it was reported below the LOQ

LOD - limit of detection

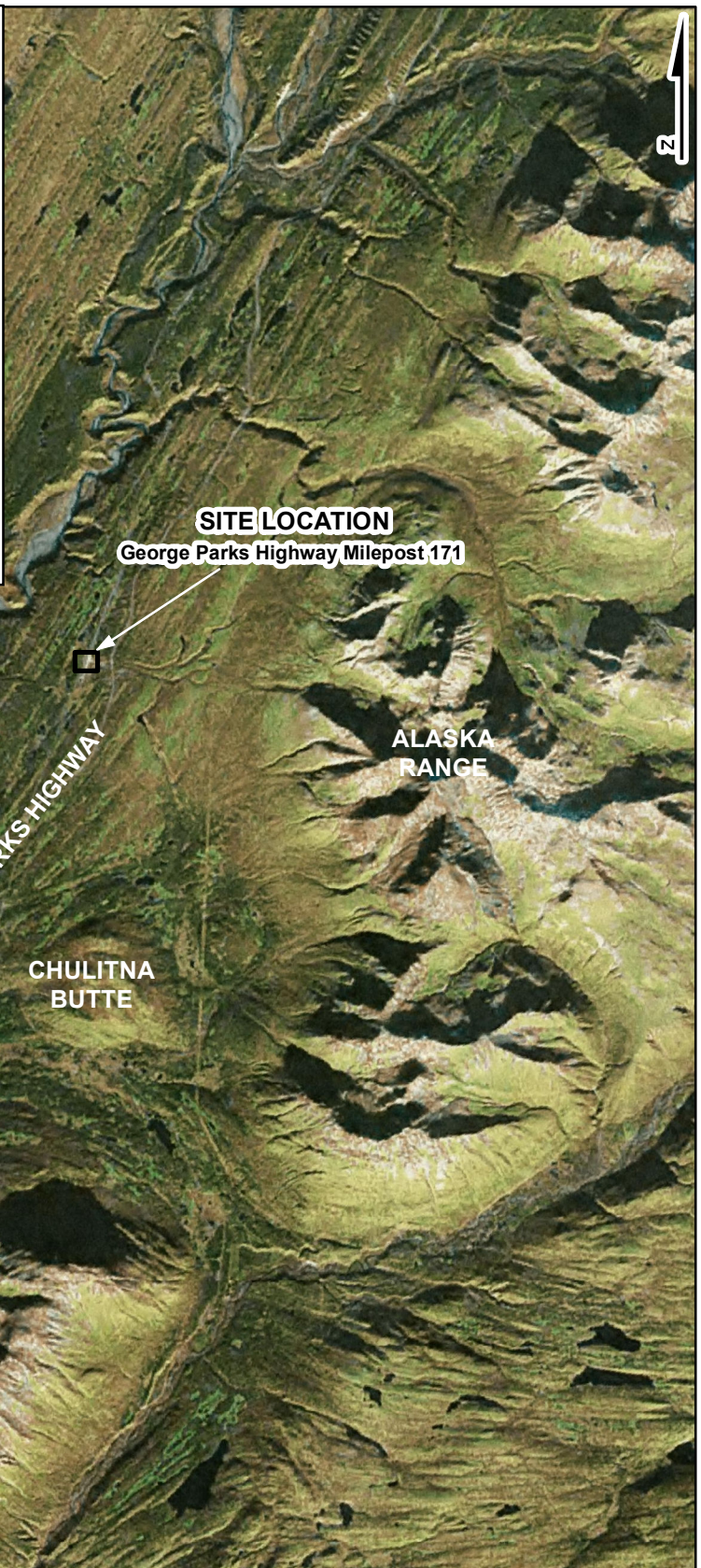
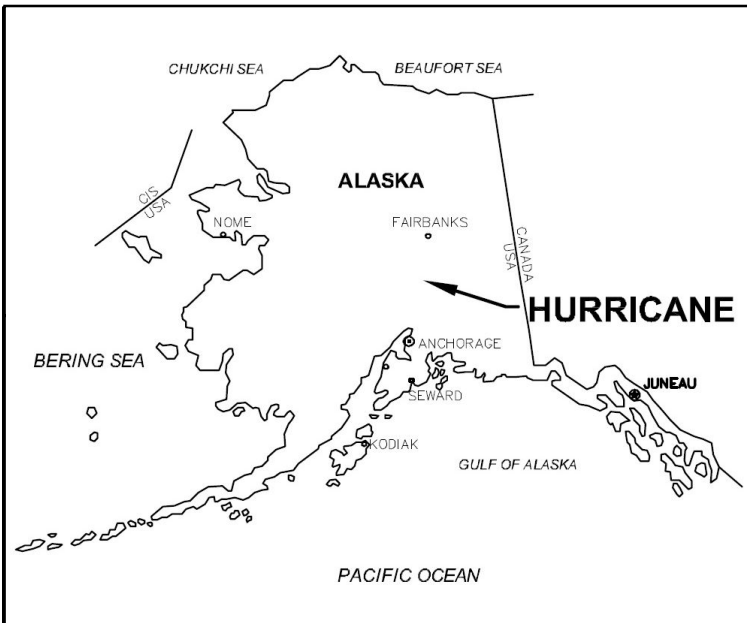
LOQ - limit of quantitation

mg/L - milligrams per Liter

ND - non-detect

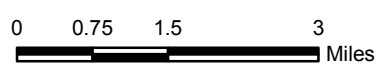
RRO - residual range organics





**NOTE:**

Source: Aerial Imagery was clipped to reduce file size, and was provided in web form by Alaska Mapped (UAF-GINA/SDMI <http://alaskamapped.org/bdl>).



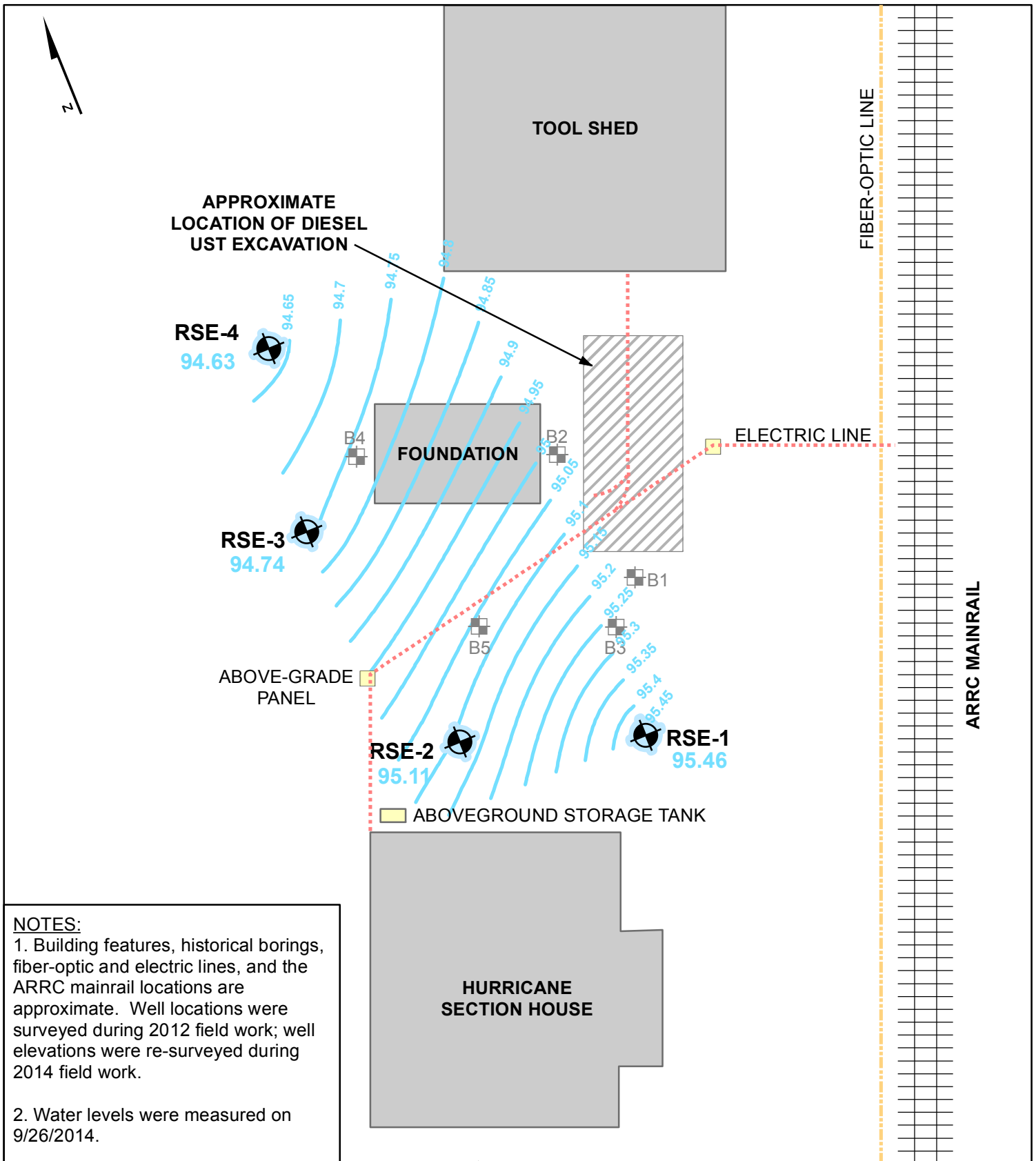
Fairbanks Environmental Services  
 3538 International Street  
 Fairbanks, Alaska 99701



**ALASKA RAILROAD CORPORATION**

**Vicinity Map**  
 2014 Report  
 Hurricane Siding  
 Hurricane, Alaska

CONTRACT: 85304	FIGURE: 1	DATE: 12/14
--------------------	--------------	----------------








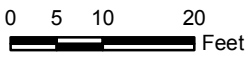
**NOTES:**

1. Building features, historical borings, fiber-optic and electric lines, and the ARRC mainrail locations are approximate. Well locations were surveyed during 2012 field work; well elevations were re-surveyed during 2014 field work.

2. Water levels were measured on 9/26/2014.

**LEGEND:**

-  Monitoring Well
-  Soil Boring (2009)
-  Approximate Location of Fiber-Optic Line
-  Approximate Location of Electric Line
-  Approximate Location of Alaska Railroad



Fairbanks Environmental Services  
3538 International Street  
Fairbanks, Alaska 99701



**ALASKA RAILROAD CORPORATION**

**Site Map**  
2014 Report  
Hurricane Siding  
Hurricane, Alaska

CONTRACT:  
85304

FIGURE:  
2

DATE:  
12/14

**CLEANUP LEVELS:**

DRO: 1.5 mg/L  
RRO: 1.1 mg/L

Results shown in milligrams per liter (mg/L). Results exceeding cleanup levels are displayed in **red**.

TOOL SHED

APPROXIMATE LOCATION OF DIESEL UST EXCAVATION

FIBER-OPTIC LINE



**RSE-4**

DRO: 0.580 J  
RRO: ND(0.272)

**RSE-3**

DRO: **1.88**  
RRO: 0.330 J

Field Duplicate  
DRO: **1.57**  
RRO: 0.252 J

B4 FOUNDATION B2

ELECTRIC LINE

B1

**RSE-1**

DRO: ND(0.310)  
RRO: ND(0.259)

ABOVE-GRADE PANEL

B5

B3

ARRC MAINRAIL

**RSE-2**

DRO: ND(0.308)  
RRO: ND(0.256)

ABOVEGROUND STORAGE TANK

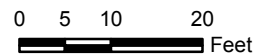
HURRICANE SECTION HOUSE






**NOTES:**

1. Building features, historical borings, fiber-optic and electric lines, and the ARRC mainrail locations are approximate; well locations were surveyed during 2012 field work; well elevations were re-surveyed during 2014 field work.

2. Samples were collected on 9/26/2014.

**LEGEND:**



-  Monitoring Well
-  Soil Boring (2009)
-  Approximate Location of Fiber-Optic Line
-  Approximate Location of Electric Line
-  Approximate Location of Alaska Railroad

Fairbanks Environmental Services  
3538 International Street  
Fairbanks, Alaska 99701



ALASKA RAILROAD CORPORATION

**DRO and RRO Results**

2014 Report  
Hurricane Siding  
Hurricane, Alaska

CONTRACT:  
85304

FIGURE:  
3

DATE:  
12/14

**APPENDIX A**  
**SGS LABORATORY REPORT 1144811**

## Laboratory Report of Analysis

To: AK Railroad Corp  
2400 Spenard Road, Suite 300  
Anchorage, AK 99503  
(907)277-7111

Report Number: **1144811**

Client Project: **ARRC-2014 Hurricane Siding**

Dear Mike Boese,

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

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

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

Sincerely,  
SGS North America Inc.

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

Victoria Pennick  
2014.10.07  
09:52:51 -08'00' for

Justin Nelson  
Project Manager  
Justin.Nelson@sgs.com

Date

Print Date: 10/06/2014 3:41:39PM

## Case Narrative

SGS Client: **AK Railroad Corp**  
SGS Project: **1144811**  
Project Name/Site: **ARRC-2014 Hurricane Siding**  
Project Contact: **Mike Boese**

Refer to sample receipt form for information on sample condition.

**RSE-3 (1144811003) PS**

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

**RSE-4 (1144811004) PS**

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

**RSE-X (1144811005) PS**

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

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

Print Date: 10/06/2014 3:41:40PM

## Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is provided under SGS general terms and conditions (<[http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm)>), unless other written agreements have been accepted by both parties.

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

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

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

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

### Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
RSE-1	1144811001	09/26/2014	09/29/2014	Water (Surface, Eff., Ground)
RSE-2	1144811002	09/26/2014	09/29/2014	Water (Surface, Eff., Ground)
RSE-3	1144811003	09/26/2014	09/29/2014	Water (Surface, Eff., Ground)
RSE-4	1144811004	09/26/2014	09/29/2014	Water (Surface, Eff., Ground)
RSE-X	1144811005	09/26/2014	09/29/2014	Water (Surface, Eff., Ground)
Trip Blank	1144811006	09/26/2014	09/29/2014	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
AK101	AK101/8021 Combo.
SW8021B	AK101/8021 Combo.
SW6020A	Dissolved Metals by ICP-MS
AK102	DRO/RRO Low Volume Water
AK103	DRO/RRO Low Volume Water
EPA 300.0	Ion Chromatographic Analysis (W)

Print Date: 10/06/2014 3:41:43PM



### Detectable Results Summary

Client Sample ID: <b>RSE-1</b>			
Lab Sample ID: 1144811001	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
<b>Waters Department</b>	Sulfate	0.621	mg/L
Client Sample ID: <b>RSE-2</b>			
Lab Sample ID: 1144811002	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
<b>Waters Department</b>	Sulfate	2.13	mg/L
Client Sample ID: <b>RSE-3</b>			
Lab Sample ID: 1144811003	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
<b>Dissolved Metals by ICP/MS</b>	Iron	6360	ug/L
<b>Semivolatile Organic Fuels</b>	Diesel Range Organics	1.88	mg/L
	Residual Range Organics	0.330J	mg/L
<b>Volatile Fuels</b>	Ethylbenzene	0.850J	ug/L
<b>Waters Department</b>	Sulfate	0.463	mg/L
Client Sample ID: <b>RSE-4</b>			
Lab Sample ID: 1144811004	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
<b>Dissolved Metals by ICP/MS</b>	Iron	737	ug/L
<b>Semivolatile Organic Fuels</b>	Diesel Range Organics	0.580J	mg/L
<b>Volatile Fuels</b>	Ethylbenzene	0.340J	ug/L
<b>Waters Department</b>	Sulfate	1.34	mg/L
Client Sample ID: <b>RSE-X</b>			
Lab Sample ID: 1144811005	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
<b>Dissolved Metals by ICP/MS</b>	Iron	6610	ug/L
<b>Semivolatile Organic Fuels</b>	Diesel Range Organics	1.57	mg/L
	Residual Range Organics	0.252J	mg/L
<b>Volatile Fuels</b>	Ethylbenzene	0.850J	ug/L
<b>Waters Department</b>	Sulfate	0.501	mg/L

Print Date: 10/06/2014 3:41:44PM

## Results of RSE-1

Client Sample ID: **RSE-1**  
 Client Project ID: **ARRC-2014 Hurricane Siding**  
 Lab Sample ID: 1144811001  
 Lab Project ID: 1144811

Collection Date: 09/26/14 13:00  
 Received Date: 09/29/14 09:00  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Iron	250 U	500	150	ug/L	5		10/01/14 13:11

## Batch Information

Analytical Batch: MMS8696  
 Analytical Method: SW6020A  
 Analyst: ACF  
 Analytical Date/Time: 10/01/14 13:11  
 Container ID: 1144811001-E

Prep Batch: MXX28149  
 Prep Method: SW3010A  
 Prep Date/Time: 09/30/14 11:25  
 Prep Initial Wt./Vol.: 25 mL  
 Prep Extract Vol: 25 mL

Print Date: 10/06/2014 3:41:45PM



Results of RSE-1

Client Sample ID: RSE-1
Client Project ID: ARRC-2014 Hurricane Siding
Lab Sample ID: 1144811001
Lab Project ID: 1144811

Collection Date: 09/26/14 13:00
Received Date: 09/29/14 09:00
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. Row: Diesel Range Organics, 0.310 U, 0.620, 0.186, mg/L, 1, 10/03/14 14:50

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 5a Androstane, 89, 50-150, %, 1, 10/03/14 14:50

Batch Information

Analytical Batch: XFC11607
Analytical Method: AK102
Analyst: MCM
Analytical Date/Time: 10/03/14 14:50
Container ID: 1144811001-F

Prep Batch: XXX32096
Prep Method: SW3520C
Prep Date/Time: 09/30/14 08:30
Prep Initial Wt./Vol.: 242 mL
Prep Extract Vol: 1 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Residual Range Organics, 0.259 U, 0.517, 0.155, mg/L, 1, 10/03/14 14:50

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: n-Triacontane-d62, 98.6, 50-150, %, 1, 10/03/14 14:50

Batch Information

Analytical Batch: XFC11607
Analytical Method: AK103
Analyst: MCM
Analytical Date/Time: 10/03/14 14:50
Container ID: 1144811001-F

Prep Batch: XXX32096
Prep Method: SW3520C
Prep Date/Time: 09/30/14 08:30
Prep Initial Wt./Vol.: 242 mL
Prep Extract Vol: 1 mL

Print Date: 10/06/2014 3:41:45PM



Results of RSE-1

Client Sample ID: RSE-1
Client Project ID: ARRC-2014 Hurricane Siding
Lab Sample ID: 1144811001
Lab Project ID: 1144811

Collection Date: 09/26/14 13:00
Received Date: 09/29/14 09:00
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, 09/29/14 19:08

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene, 95.8, 50-150, %, 1, 09/29/14 19:08

Batch Information

Analytical Batch: VFC12142
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 09/29/14 19:08
Container ID: 1144811001-A

Prep Batch: VXX26533
Prep Method: SW5030B
Prep Date/Time: 09/29/14 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, 97.1, 77-115, %, 1, 09/29/14 19:08

Batch Information

Analytical Batch: VFC12142
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 09/29/14 19:08
Container ID: 1144811001-A

Prep Batch: VXX26533
Prep Method: SW5030B
Prep Date/Time: 09/29/14 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/06/2014 3:41:45PM

## Results of RSE-1

Client Sample ID: **RSE-1**  
Client Project ID: **ARRC-2014 Hurricane Siding**  
Lab Sample ID: 1144811001  
Lab Project ID: 1144811

Collection Date: 09/26/14 13:00  
Received Date: 09/29/14 09:00  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

## Results by Waters Department

<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>
Sulfate	0.621	0.100	0.0310	mg/L	1		09/30/14 05:42

## Batch Information

Analytical Batch: WIC5282  
Analytical Method: EPA 300.0  
Analyst: SLC  
Analytical Date/Time: 09/30/14 05:42  
Container ID: 1144811001-D

Prep Batch: WXX10750  
Prep Method: METHOD  
Prep Date/Time: 09/29/14 11:26  
Prep Initial Wt./Vol.: 10 mL  
Prep Extract Vol: 10 mL

Print Date: 10/06/2014 3:41:45PM

## Results of RSE-2

Client Sample ID: **RSE-2**  
 Client Project ID: **ARRC-2014 Hurricane Siding**  
 Lab Sample ID: 1144811002  
 Lab Project ID: 1144811

Collection Date: 09/26/14 11:45  
 Received Date: 09/29/14 09:00  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Iron	250 U	500	150	ug/L	5		10/01/14 13:13

## Batch Information

Analytical Batch: MMS8696  
 Analytical Method: SW6020A  
 Analyst: ACF  
 Analytical Date/Time: 10/01/14 13:13  
 Container ID: 1144811002-E

Prep Batch: MXX28149  
 Prep Method: SW3010A  
 Prep Date/Time: 09/30/14 11:25  
 Prep Initial Wt./Vol.: 25 mL  
 Prep Extract Vol: 25 mL

Print Date: 10/06/2014 3:41:45PM



Results of RSE-2

Client Sample ID: RSE-2
Client Project ID: ARRC-2014 Hurricane Siding
Lab Sample ID: 1144811002
Lab Project ID: 1144811

Collection Date: 09/26/14 11:45
Received Date: 09/29/14 09:00
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. Row: Diesel Range Organics, 0.308 U, 0.615, 0.184, mg/L, 1, 10/03/14 15:11

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 5a Androstane, 89, 50-150, %, 1, 10/03/14 15:11

Batch Information

Analytical Batch: XFC11607
Analytical Method: AK102
Analyst: MCM
Analytical Date/Time: 10/03/14 15:11
Container ID: 1144811002-F

Prep Batch: XXX32096
Prep Method: SW3520C
Prep Date/Time: 09/30/14 08:30
Prep Initial Wt./Vol.: 244 mL
Prep Extract Vol: 1 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Residual Range Organics, 0.256 U, 0.512, 0.154, mg/L, 1, 10/03/14 15:11

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: n-Triacontane-d62, 97.5, 50-150, %, 1, 10/03/14 15:11

Batch Information

Analytical Batch: XFC11607
Analytical Method: AK103
Analyst: MCM
Analytical Date/Time: 10/03/14 15:11
Container ID: 1144811002-F

Prep Batch: XXX32096
Prep Method: SW3520C
Prep Date/Time: 09/30/14 08:30
Prep Initial Wt./Vol.: 244 mL
Prep Extract Vol: 1 mL

Print Date: 10/06/2014 3:41:45PM



Results of RSE-2

Client Sample ID: RSE-2
Client Project ID: ARRC-2014 Hurricane Siding
Lab Sample ID: 1144811002
Lab Project ID: 1144811

Collection Date: 09/26/14 11:45
Received Date: 09/29/14 09:00
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, 09/29/14 19:27

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene, 101, 50-150, %, 1, 09/29/14 19:27

Batch Information

Analytical Batch: VFC12142
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 09/29/14 19:27
Container ID: 1144811002-A

Prep Batch: VXX26533
Prep Method: SW5030B
Prep Date/Time: 09/29/14 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, 100, 77-115, %, 1, 09/29/14 19:27

Batch Information

Analytical Batch: VFC12142
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 09/29/14 19:27
Container ID: 1144811002-A

Prep Batch: VXX26533
Prep Method: SW5030B
Prep Date/Time: 09/29/14 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/06/2014 3:41:45PM





Results of **RSE-2**

Client Sample ID: **RSE-2**  
Client Project ID: **ARRC-2014 Hurricane Siding**  
Lab Sample ID: 1144811002  
Lab Project ID: 1144811

Collection Date: 09/26/14 11:45  
Received Date: 09/29/14 09:00  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

Results by **Waters Department**

<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>
Sulfate	2.13	0.100	0.0310	mg/L	1		09/30/14 07:23

**Batch Information**

Analytical Batch: WIC5282  
Analytical Method: EPA 300.0  
Analyst: SLC  
Analytical Date/Time: 09/30/14 07:23  
Container ID: 1144811002-D

Prep Batch: WXX10750  
Prep Method: METHOD  
Prep Date/Time: 09/29/14 11:26  
Prep Initial Wt./Vol.: 10 mL  
Prep Extract Vol: 10 mL

Print Date: 10/06/2014 3:41:45PM

## Results of RSE-3

Client Sample ID: **RSE-3**  
 Client Project ID: **ARRC-2014 Hurricane Siding**  
 Lab Sample ID: 1144811003  
 Lab Project ID: 1144811

Collection Date: 09/26/14 13:55  
 Received Date: 09/29/14 09:00  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Iron	6360	500	150	ug/L	5		10/01/14 13:16

## Batch Information

Analytical Batch: MMS8696  
 Analytical Method: SW6020A  
 Analyst: ACF  
 Analytical Date/Time: 10/01/14 13:16  
 Container ID: 1144811003-E

Prep Batch: MXX28149  
 Prep Method: SW3010A  
 Prep Date/Time: 09/30/14 11:25  
 Prep Initial Wt./Vol.: 25 mL  
 Prep Extract Vol: 25 mL

Print Date: 10/06/2014 3:41:45PM



Results of RSE-3

Client Sample ID: RSE-3
Client Project ID: ARRC-2014 Hurricane Siding
Lab Sample ID: 1144811003
Lab Project ID: 1144811

Collection Date: 09/26/14 13:55
Received Date: 09/29/14 09:00
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. Row: Diesel Range Organics, 1.88, 0.636, 0.191, mg/L, 1, 10/03/14 15:31

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 5a Androstane, 78.8, 50-150, %, 1, 10/03/14 15:31

Batch Information

Analytical Batch: XFC11607
Analytical Method: AK102
Analyst: MCM
Analytical Date/Time: 10/03/14 15:31
Container ID: 1144811003-F

Prep Batch: XXX32096
Prep Method: SW3520C
Prep Date/Time: 09/30/14 08:30
Prep Initial Wt./Vol.: 236 mL
Prep Extract Vol: 1 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Residual Range Organics, 0.330 J, 0.530, 0.159, mg/L, 1, 10/03/14 15:31

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: n-Triacontane-d62, 79.7, 50-150, %, 1, 10/03/14 15:31

Batch Information

Analytical Batch: XFC11607
Analytical Method: AK103
Analyst: MCM
Analytical Date/Time: 10/03/14 15:31
Container ID: 1144811003-F

Prep Batch: XXX32096
Prep Method: SW3520C
Prep Date/Time: 09/30/14 08:30
Prep Initial Wt./Vol.: 236 mL
Prep Extract Vol: 1 mL

Print Date: 10/06/2014 3:41:45PM



Results of RSE-3

Client Sample ID: RSE-3
Client Project ID: ARRC-2014 Hurricane Siding
Lab Sample ID: 1144811003
Lab Project ID: 1144811

Collection Date: 09/26/14 13:55
Received Date: 09/29/14 09:00
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, 09/29/14 19:46

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene, 99.5, 50-150, %, 1, 09/29/14 19:46

Batch Information

Analytical Batch: VFC12142
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 09/29/14 19:46
Container ID: 1144811003-A

Prep Batch: VXX26533
Prep Method: SW5030B
Prep Date/Time: 09/29/14 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, 97.2, 77-115, %, 1, 09/29/14 19:46

Batch Information

Analytical Batch: VFC12142
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 09/29/14 19:46
Container ID: 1144811003-A

Prep Batch: VXX26533
Prep Method: SW5030B
Prep Date/Time: 09/29/14 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/06/2014 3:41:45PM

## Results of RSE-3

Client Sample ID: **RSE-3**  
 Client Project ID: **ARRC-2014 Hurricane Siding**  
 Lab Sample ID: 1144811003  
 Lab Project ID: 1144811

Collection Date: 09/26/14 13:55  
 Received Date: 09/29/14 09:00  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Waters Department

<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>
Sulfate	0.463	0.100	0.0310	mg/L	1		09/30/14 07:44

## Batch Information

Analytical Batch: WIC5282  
 Analytical Method: EPA 300.0  
 Analyst: SLC  
 Analytical Date/Time: 09/30/14 07:44  
 Container ID: 1144811003-D

Prep Batch: WXX10750  
 Prep Method: METHOD  
 Prep Date/Time: 09/29/14 11:26  
 Prep Initial Wt./Vol.: 10 mL  
 Prep Extract Vol: 10 mL

Print Date: 10/06/2014 3:41:45PM



**Results of RSE-4**

Client Sample ID: **RSE-4**  
Client Project ID: **ARRC-2014 Hurricane Siding**  
Lab Sample ID: 1144811004  
Lab Project ID: 1144811

Collection Date: 09/26/14 14:50  
Received Date: 09/29/14 09:00  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Iron	737	500	150	ug/L	5		10/01/14 13:38

**Batch Information**

Analytical Batch: MMS8696  
Analytical Method: SW6020A  
Analyst: ACF  
Analytical Date/Time: 10/01/14 13:38  
Container ID: 1144811004-E

Prep Batch: MXX28149  
Prep Method: SW3010A  
Prep Date/Time: 09/30/14 11:25  
Prep Initial Wt./Vol.: 25 mL  
Prep Extract Vol: 25 mL

Print Date: 10/06/2014 3:41:45PM



Results of RSE-4

Client Sample ID: RSE-4
Client Project ID: ARRC-2014 Hurricane Siding
Lab Sample ID: 1144811004
Lab Project ID: 1144811

Collection Date: 09/26/14 14:50
Received Date: 09/29/14 09:00
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. Row: Diesel Range Organics, 0.580 J, 0.652, 0.196, mg/L, 1, 10/03/14 15:52

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 5a Androstane, 97.7, 50-150, %, 1, 10/03/14 15:52

Batch Information

Analytical Batch: XFC11607
Analytical Method: AK102
Analyst: MCM
Analytical Date/Time: 10/03/14 15:52
Container ID: 1144811004-F

Prep Batch: XXX32096
Prep Method: SW3520C
Prep Date/Time: 09/30/14 08:30
Prep Initial Wt./Vol.: 230 mL
Prep Extract Vol: 1 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Residual Range Organics, 0.272 U, 0.543, 0.163, mg/L, 1, 10/03/14 15:52

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: n-Triacontane-d62, 106, 50-150, %, 1, 10/03/14 15:52

Batch Information

Analytical Batch: XFC11607
Analytical Method: AK103
Analyst: MCM
Analytical Date/Time: 10/03/14 15:52
Container ID: 1144811004-F

Prep Batch: XXX32096
Prep Method: SW3520C
Prep Date/Time: 09/30/14 08:30
Prep Initial Wt./Vol.: 230 mL
Prep Extract Vol: 1 mL

Print Date: 10/06/2014 3:41:45PM



### Results of RSE-4

Client Sample ID: **RSE-4**  
 Client Project ID: **ARRC-2014 Hurricane Siding**  
 Lab Sample ID: 1144811004  
 Lab Project ID: 1144811

Collection Date: 09/26/14 14:50  
 Received Date: 09/29/14 09:00  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

### Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0500 U	0.100	0.0310	mg/L	1		09/30/14 03:40

#### Surrogates

4-Bromofluorobenzene	96.6	50-150		%	1		09/30/14 03:40
----------------------	------	--------	--	---	---	--	----------------

### Batch Information

Analytical Batch: VFC12142  
 Analytical Method: AK101  
 Analyst: ST  
 Analytical Date/Time: 09/30/14 03:40  
 Container ID: 1144811004-A

Prep Batch: VXX26534  
 Prep Method: SW5030B  
 Prep Date/Time: 09/29/14 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	0.250 U	0.500	0.150	ug/L	1		09/30/14 03:40
Ethylbenzene	0.340 J	1.00	0.310	ug/L	1		09/30/14 03:40
o-Xylene	0.500 U	1.00	0.310	ug/L	1		09/30/14 03:40
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		09/30/14 03:40
Toluene	0.500 U	1.00	0.310	ug/L	1		09/30/14 03:40

#### Surrogates

1,4-Difluorobenzene	96.7	77-115		%	1		09/30/14 03:40
---------------------	------	--------	--	---	---	--	----------------

### Batch Information

Analytical Batch: VFC12142  
 Analytical Method: SW8021B  
 Analyst: ST  
 Analytical Date/Time: 09/30/14 03:40  
 Container ID: 1144811004-A

Prep Batch: VXX26534  
 Prep Method: SW5030B  
 Prep Date/Time: 09/29/14 08:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 10/06/2014 3:41:45PM



## Results of RSE-4

Client Sample ID: **RSE-4**  
 Client Project ID: **ARRC-2014 Hurricane Siding**  
 Lab Sample ID: 1144811004  
 Lab Project ID: 1144811

Collection Date: 09/26/14 14:50  
 Received Date: 09/29/14 09:00  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Waters Department

<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>
Sulfate	1.34	0.100	0.0310	mg/L	1		09/30/14 08:04

## Batch Information

Analytical Batch: WIC5282  
 Analytical Method: EPA 300.0  
 Analyst: SLC  
 Analytical Date/Time: 09/30/14 08:04  
 Container ID: 1144811004-D

Prep Batch: WXX10750  
 Prep Method: METHOD  
 Prep Date/Time: 09/29/14 11:26  
 Prep Initial Wt./Vol.: 10 mL  
 Prep Extract Vol: 10 mL



**Results of RSE-X**

Client Sample ID: **RSE-X**  
Client Project ID: **ARRC-2014 Hurricane Siding**  
Lab Sample ID: 1144811005  
Lab Project ID: 1144811

Collection Date: 09/26/14 14:00  
Received Date: 09/29/14 09:00  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Dissolved Metals by ICP/MS**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Iron	6610	500	150	ug/L	5		10/01/14 13:41

**Batch Information**

Analytical Batch: MMS8696  
Analytical Method: SW6020A  
Analyst: ACF  
Analytical Date/Time: 10/01/14 13:41  
Container ID: 1144811005-E

Prep Batch: MXX28149  
Prep Method: SW3010A  
Prep Date/Time: 09/30/14 11:25  
Prep Initial Wt./Vol.: 25 mL  
Prep Extract Vol: 25 mL

Print Date: 10/06/2014 3:41:45PM



Results of RSE-X

Client Sample ID: RSE-X
Client Project ID: ARRC-2014 Hurricane Siding
Lab Sample ID: 1144811005
Lab Project ID: 1144811

Collection Date: 09/26/14 14:00
Received Date: 09/29/14 09:00
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. Row: Diesel Range Organics, 1.57, 0.647, 0.194, mg/L, 1, 10/03/14 16:12

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 5a Androstane, 73.7, 50-150, %, 1, 10/03/14 16:12

Batch Information

Analytical Batch: XFC11607
Analytical Method: AK102
Analyst: MCM
Analytical Date/Time: 10/03/14 16:12
Container ID: 1144811005-F

Prep Batch: XXX32096
Prep Method: SW3520C
Prep Date/Time: 09/30/14 08:30
Prep Initial Wt./Vol.: 232 mL
Prep Extract Vol: 1 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Residual Range Organics, 0.252 J, 0.539, 0.162, mg/L, 1, 10/03/14 16:12

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: n-Triacontane-d62, 76.3, 50-150, %, 1, 10/03/14 16:12

Batch Information

Analytical Batch: XFC11607
Analytical Method: AK103
Analyst: MCM
Analytical Date/Time: 10/03/14 16:12
Container ID: 1144811005-F

Prep Batch: XXX32096
Prep Method: SW3520C
Prep Date/Time: 09/30/14 08:30
Prep Initial Wt./Vol.: 232 mL
Prep Extract Vol: 1 mL

Print Date: 10/06/2014 3:41:45PM



Results of RSE-X

Client Sample ID: RSE-X
Client Project ID: ARRC-2014 Hurricane Siding
Lab Sample ID: 1144811005
Lab Project ID: 1144811

Collection Date: 09/26/14 14:00
Received Date: 09/29/14 09:00
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, 09/30/14 03:59

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene, 98.1, 50-150, %, 1, 09/30/14 03:59

Batch Information

Analytical Batch: VFC12142
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 09/30/14 03:59
Container ID: 1144811005-A

Prep Batch: VXX26534
Prep Method: SW5030B
Prep Date/Time: 09/29/14 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, 97.7, 77-115, %, 1, 09/30/14 03:59

Batch Information

Analytical Batch: VFC12142
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 09/30/14 03:59
Container ID: 1144811005-A

Prep Batch: VXX26534
Prep Method: SW5030B
Prep Date/Time: 09/29/14 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 10/06/2014 3:41:45PM



**Results of RSE-X**

Client Sample ID: **RSE-X**  
Client Project ID: **ARRC-2014 Hurricane Siding**  
Lab Sample ID: 1144811005  
Lab Project ID: 1144811

Collection Date: 09/26/14 14:00  
Received Date: 09/29/14 09:00  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Waters Department**

<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>
Sulfate	0.501	0.100	0.0310	mg/L	1		09/30/14 09:05

**Batch Information**

Analytical Batch: WIC5282  
Analytical Method: EPA 300.0  
Analyst: SLC  
Analytical Date/Time: 09/30/14 09:05  
Container ID: 1144811005-D

Prep Batch: WXX10750  
Prep Method: METHOD  
Prep Date/Time: 09/29/14 11:26  
Prep Initial Wt./Vol.: 10 mL  
Prep Extract Vol: 10 mL

Print Date: 10/06/2014 3:41:45PM



**Results of Trip Blank**

Client Sample ID: **Trip Blank**  
Client Project ID: **ARRC-2014 Hurricane Siding**  
Lab Sample ID: 1144811006  
Lab Project ID: 1144811

Collection Date: 09/26/14 09:00  
Received Date: 09/29/14 09:00  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Volatile Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0500 U	0.100	0.0310	mg/L	1		09/30/14 04:36

**Surrogates**

4-Bromofluorobenzene	96.4	50-150		%	1		09/30/14 04:36
----------------------	------	--------	--	---	---	--	----------------

**Batch Information**

Analytical Batch: VFC12142  
Analytical Method: AK101  
Analyst: ST  
Analytical Date/Time: 09/30/14 04:36  
Container ID: 1144811006-A

Prep Batch: VXX26534  
Prep Method: SW5030B  
Prep Date/Time: 09/29/14 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	0.250 U	0.500	0.150	ug/L	1		09/30/14 04:36
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		09/30/14 04:36
o-Xylene	0.500 U	1.00	0.310	ug/L	1		09/30/14 04:36
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		09/30/14 04:36
Toluene	0.500 U	1.00	0.310	ug/L	1		09/30/14 04:36

**Surrogates**

1,4-Difluorobenzene	98.2	77-115		%	1		09/30/14 04:36
---------------------	------	--------	--	---	---	--	----------------

**Batch Information**

Analytical Batch: VFC12142  
Analytical Method: SW8021B  
Analyst: ST  
Analytical Date/Time: 09/30/14 04:36  
Container ID: 1144811006-A

Prep Batch: VXX26534  
Prep Method: SW5030B  
Prep Date/Time: 09/29/14 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 10/06/2014 3:41:45PM

## Method Blank

Blank ID: MB for HBN 1653288 [MXX/28149]  
Blank Lab ID: 1237137

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1144811001, 1144811002, 1144811003, 1144811004, 1144811005

## Results by SW6020A

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Iron	250U	500	150	ug/L

## Batch Information

Analytical Batch: MMS8696  
Analytical Method: SW6020A  
Instrument: Perkin Elmer Sciex ICP-MS P3  
Analyst: ACF  
Analytical Date/Time: 10/1/2014 12:54:46PM

Prep Batch: MXX28149  
Prep Method: SW3010A  
Prep Date/Time: 9/30/2014 11:25:44AM  
Prep Initial Wt./Vol.: 25 mL  
Prep Extract Vol: 25 mL

Print Date: 10/06/2014 3:41:48PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1144811 [MXX28149]

Blank Spike Lab ID: 1237138

Date Analyzed: 10/01/2014 12:57

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1144811001, 1144811002, 1144811003, 1144811004, 1144811005

## Results by SW6020A

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Iron	5000	5560	111	( 80-120 )

## Batch Information

Analytical Batch: **MMS8696**

Analytical Method: **SW6020A**

Instrument: **Perkin Elmer Sciex ICP-MS P3**

Analyst: **ACF**

Prep Batch: **MXX28149**

Prep Method: **SW3010A**

Prep Date/Time: **09/30/2014 11:25**

Spike Init Wt./Vol.: 5000 ug/L Extract Vol: 25 mL

Dup Init Wt./Vol.: Extract Vol:



## Matrix Spike Summary

Original Sample ID: 1237523  
 MS Sample ID: 1237139 MS  
 MSD Sample ID: 1237140 MSD

Analysis Date: 10/01/2014 12:59  
 Analysis Date: 10/01/2014 13:01  
 Analysis Date: 10/01/2014 13:04  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1144811001, 1144811002, 1144811003, 1144811004, 1144811005

## Results by SW6020A

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Iron	7190	5000	11900	94	5000	12300	102	80-120	3.31	(< 15)

## Batch Information

Analytical Batch: MMS8696  
 Analytical Method: SW6020A  
 Instrument: Perkin Elmer Sciex ICP-MS P3  
 Analyst: ACF  
 Analytical Date/Time: 10/1/2014 1:01:50PM

Prep Batch: MXX28149  
 Prep Method: 3010 H2O Digest for Metals ICP-MS  
 Prep Date/Time: 9/30/2014 11:25:44AM  
 Prep Initial Wt./Vol.: 25.00mL  
 Prep Extract Vol: 25.00mL

Print Date: 10/06/2014 3:41:50PM



**Method Blank**

Blank ID: MB for HBN 1653261 [VXX/26533]  
Blank Lab ID: 1237021

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1144811001, 1144811002, 1144811003

**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	93.1	50-150		%

**Batch Information**

Analytical Batch: VFC12142  
Analytical Method: AK101  
Instrument: Agilent 7890A PID/FID  
Analyst: ST  
Analytical Date/Time: 9/29/2014 9:01:00AM

Prep Batch: VXX26533  
Prep Method: SW5030B  
Prep Date/Time: 9/29/2014 8:00:00AM  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 10/06/2014 3:41:51PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1144811 [VXX26533]  
 Blank Spike Lab ID: 1237024  
 Date Analyzed: 09/29/2014 10:04

Spike Duplicate ID: LCSD for HBN 1144811 [VXX26533]  
 Spike Duplicate Lab ID: 1237025  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1144811001, 1144811002, 1144811003

## Results by AK101

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	1.00	0.964	96	1.00	0.991	99	( 60-120 )	2.80	(< 20 )
<b>Surrogates</b>									
4-Bromofluorobenzene	0.0500		100	0.0500		102	( 50-150 )	2.00	

## Batch Information

Analytical Batch: VFC12142  
 Analytical Method: AK101  
 Instrument: Agilent 7890A PID/FID  
 Analyst: ST

Prep Batch: VXX26533  
 Prep Method: SW5030B  
 Prep Date/Time: 09/29/2014 08:00  
 Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL  
 Dup Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

## Method Blank

Blank ID: MB for HBN 1653261 [VXX/26533]  
 Blank Lab ID: 1237021

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1144811001, 1144811002, 1144811003

## 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	93.6	77-115		%

## Batch Information

Analytical Batch: VFC12142  
 Analytical Method: SW8021B  
 Instrument: Agilent 7890A PID/FID  
 Analyst: ST  
 Analytical Date/Time: 9/29/2014 9:01:00AM

Prep Batch: VXX26533  
 Prep Method: SW5030B  
 Prep Date/Time: 9/29/2014 8:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1144811 [VXX26533]  
 Blank Spike Lab ID: 1237022  
 Date Analyzed: 09/29/2014 09:45

Spike Duplicate ID: LCSD for HBN 1144811 [VXX26533]  
 Spike Duplicate Lab ID: 1237023  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1144811001, 1144811002, 1144811003

## Results by SW8021B

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	100	106	106	100	109	109	( 80-120 )	2.80	(< 20 )
Ethylbenzene	100	96.7	97	100	102	102	( 75-125 )	5.10	(< 20 )
o-Xylene	100	95.8	96	100	102	102	( 80-120 )	5.80	(< 20 )
P & M -Xylene	200	188	94	200	199	99	( 75-130 )	5.60	(< 20 )
Toluene	100	99.3	99	100	104	104	( 75-120 )	4.20	(< 20 )
<b>Surrogates</b>									
1,4-Difluorobenzene	50		99	50		102	( 77-115 )	2.70	

## Batch Information

Analytical Batch: **VFC12142**  
 Analytical Method: **SW8021B**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX26533**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **09/29/2014 08:00**  
 Spike Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL  
 Dup Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL

## Method Blank

Blank ID: MB for HBN 1653263 [VXX/26534]  
 Blank Lab ID: 1237032

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1144811004, 1144811005, 1144811006

## 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	96.5	50-150		%

## Batch Information

Analytical Batch: VFC12142  
 Analytical Method: AK101  
 Instrument: Agilent 7890A PID/FID  
 Analyst: ST  
 Analytical Date/Time: 9/29/2014 9:21:00PM

Prep Batch: VXX26534  
 Prep Method: SW5030B  
 Prep Date/Time: 9/29/2014 8:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 10/06/2014 3:41:56PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1144811 [VXX26534]  
 Blank Spike Lab ID: 1237035  
 Date Analyzed: 09/29/2014 23:15

Spike Duplicate ID: LCSD for HBN 1144811 [VXX26534]  
 Spike Duplicate Lab ID: 1237036  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1144811004, 1144811005, 1144811006

## Results by AK101

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	1.00	0.965	97	1.00	0.955	96	( 60-120 )	1.00	(< 20 )

### Surrogates

4-Bromofluorobenzene	0.0500	103	0.0500	101	( 50-150 )	1.20
----------------------	--------	-----	--------	-----	------------	------

## Batch Information

Analytical Batch: **VFC12142**  
 Analytical Method: **AK101**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX26534**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **09/29/2014 08:00**  
 Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL  
 Dup Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

## Method Blank

Blank ID: MB for HBN 1653263 [VXX/26534]  
 Blank Lab ID: 1237032

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1144811004, 1144811005, 1144811006

## 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	99.9	77-115		%

## Batch Information

Analytical Batch: VFC12142  
 Analytical Method: SW8021B  
 Instrument: Agilent 7890A PID/FID  
 Analyst: ST  
 Analytical Date/Time: 9/29/2014 9:21:00PM

Prep Batch: VXX26534  
 Prep Method: SW5030B  
 Prep Date/Time: 9/29/2014 8:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL



## Blank Spike Summary

Blank Spike ID: LCS for HBN 1144811 [VXX26534]  
 Blank Spike Lab ID: 1237033  
 Date Analyzed: 09/29/2014 22:56

Spike Duplicate ID: LCSD for HBN 1144811 [VXX26534]  
 Spike Duplicate Lab ID: 1237034  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1144811004, 1144811005, 1144811006

## Results by SW8021B

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	100	112	112	100	110	110	( 80-120 )	2.20	(< 20 )
Ethylbenzene	100	104	104	100	101	101	( 75-125 )	3.00	(< 20 )
o-Xylene	100	103	103	100	101	101	( 80-120 )	2.20	(< 20 )
P & M -Xylene	200	203	101	200	197	98	( 75-130 )	3.10	(< 20 )
Toluene	100	106	106	100	103	103	( 75-120 )	2.80	(< 20 )
<b>Surrogates</b>									
1,4-Difluorobenzene	50		106	50		106	( 77-115 )	0.45	

## Batch Information

Analytical Batch: **VFC12142**  
 Analytical Method: **SW8021B**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX26534**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **09/29/2014 08:00**  
 Spike Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL  
 Dup Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL

## Method Blank

Blank ID: MB for HBN 1653366 [WXX/10750]

Blank Lab ID: 1237286

QC for Samples:

1144811001, 1144811002, 1144811003, 1144811004, 1144811005

Matrix: Water (Surface, Eff., Ground)

## Results by EPA 300.0

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Sulfate	0.0500U	0.100	0.0310	mg/L

## Batch Information

Analytical Batch: WIC5282

Analytical Method: EPA 300.0

Instrument: Metrohm 733 DX2

Analyst: SLC

Analytical Date/Time: 9/30/2014 5:01:43AM

Prep Batch: WXX10750

Prep Method: METHOD

Prep Date/Time: 9/29/2014 11:26:00AM

Prep Initial Wt./Vol.: 10 mL

Prep Extract Vol: 10 mL

Print Date: 10/06/2014 3:42:03PM

## Duplicate Sample Summary

Original Sample ID: 1237288

Duplicate Sample ID: 1237289

QC for Samples:

1144811001, 1144811002, 1144811003, 1144811004, 1144811005

Analysis Date: 09/30/2014 06:02

Matrix: Water (Surface, Eff., Ground)

## Results by EPA 300.0

<u>NAME</u>	<u>Original (WXX1075)</u>	<u>Duplicate (WXX10750)</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Sulfate	0.621	0.567	9.10	20.00

## Batch Information

Analytical Batch: WIC5282  
Analytical Method: EPA 300.0  
Instrument: Metrohm 733 DX2  
Analyst: SLC

Prep Batch: Water (Surface, Eff., Ground)  
Prep Method: WIC5282  
Prep Date/Time: WXX10750

Print Date: 10/06/2014 3:42:04PM

## Duplicate Sample Summary

Original Sample ID: 1237291  
Duplicate Sample ID: 1237292

Analysis Date: 09/30/2014 10:46  
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1144811001, 1144811002, 1144811003, 1144811004, 1144811005

## Results by EPA 300.0

<u>NAME</u>	<u>Original (WXX1075)</u>	<u>Duplicate (WXX10750)</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Sulfate	18.5	18.5	0.14	20.00

## Batch Information

Analytical Batch: WIC5282  
Analytical Method: EPA 300.0  
Instrument: Metrohm 733 DX2  
Analyst: SLC

Prep Batch: Water (Surface, Eff., Ground)  
Prep Method: WIC5282  
Prep Date/Time: WXX10750

Print Date: 10/06/2014 3:42:04PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1144811 [WXX10750]

Blank Spike Lab ID: 1237287

Date Analyzed: 09/30/2014 05:22

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1144811001, 1144811002, 1144811003, 1144811004, 1144811005

## Results by EPA 300.0

Parameter	Blank Spike (mg/L)			CL
	Spike	Result	Rec (%)	
Sulfate	10	10.6	106	( 90-110 )

## Batch Information

Analytical Batch: **WIC5282**

Analytical Method: **EPA 300.0**

Instrument: **Metrohm 733 DX2**

Analyst: **SLC**

Prep Batch: **WXX10750**

Prep Method: **METHOD**

Prep Date/Time: **09/29/2014 11:26**

Spike Init Wt./Vol.: 10 mg/L Extract Vol: 10 mL

Dup Init Wt./Vol.: Extract Vol:

## Matrix Spike Summary

Original Sample ID: 1237288  
 MS Sample ID: 1237290 MS  
 MSD Sample ID:

Analysis Date: 09/30/2014 5:42  
 Analysis Date: 09/30/2014 6:22  
 Analysis Date:  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1144811001, 1144811002, 1144811003, 1144811004, 1144811005

## Results by EPA 300.0

Parameter	Sample	Matrix Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Sulfate	0.621	10.0	10.5	99				90-110		

## Batch Information

Analytical Batch: WIC5282  
 Analytical Method: EPA 300.0  
 Instrument: Metrohm 733 DX2  
 Analyst: SLC  
 Analytical Date/Time: 9/30/2014 6:22:56AM

Prep Batch: WXX10750  
 Prep Method: EPA 300.0 Extraction Waters/Liquids  
 Prep Date/Time: 9/29/2014 11:26:00AM  
 Prep Initial Wt./Vol.: 10.00mL  
 Prep Extract Vol: 10.00mL

Print Date: 10/06/2014 3:42:06PM

## Matrix Spike Summary

Original Sample ID: 1237291  
 MS Sample ID: 1237293 MS  
 MSD Sample ID:

Analysis Date: 09/30/2014 10:26  
 Analysis Date: 09/30/2014 11:07  
 Analysis Date:  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1144811001, 1144811002, 1144811003, 1144811004, 1144811005

## Results by EPA 300.0

Parameter	Sample	Matrix Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Sulfate	18.5	10.0	28.5	100				90-110		

## Batch Information

Analytical Batch: WIC5282  
 Analytical Method: EPA 300.0  
 Instrument: Metrohm 733 DX2  
 Analyst: SLC  
 Analytical Date/Time: 9/30/2014 11:07:11AM

Prep Batch: WXX10750  
 Prep Method: EPA 300.0 Extraction Waters/Liquids  
 Prep Date/Time: 9/29/2014 11:26:00AM  
 Prep Initial Wt./Vol.: 10.00mL  
 Prep Extract Vol: 10.00mL

## Method Blank

Blank ID: MB for HBN 1653267 [XXX/32096]  
 Blank Lab ID: 1237040

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1144811001, 1144811002, 1144811003, 1144811004, 1144811005

## 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	81.7	60-120		%

## Batch Information

Analytical Batch: XFC11607  
 Analytical Method: AK102  
 Instrument: HP 7890A FID SV E R  
 Analyst: MCM  
 Analytical Date/Time: 10/3/2014 1:46:00PM

Prep Batch: XXX32096  
 Prep Method: SW3520C  
 Prep Date/Time: 9/30/2014 8:30:44AM  
 Prep Initial Wt./Vol.: 250 mL  
 Prep Extract Vol: 1 mL

Print Date: 10/06/2014 3:42:07PM



## Blank Spike Summary

Blank Spike ID: LCS for HBN 1144811 [XXX32096]  
 Blank Spike Lab ID: 1237041  
 Date Analyzed: 10/03/2014 14:08

Spike Duplicate ID: LCSD for HBN 1144811  
 [XXX32096]  
 Spike Duplicate Lab ID: 1237042  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1144811001, 1144811002, 1144811003, 1144811004, 1144811005

## 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	18.8	94	20	18.5	93	( 75-125 )	1.30	(< 20 )	
<b>Surrogates</b>										
5a Androstane	0.4		94	0.4		92	( 60-120 )	2.50		

## Batch Information

Analytical Batch: **XFC11607**  
 Analytical Method: **AK102**  
 Instrument: **HP 7890A FID SV E R**  
 Analyst: **MCM**

Prep Batch: **XXX32096**  
 Prep Method: **SW3520C**  
 Prep Date/Time: **09/30/2014 08:30**  
 Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL  
 Dup Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

## Method Blank

Blank ID: MB for HBN 1653267 [XXX/32096]  
Blank Lab ID: 1237040

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1144811001, 1144811002, 1144811003, 1144811004, 1144811005

## 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	85.5	60-120		%

## Batch Information

Analytical Batch: XFC11607  
Analytical Method: AK103  
Instrument: HP 7890A FID SV E R  
Analyst: MCM  
Analytical Date/Time: 10/3/2014 1:46:00PM

Prep Batch: XXX32096  
Prep Method: SW3520C  
Prep Date/Time: 9/30/2014 8:30:44AM  
Prep Initial Wt./Vol.: 250 mL  
Prep Extract Vol: 1 mL

Print Date: 10/06/2014 3:42:09PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1144811 [XXX32096]  
 Blank Spike Lab ID: 1237041  
 Date Analyzed: 10/03/2014 14:08

Spike Duplicate ID: LCSD for HBN 1144811 [XXX32096]  
 Spike Duplicate Lab ID: 1237042  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1144811001, 1144811002, 1144811003, 1144811004, 1144811005

## 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	18.4	92	20	18.3	92	( 60-120 )	0.17	(< 20 )
<b>Surrogates</b>									
n-Triacontane-d62	0.4		92	0.4		89	( 60-120 )	3.70	

## Batch Information

Analytical Batch: **XFC11607**  
 Analytical Method: **AK103**  
 Instrument: **HP 7890A FID SV ER**  
 Analyst: **MCM**

Prep Batch: **XXX32096**  
 Prep Method: **SW3520C**  
 Prep Date/Time: **09/30/2014 08:30**  
 Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL  
 Dup Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL



# SGS North America CHAIN OF CUSTODY

# 1144811



Locations Nationwide  
 Alaska Maryland  
 New Jersey New York  
 North Carolina Ohio  
 West Virginia

www.us.sgs.com

CLIENT: Fairbanks Environmental Services  
 CONTACT: Mike Boese PHONE NO: 907-452-1006  
 PROJECT/SITE: Hurricane Siding (ARRC)  
 REPORTS TO: Mike Boese E-MAIL: MBoese@FESalaska.com  
 INVOICE TO: ARRC Project: ARRC-2014 Hurricane  
 CONTRACT NUMBER: ARRC - 265-2429

SGS Reference #: \_\_\_\_\_ page 1 of 1

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX/ MATRIX CODE	Preservative SAMPLE TYPE	HCl	HCl	HNO <sub>3</sub>	None	REMARKS
① A-G	RSE-1	9/26/2014	1300	Water	G	X	X	X	X	
② A-G	RSE-2	9/26/2014	1145	Water	G	X	X	X	X	
③ A-G	RSE-3	9/26/2014	1355	Water	G	X	X	X	X	
④ A-G	RSE-4	9/26/2014	1450	Water	G	X	X	X	X	
⑤ A-G	RSE-X	9/26/2014	1400	Water	G	X	X	X	X	
⑥ A-C	Trip Blank	9/26/2014	900	Water	G	X				

Collected/Relinquished By: (1) *Michael Boese* Date: 9/29/14 Time: 0840  
 Received By: \_\_\_\_\_  
 Relinquished By: (2) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Relinquished By: (3) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Relinquished By: (4) \_\_\_\_\_ Date: 9/29/14 Time: 9:00  
 Received For Laboratory By: *Sam Duong*

DOD Project? NO Special Deliverable Requirements:  
 Cooler ID \_\_\_\_\_  
 Cooler Temp °C \_\_\_\_\_  
 Level 2 Data Package, EQUIS, EDF VERSION 1.2a, and PDF. No hard copy required.

Requested Turnaround Time and/or Special Instructions:  
 Quote 10402, Normal TAT, Bill ARRC directly (265-2429)

Temperature Blank °C: 4.2 #242 Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT IF 15

200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301  
 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1903  
[http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm)



## SAMPLE RECEIPT FORM

Review Criteria:	Condition:	Comments/Action Taken:
Were <b>custody seals</b> intact? Note # & location, if applicable. COC accompanied samples?	Yes No N/A <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Exemption permitted if sampler hand carries/delivers. 15, 1B
<b>Temperature blank</b> compliant* (i.e., 0-6°C after CF)? If >6°C, were samples collected <8 hours ago? If <0°C, were all sample containers ice free? Cooler ID: <u>1</u> @ <u>4, 2</u> w/ Therm.ID: <u>242</u> Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ If samples are received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank <u>nor</u> cooler temp can be obtained, note "ambient" or "chilled."	Yes No N/A <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Yes No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Exemption permitted if chilled & collected <8 hrs ago. Sample 4C has ICE in it Alternate container used for analysis, results are not impacted <i>Ma/29</i> . Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.
Delivery method (specify all that apply): USPS Lynden AK Air Alert Courier UPS FedEx RAVN C&D Delivery Carlisle Pen Air Warp Speed Other: _____ → For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?	Client (hand carried) Alert Courier C&D Delivery Other: _____ Tracking/AB # or see attached or N/A Yes No N/A	
→ For samples received with payment, note amount ( \$ ) and whether cash / check / CC (circle one) was received. → For samples received in FBKS, ANCH staff will verify all criteria are reviewed. SRF initiated in FBKS by:		
Were samples received within hold time? Do samples <b>match COC*</b> (i.e., sample IDs, dates/times collected)? Were analyses requested unambiguous?	Yes No N/A <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Note: Refer to form F-083 "Sample Guide" for hold times. Note: If times differ <1hr, record details and login per COC.
Were samples in <b>good condition</b> (no leaks/cracks/breakage)? Packing material used (specify all that apply): Bubble Wrap Separate plastic bags Vermiculite Other:	Yes No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Were <b>proper containers</b> (type/mass/volume/preservative*) used? Were <b>Trip Blanks</b> (i.e., VOAs, LL-Hg) in cooler with samples? Were all VOA vials <b>free of headspace</b> (i.e., bubbles ≤6 mm)? Were all soil VOAs <b>field extracted</b> with MeOH+BFB?	Yes No N/A <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Exemption permitted for metals (e.g., 200.8/6020A).
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was <b>pH verified and compliant</b> ? If pH was adjusted, were bottles flagged (i.e., stickers)?	Yes No N/A <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
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)?	Yes No N/A <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
For <b>RUSH/SHORT Hold Time</b> , were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
For <b>SITE-SPECIFIC QC</b> , e.g. BMS/BMSD/BDUP, were containers / paperwork flagged accordingly?	Yes No N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	Yes No N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	SRF Completed by: <i>[Signature]</i> PM notified: N/A
Was <b>PEER REVIEW</b> of sample numbering/labeling completed?	Yes No N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Peer Reviewed by: N/A

Additional notes (if applicable):

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



## Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1144811001-A	HCL to pH < 2	OK			
1144811001-B	HCL to pH < 2	OK			
1144811001-C	HCL to pH < 2	OK			
1144811001-D	No Preservative Required	OK			
1144811001-E	HNO3 to pH < 2	OK			
1144811001-F	HCL to pH < 2	OK			
1144811001-G	HCL to pH < 2	OK			
1144811002-A	HCL to pH < 2	OK			
1144811002-B	HCL to pH < 2	OK			
1144811002-C	HCL to pH < 2	OK			
1144811002-D	No Preservative Required	OK			
1144811002-E	HNO3 to pH < 2	OK			
1144811002-F	HCL to pH < 2	OK			
1144811002-G	HCL to pH < 2	OK			
1144811003-A	HCL to pH < 2	OK			
1144811003-B	HCL to pH < 2	OK			
1144811003-C	HCL to pH < 2	OK			
1144811003-D	No Preservative Required	OK			
1144811003-E	HNO3 to pH < 2	OK			
1144811003-F	HCL to pH < 2	OK			
1144811003-G	HCL to pH < 2	OK			
1144811004-A	HCL to pH < 2	OK			
1144811004-B	HCL to pH < 2	OK			
1144811004-C	HCL to pH < 2	FR			
1144811004-D	No Preservative Required	OK			
1144811004-E	HNO3 to pH < 2	OK			
1144811004-F	HCL to pH < 2	OK			
1144811004-G	HCL to pH < 2	OK			
1144811005-A	HCL to pH < 2	OK			
1144811005-B	HCL to pH < 2	OK			
1144811005-C	HCL to pH < 2	OK			
1144811005-D	No Preservative Required	OK			
1144811005-E	HNO3 to pH < 2	OK			
1144811005-F	HCL to pH < 2	OK			
1144811005-G	HCL to pH < 2	OK			
1144811006-A	HCL to pH < 2	OK			
1144811006-B	HCL to pH < 2	OK			
1144811006-C	HCL to pH < 2	OK			

**APPENDIX B**  
**ADEC LABORATORY REVIEW CHECKLIST**

## Laboratory Data Review Checklist

Completed by:

Title:  Date:

CS Report Name:  Report Date:

Consultant Firm:

Laboratory Name:  Laboratory Report Number:

ADEC File Number:  ADEC RecKey Number:

1. Laboratory

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

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?  
     Yes     No     NA (Please explain.)                      Comments:

2. Chain of Custody (COC)

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

- b. Correct analyses requested?  
     Yes     No     NA (Please explain.)                      Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ( $4^{\circ} \pm 2^{\circ} \text{C}$ )?  
     Yes     No     NA (Please explain.)                      Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?  
     Yes     No     NA (Please explain.)                      Comments:



- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?  
■Yes No NA (Please explain.) Comments:

There was ice in sample jar “4C” associated with sample RSE-4. There was no impact to data since analysis was performed using an alternate container.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?  
■Yes No NA (Please explain.) Comments:

See 3c.

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

There was no impact to data quality; See 3c for details.

#### 4. Case Narrative

- a. Present and understandable?  
■Yes No NA (Please explain.) Comments:

- b. Discrepancies, errors or QC failures identified by the lab?  
Yes No ■NA (Please explain.) Comments:

No discrepancies, errors, of QC failures were identified.

- c. Were all corrective actions documented?  
Yes No ■NA (Please explain.) Comments:

No discrepancies, errors, of QC failures were identified.

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

The case narrative only described the laboratory qualifications made to the data based on problems encountered during sample receiving and analysis. No discrepancies, errors, of QC failures were identified. The case narrative only discussed DRO patterns.

#### 5. Samples Results

- a. Correct analyses performed/reported as requested on COC?  
■Yes No NA (Please explain.) Comments:

- b. All applicable holding times met?

Yes   No   NA (Please explain.)                      Comments:

c. All soils reported on a dry weight basis?  
Yes   No    NA (Please explain.)                      Comments:

No soil samples submitted for analysis.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?  
 Yes   No   NA (Please explain.)                      Comments:

e. Data quality or usability affected?    Comments:

Data reported with adequate sensitivity, and were analyzed within hold time. There was no impact to data quality or usability.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?  
 Yes   No   NA (Please explain.)                      Comments:

ii. All method blank results less than PQL?  
 Yes   No   NA (Please explain.)                      Comments:

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

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?  
Yes   No    NA (Please explain.)                      Comments:

No data were impacted by method blank contamination

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

No data were adversely impacted; all method blanks were ND.

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

- i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

■ Yes No NA (Please explain.) Comments:

LCS/LCSD samples were performed for every analytical batch. LCS accuracy and precision was evaluated.

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

■ Yes No NA (Please explain.) Comments:

- iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

■ Yes No NA (Please explain.) Comments:

- iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

■ Yes No NA (Please explain.) Comments:

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

Comments:

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

Yes No ■ NA (Please explain.) Comments:

All batch precision and accuracy measurements were acceptable, so no flags were required.

- vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

No impact to data. See discussion above.

c. Surrogates – Organics Only

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

■ Yes No NA (Please explain.) Comments:

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

Yes  No  NA (Please explain.)                      Comments:

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

Yes  No  NA (Please explain.)                      Comments:

No samples had failed surrogate recoveries.

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

Comments:

Data quality was not impacted. No samples had failed surrogate recoveries.

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

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes  No  NA (Please explain.)                      Comments:

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes  No  NA (Please explain.)                      Comments:

- iii. All results less than PQL?

Yes  No  NA (Please explain.)                      Comments:

No analytes were detected in the trip blank sample.

- iv. If above PQL, what samples are affected?

Comments:

No analytes were detected in the trip blank sample.

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

Comments:

Data quality was not impacted. No analytes were detected in the trip blank sample.

e. Field Duplicate

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

Yes  No  NA (Please explain.)      Comments:

Field duplicates were collected at a minimum frequency of 10% for all analyses, per contractual requirement.

ii. Submitted blind to lab?

Yes  No  NA (Please explain.)      Comments:

Sample RSE-X was a field duplicate sample for project sample RSE-3.

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

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

Where  $R_1$  = Sample Concentration

$R_2$  = Field Duplicate Concentration

Yes  No  NA (Please explain.)      Comments:

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

Comments:

No impact to data quality. Field duplicate precision was acceptable.

f. Decontamination or Equipment Blank (If not used explain why).

Yes  No  NA (Please explain.)      Comments:

Samples were collected using a peristaltic pump and new, disposable tubing at each well, so a rinsate sample was not required.

i. All results less than PQL?

Yes  No  NA (Please explain.)      Comments:

A rinsate sample was not submitted.

ii. If above PQL, what samples are affected?

Comments:

Not applicable. A rinsate sample was not submitted.

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

Comments:

Not applicable. A rinsate sample was not submitted.

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

a. Defined and appropriate?

■ Yes No NA (Please explain.)

Comments:

Results reported below the limit of quantitation (LOQ) were qualified with a J flag to indicate they are estimated values.