

FES

3538 International Street  
Fairbanks, Alaska 99701

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

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**FAIRBANKS ENVIRONMENTAL SERVICES**



DATE: September 30, 2013

TO: Mr. Russell Grandel, Alaska Railroad Corporation

FROM: Michael Boese, Fairbanks Environmental Services

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

## EXECUTIVE SUMMARY

On June 12 and 13, 2013, Fairbanks Environmental Services (FES) collected groundwater samples from four existing 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) groundwater cleanup levels for DRO and RRO. All other laboratory results were below ADEC Table C cleanup levels. Natural attenuation indicator parameters suggest that biodegradation of petroleum hydrocarbons has occurred via iron and sulfate reduction.

A limited removal could be conducted to excavate soils with concentrations greater than 10,000 milligrams per kilogram (mg/Kg). Excavation should be combined with a continued groundwater monitoring program to document impacts.

## 1.0 INTRODUCTION

### 1.1 Site Description

The Hurricane Siding is located at railroad milepost 281.5 (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.

During the 2009 investigation, both GRO and DRO were detected in soil samples west and southwest of the former diesel UST excavation area (Clarus 2010) at concentrations in excess of ADEC Method 2 migration to groundwater cleanup levels (300 milligrams per kilogram [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.

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).

## 2.0 WORK PERFORMED

### 2.1 Water Level Measurements

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 June 12, 2013 are shown on Figure 2.

### 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. Turbidity readings were measured with an Oakton T-100 turbidimeter. With two exceptions, 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. Wells RSE-2 and RSE-3 were both pumped dry on June 12 and were sampled without measuring parameters after a one day recovery period. Well RSE-2 drew down on a very low flow setting and went dry after approximately 1 casing volume had been removed and RSE-3 was

pumped dry after only half a casing volume due to presence of ice in the well. To increase the yield, two pints of heated drinking water was inserted into the well casing to melt the ice, and the total depth in RSE-3 increased from 4.9 feet bgs to 6 feet bgs. RSE-3 was pumped dry a second time on June 12 to remove the drinking water and any ice melt.

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-4. 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 200.8 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, are summarized in Table 1. Laboratory results from June 2013 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 2.1 to 4.5 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 0.016. This direction and gradient are consistent with 2011 data (Restoration Science and Engineering 2012) and 2012 data (FES 2012); however, there does appear to be some minor variations in contours near wells that contained ice (RSE-2 and RSE-3). Minor jacking was noted in well RSE-3 during the June sampling event and it may have slightly skewed contour lines near that location. No floating product was identified.

All groundwater samples had results below Table C cleanup levels except for DRO and RRO in well RSE-3. The DRO and RRO results in RSE-3 were notably higher than previous results from this well.

Natural attenuation parameters indicate that anaerobic biodegradation of petroleum hydrocarbons is occurring at the site via iron and sulfate reduction. Elevated ferrous iron concentrations (indicative of iron reduction) and 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 (RSE-1).

### 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

With two exceptions, groundwater samples were collected and analyzed in accordance with the approved Work Plan (FES 2013). Wells RSE-2 and RSE-3 were purged dry on June 12, 2013 and were sampled without purging on June 13, 2013 upon full recharge. Well RSE-2 has historically been a low yield well, and the presence of ice in RSE-3 presumably inhibited recharge; a foot of ice was melted in RSE-3 on June 12, 2013. The unconventional sampling method, especially in well RSE-3, may have affected sample results.

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 1132384. 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. Sample RSE-3 was reanalyzed by the project laboratory for DRO and RRO at the request of FES (under work order 1132902) because the result was elevated above historical results and because the sample did not exhibit significant odor/sheen. The reanalyzed DRO and RRO results (ran 12 days outside of holding time) confirmed the original results.

## 6.0 CONCLUSION AND RECOMMENDATIONS

DRO and RRO exceeded the ADEC groundwater cleanup level in one well, RSE-3, during the June 2013 sampling event. If detected, GRO and BTEX concentrations were two to three orders of magnitude below their respective cleanup levels. Contaminant concentrations in downgradient well RSE-4 were below cleanup levels and show that contamination is not leaving the site. Changes noted in natural attenuation parameter concentrations indicate that anaerobic biodegradation of hydrocarbons has occurred.

The DRO concentration in RSE-3 has increased during each of the last three annual sampling events, and RRO was detected in this well for the first time; this is the also first time the DRO or RRO concentrations exceeded the cleanup level in RSE-3.

Based on results from the 2009 soil investigation, elevated concentrations of petroleum hydrocarbons are present in soil in the area surrounding the south end of the former UST (Clarus 2010). Although the 2013 groundwater results indicate that anaerobic biodegradation has occurred, natural attenuation is not likely a feasible remedy to treat the contaminant source. Contaminant concentrations in the downgradient well (RSE-4) have been below ADEC groundwater cleanup levels during the last two sampling events (2012 and 2013), indicating that groundwater contamination migration to this well is no longer occurring.

A limited excavation of residual source area contaminated soils located near 2009 borings B1 and B5 (shown on Figure 2) 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. The wells should be sampled between mid-July and September to avoid ice in monitoring wells.

## 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 – 2013 Field Parameters

Table 2 – 2013 Groundwater Results

Table 3 – Historical Groundwater Results

Figure 1 – Vicinity Map

Figure 2 – Site Map

Figure 3 – 2013 DRO and RRO Results

Appendix A – SGS Report 1132384

Appendix B – ADEC Laboratory Review Checklist

**Table 1 - 2013 Field Parameters  
ARRC Hurricane Siding**

Well	Date	Seen or Odor?	Depth to Groundwater (feet BTOC)	Temperature (Degrees Celsius)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	pH	Potential (mV)	Turbidity (NTU)
RSE-1	6/12/2013	None	4.09	4.34	0.284	10.52 <sup>2</sup>	4.50	96.9	2.36
RSE-2	6/12/2013	None	4.54	Dry <sup>1</sup>	Dry <sup>1</sup>	Dry <sup>1</sup>	Dry <sup>1</sup>	Dry <sup>1</sup>	Dry <sup>1</sup>
RSE-3	6/12/2013	Light Odor	3.73 <sup>3</sup>	Dry <sup>1</sup>	Dry <sup>1</sup>	Dry <sup>1</sup>	Dry <sup>1</sup>	Dry <sup>1</sup>	Dry <sup>1</sup>
RSE-4	6/12/2013	Moderate Odor	2.12	3.35	0.048	7.62 <sup>2</sup>	4.60	88.4	19.24

<sup>1</sup> - Wells RSE-2 and RSE-3 were purged dry before groundwater parameters could stabilize.

<sup>2</sup> - Dissolved oxygen readings are inaccurate due to a bad membrane.

<sup>3</sup> - Well RSE-3 had jacked slightly since the previous vertical survey in 2012.

BTOC - below top of casing

mg/L - milligrams per liter

mS/cm - milliSiemens per centimeter

mV - millivolts

NTU - nephelometric turbidity units

Table 2 - 2013 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 1132384001 Primary 6/12/2013 Groundwater	RSE-2 RSE-2 1132384002 Primary 6/13/2013 Groundwater	RSE-3 RSE-3 1132384003 Primary 6/13/2013 Groundwater	RSE-4 RSE-4 1132384004 Primary 6/12/2013 Groundwater	RSE-X RSE-4 1132384005 Field Duplicate 6/12/2013 Groundwater	Trip Blank Trip Blank 1132384006 Trip Blank 6/12/2013 Water
Analyte	Analysis	Units		Result [LOD]	Result [LOD]	Result [LOD]	Result [LOD]	Result [LOD]	Result [LOD]
Benzene	SW8021B	ug/L	5	ND [0.3]	ND [0.3]	ND [0.3]	ND [0.3]	ND [0.3]	ND [0.3]
Toluene	SW8021B	ug/L	1,000	ND [0.62]	ND [0.62]	0.78 [0.62] J	ND [0.62]	ND [0.62]	ND [0.62]
Ethylbenzene	SW8021B	ug/L	700	ND [0.62]	ND [0.62]	ND [0.62]	ND [0.62]	ND [0.62]	ND [0.62]
o-Xylene	SW8021B	ug/L	10,000 <sup>2</sup>	ND [0.62]	ND [0.62]	ND [0.62]	ND [0.62]	ND [0.62]	ND [0.62]
p & m -Xylene	SW8021B	ug/L		ND [1.24]	ND [1.24]	ND [1.24]	ND [1.24]	ND [1.24]	ND [1.24]
Gasoline Range Organics	AK101	mg/L	2.2	ND [0.062]	ND [0.062]	ND [0.062]	0.0341 [0.062] J	ND [0.062]	ND [0.062]
Diesel Range Organics	AK102	mg/L	1.5	0.323 [0.360] J	0.237 [0.392] J	5.51 [0.360]	0.425 [0.346] J	0.385 [0.360] J	-
Residual Range Organics	AK103	mg/L	1.1	0.567 [0.300]	0.388 [0.326] J	1.34 [0.300]	0.252 [0.288] J	0.188 [0.300] J	-
Iron	200.8	ug/L	NA	ND [156]	ND [156]	679 [156]	306 [156]		
Sulfate	300.0	mg/L	NA	5.99 [0.062]	6.03 [0.062]	0.600 [0.062]	1.53 [0.062]		

<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

ug/L - micrograms per liter

mg/L - milligrams per liter

NA - not applicable

ND - analytes 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-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-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-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

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)Qual

ADEC - Alaska Department of Environmental Conservation

DRO - Diesel 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

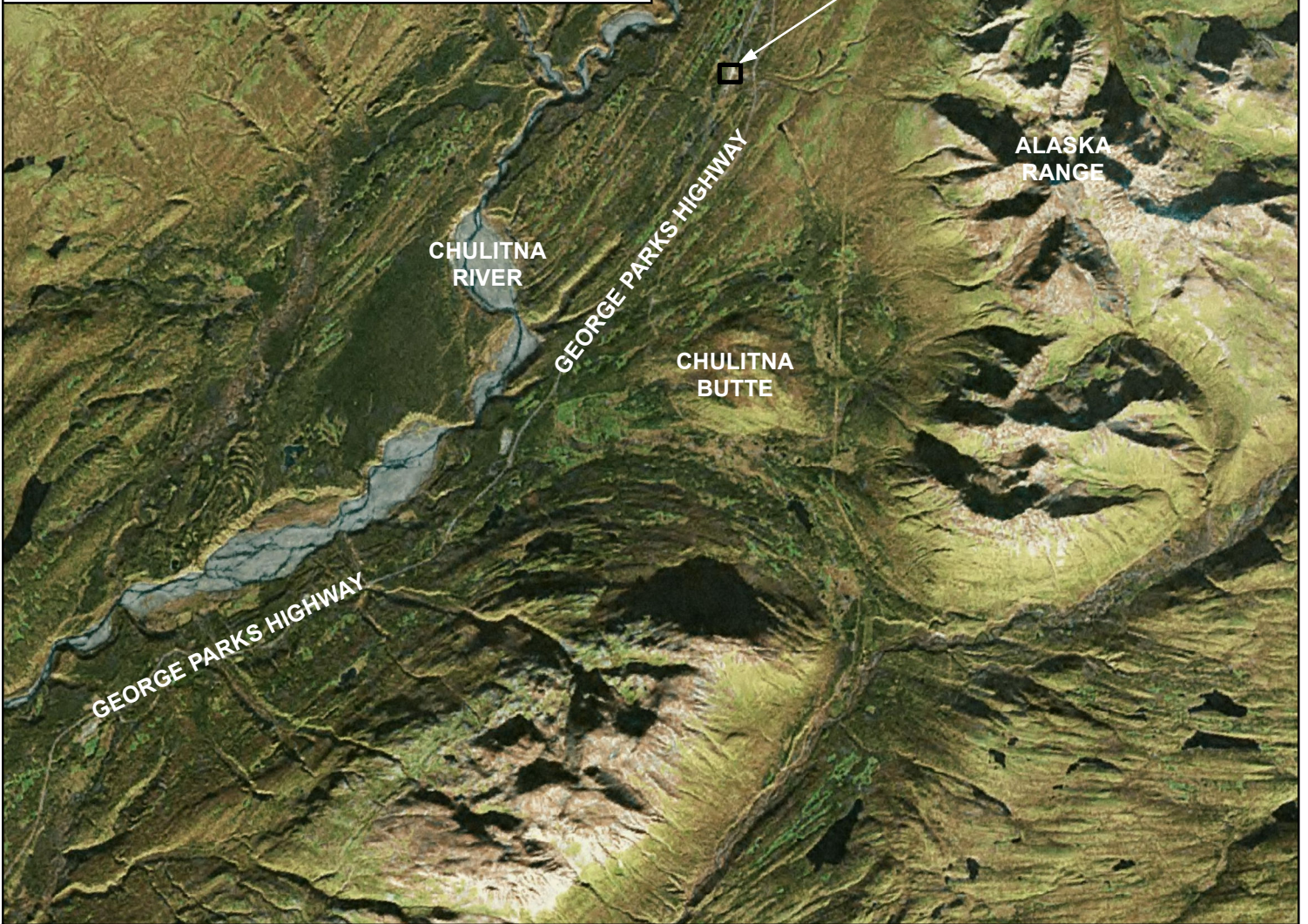
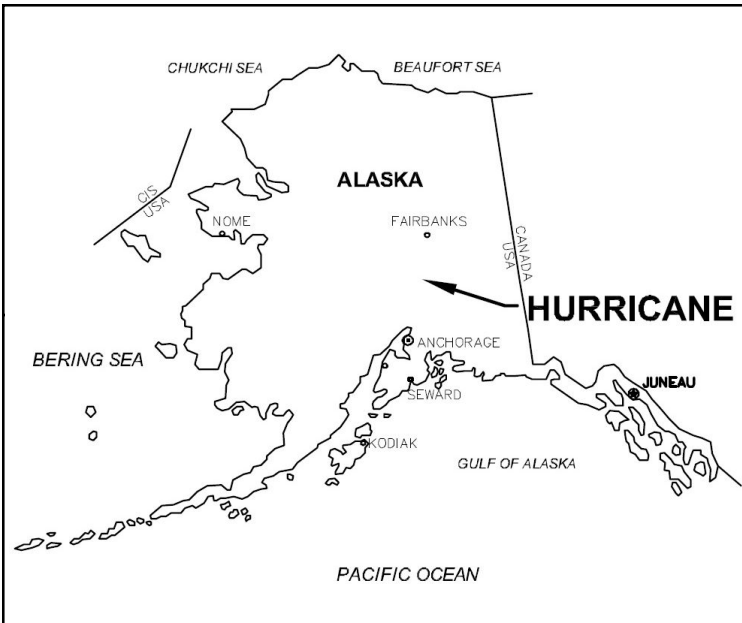
Q - Sample result is considered an estimate due to field duplicate imprecision

Qual - Qualifier

RRO - Residual range organics

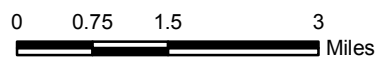
ug/L - Micrograms per Liter





**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**

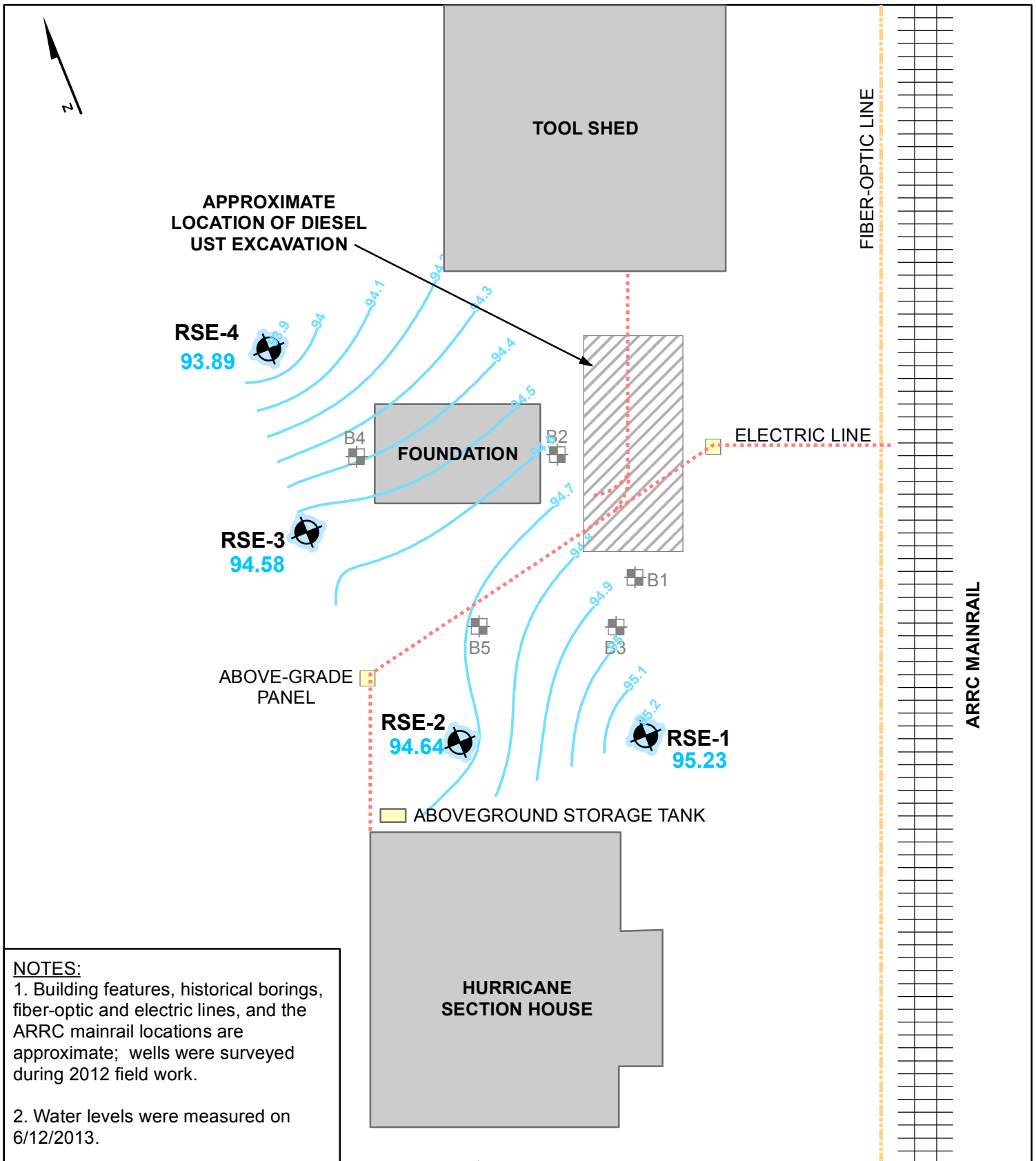
Report  
 Hurricane Siding  
 Hurricane, Alaska

CONTRACT: 85304

FIGURE: 1

DATE: 8/13





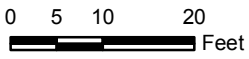
**NOTES:**

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

2. Water levels were measured on 6/12/2013.

**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**  
Report  
Hurricane Siding  
Hurricane, Alaska

CONTRACT:  
85304

FIGURE:  
2

DATE:  
8/13

**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

FOUNDATION

ELECTRIC LINE

FIBER-OPTIC LINE

ARRC MAINRAIL

**RSE-4**

DRO: 0.425 J  
RRO: 0.252 J

Field Duplicate  
DRO: 0.385 J  
RRO: 0.188 J

**RSE-3**

DRO: **5.51**  
RRO: **1.34**

ABOVE-GRADE PANEL

**RSE-2**

DRO: 0.237 J  
RRO: 0.388 J

**RSE-1**

DRO: 0.323 J  
RRO: 0.567

ABOVEGROUND STORAGE TANK

HURRICANE SECTION HOUSE

**NOTES:**

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

2. Water levels were measured on 6/12/2013.

**LEGEND:**



Monitoring Well



Soil Boring (2009)



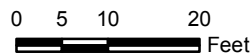
Approximate Location of Fiber-Optic Line



Approximate Location of Electric Line



Approximate Location of Alaska Railroad



Fairbanks Environmental Services  
3538 International Street  
Fairbanks, Alaska 99701



ALASKA RAILROAD CORPORATION

**2013 DRO and RRO Results**

Report  
Hurricane Siding  
Hurricane, Alaska

CONTRACT:  
85304

FIGURE:  
3

DATE:  
8/13

**APPENDIX A**  
**SGS LABORATORY REPORT 1132384**

## Laboratory Report of Analysis

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

Report Number: **1132384**

Client Project: **Hurricane Siding (ARRC)**

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 Steve 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  
Environmental Services - Alaska Division  
Project Manager

Steven Crupi  
2013.06.28  
15:48:43 -08'00'

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Steve Crupi  
Project Manager  
steven.crupi@sgs.com

Date

### Case Narrative

SGS Client: **AK Railroad Corp**  
SGS Project: **1132384**  
Project Name/Site: **Hurricane Siding (ARRC)**  
Project Contact: **Mike Boese**

Refer to sample receipt form for information on sample condition.

**RSE-1 (1132384001) PS**

AK103 - Unknown hydrocarbon with several peaks is present.

**RSE-3 (1132384003) PS**

AK102 - The pattern is consistent with a weathered middle distillate.  
AK103 - Unknown hydrocarbon with several peaks is present.

**CCV2 for HBN 1455689 (VFC/1146 (1153745) CCV2**

8021B - CCV2 recoveries for toluene and ethylbenzene do not meet QC criteria (biased high). These analytes were not detected above LOQ in the associated samples.

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

Print Date: 06/28/2013 3:41:08PM

## 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., 2xDL)
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	1132384001	06/12/2013	06/14/2013	Water (Surface, Eff., Ground)
RSE-2	1132384002	06/13/2013	06/14/2013	Water (Surface, Eff., Ground)
RSE-3	1132384003	06/13/2013	06/14/2013	Water (Surface, Eff., Ground)
RSE-4	1132384004	06/12/2013	06/14/2013	Water (Surface, Eff., Ground)
RSE-X	1132384005	06/12/2013	06/14/2013	Water (Surface, Eff., Ground)
Trip Blank	1132384006	06/12/2013	06/14/2013	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
EPA 300.0	Ion Chromatographic Analysis (W)
EP200.8	Metals in Drinking Water by ICP-MS DISSO

Print Date: 06/28/2013 3:41:09PM



### Detectable Results Summary

Client Sample ID: **RSE-1**  
 Lab Sample ID: 1132384001  
**Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	0.323J	mg/L
Residual Range Organics	0.567	mg/L
Sulfate	5.99	mg/L

**Waters Department**

Client Sample ID: **RSE-2**  
 Lab Sample ID: 1132384002  
**Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	0.237J	mg/L
Residual Range Organics	0.388J	mg/L
Sulfate	6.03	mg/L

**Waters Department**

Client Sample ID: **RSE-3**  
 Lab Sample ID: 1132384003  
**Dissolved Metals by ICP/MS**  
**Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Iron	679	ug/L
Diesel Range Organics	5.51	mg/L
Residual Range Organics	1.34	mg/L
Toluene	0.780J	ug/L
Sulfate	0.600	mg/L

**Volatile Fuels**

**Waters Department**

Client Sample ID: **RSE-4**  
 Lab Sample ID: 1132384004  
**Dissolved Metals by ICP/MS**  
**Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Iron	306	ug/L
Diesel Range Organics	0.425J	mg/L
Residual Range Organics	0.252J	mg/L
Gasoline Range Organics	0.0341J	mg/L
Sulfate	1.53	mg/L

**Volatile Fuels**

**Waters Department**

Client Sample ID: **RSE-X**  
 Lab Sample ID: 1132384005  
**Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	0.385J	mg/L
Residual Range Organics	0.188J	mg/L

## Results of RSE-1

Client Sample ID: **RSE-1**  
Client Project ID: **Hurricane Siding (ARRC)**  
Lab Sample ID: 1132384001  
Lab Project ID: 1132384

Collection Date: 06/12/13 13:00  
Received Date: 06/14/13 09:03  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

## Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Iron	156	U	250	78.0	ug/L	1	06/24/13 20:26

## Batch Information

Analytical Batch: MMS8010  
Analytical Method: EP200.8  
Analyst: ACF  
Analytical Date/Time: 06/24/13 20:26  
Container ID: 1132384001-F

Prep Batch: MXX26603  
Prep Method: E200.2  
Prep Date/Time: 06/24/13 09:25  
Prep Initial Wt./Vol.: 20 mL  
Prep Extract Vol: 50 mL

Print Date: 06/28/2013 3:41:10PM



Results of RSE-1

Client Sample ID: RSE-1
Client Project ID: Hurricane Siding (ARRC)
Lab Sample ID: 1132384001
Lab Project ID: 1132384

Collection Date: 06/12/13 13:00
Received Date: 06/14/13 09:03
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by Semivolatile Organic Fuels

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

Batch Information

Analytical Batch: XFC10932
Analytical Method: AK102
Analyst: HM
Analytical Date/Time: 06/20/13 18:51
Container ID: 1132384001-D

Prep Batch: XXX29187
Prep Method: SW3520C
Prep Date/Time: 06/18/13 09:45
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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

Batch Information

Analytical Batch: XFC10932
Analytical Method: AK103
Analyst: HM
Analytical Date/Time: 06/20/13 18:51
Container ID: 1132384001-D

Prep Batch: XXX29187
Prep Method: SW3520C
Prep Date/Time: 06/18/13 09:45
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL



Results of RSE-1

Client Sample ID: RSE-1  
Client Project ID: Hurricane Siding (ARRC)  
Lab Sample ID: 1132384001  
Lab Project ID: 1132384

Collection Date: 06/12/13 13:00  
Received Date: 06/14/13 09:03  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

Results by Volatile Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	0.0620	U	0.100	0.0310	mg/L	1	06/19/13 02:41

Surrogates

4-Bromofluorobenzene	77		50-150		%	1	06/19/13 02:41
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Batch Information

Analytical Batch: VFC11469  
Analytical Method: AK101  
Analyst: ST  
Analytical Date/Time: 06/19/13 02:41  
Container ID: 1132384001-A

Prep Batch: VXX24822  
Prep Method: SW5030B  
Prep Date/Time: 06/18/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	0.300	U	0.500	0.150	ug/L	1	06/19/13 02:41
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	06/19/13 02:41
o-Xylene	0.620	U	1.00	0.310	ug/L	1	06/19/13 02:41
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	06/19/13 02:41
Toluene	0.620	U	1.00	0.310	ug/L	1	06/19/13 02:41

Surrogates

1,4-Difluorobenzene	93		77-115		%	1	06/19/13 02:41
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Batch Information

Analytical Batch: VFC11469  
Analytical Method: SW8021B  
Analyst: ST  
Analytical Date/Time: 06/19/13 02:41  
Container ID: 1132384001-A

Prep Batch: VXX24822  
Prep Method: SW5030B  
Prep Date/Time: 06/18/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

## Results of RSE-1

Client Sample ID: **RSE-1**  
Client Project ID: **Hurricane Siding (ARRC)**  
Lab Sample ID: 1132384001  
Lab Project ID: 1132384

Collection Date: 06/12/13 13:00  
Received Date: 06/14/13 09:03  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

## Results by Waters Department

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Sulfate	5.99		0.100	0.0310	mg/L	1	06/21/13 08:59

## Batch Information

Analytical Batch: WIC5110  
Analytical Method: EPA 300.0  
Analyst: SDP  
Analytical Date/Time: 06/21/13 08:59  
Container ID: 1132384001-G

Prep Batch: WXX9860  
Prep Method: METHOD  
Prep Date/Time: 06/20/13 09:45  
Prep Initial Wt./Vol.: 10 mL  
Prep Extract Vol: 10 mL



**Results of RSE-2**

Client Sample ID: **RSE-2**  
Client Project ID: **Hurricane Siding (ARRC)**  
Lab Sample ID: 1132384002  
Lab Project ID: 1132384

Collection Date: 06/13/13 13:15  
Received Date: 06/14/13 09:03  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

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

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Iron	156	U	250	78.0	ug/L	1	06/24/13 20:50

**Batch Information**

Analytical Batch: MMS8010  
Analytical Method: EP200.8  
Analyst: ACF  
Analytical Date/Time: 06/24/13 20:50  
Container ID: 1132384002-F

Prep Batch: MX26603  
Prep Method: E200.2  
Prep Date/Time: 06/24/13 09:25  
Prep Initial Wt./Vol.: 20 mL  
Prep Extract Vol: 50 mL

Print Date: 06/28/2013 3:41:10PM



Results of RSE-2

Client Sample ID: RSE-2
Client Project ID: Hurricane Siding (ARRC)
Lab Sample ID: 1132384002
Lab Project ID: 1132384

Collection Date: 06/13/13 13:15
Received Date: 06/14/13 09:03
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by Semivolatile Organic Fuels

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

Batch Information

Analytical Batch: XFC10932
Analytical Method: AK102
Analyst: HM
Analytical Date/Time: 06/20/13 19:11
Container ID: 1132384002-D

Prep Batch: XXX29187
Prep Method: SW3520C
Prep Date/Time: 06/18/13 09:45
Prep Initial Wt./Vol.: 230 mL
Prep Extract Vol: 1 mL

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

Batch Information

Analytical Batch: XFC10932
Analytical Method: AK103
Analyst: HM
Analytical Date/Time: 06/20/13 19:11
Container ID: 1132384002-D

Prep Batch: XXX29187
Prep Method: SW3520C
Prep Date/Time: 06/18/13 09:45
Prep Initial Wt./Vol.: 230 mL
Prep Extract Vol: 1 mL



Results of **RSE-2**

Client Sample ID: **RSE-2**  
Client Project ID: **Hurricane Siding (ARRC)**  
Lab Sample ID: 1132384002  
Lab Project ID: 1132384

Collection Date: 06/13/13 13:15  
Received Date: 06/14/13 09:03  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

Results by **Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0620	U	0.100	0.0310	mg/L	1	06/19/13 02:59

**Surrogates**

4-Bromofluorobenzene	79.6		50-150		%	1	06/19/13 02:59
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**Batch Information**

Analytical Batch: VFC11469  
Analytical Method: AK101  
Analyst: ST  
Analytical Date/Time: 06/19/13 02:59  
Container ID: 1132384002-A

Prep Batch: VXX24822  
Prep Method: SW5030B  
Prep Date/Time: 06/18/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Benzene	0.300	U	0.500	0.150	ug/L	1	06/19/13 02:59
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	06/19/13 02:59
o-Xylene	0.620	U	1.00	0.310	ug/L	1	06/19/13 02:59
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	06/19/13 02:59
Toluene	0.620	U	1.00	0.310	ug/L	1	06/19/13 02:59

**Surrogates**

1,4-Difluorobenzene	93.4		77-115		%	1	06/19/13 02:59
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**Batch Information**

Analytical Batch: VFC11469  
Analytical Method: SW8021B  
Analyst: ST  
Analytical Date/Time: 06/19/13 02:59  
Container ID: 1132384002-A

Prep Batch: VXX24822  
Prep Method: SW5030B  
Prep Date/Time: 06/18/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL



## Results of RSE-2

Client Sample ID: **RSE-2**  
Client Project ID: **Hurricane Siding (ARRC)**  
Lab Sample ID: 1132384002  
Lab Project ID: 1132384

Collection Date: 06/13/13 13:15  
Received Date: 06/14/13 09:03  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

## Results by Waters Department

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Sulfate	6.03		0.100	0.0310	mg/L	1	06/21/13 13:52

## Batch Information

Analytical Batch: WIC5110  
Analytical Method: EPA 300.0  
Analyst: SDP  
Analytical Date/Time: 06/21/13 13:52  
Container ID: 1132384002-G

Prep Batch: WXX9860  
Prep Method: METHOD  
Prep Date/Time: 06/20/13 09:45  
Prep Initial Wt./Vol.: 10 mL  
Prep Extract Vol: 10 mL

## Results of RSE-3

Client Sample ID: **RSE-3**  
Client Project ID: **Hurricane Siding (ARRC)**  
Lab Sample ID: 1132384003  
Lab Project ID: 1132384

Collection Date: 06/13/13 13:45  
Received Date: 06/14/13 09:03  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

## Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Iron	679		250	78.0	ug/L	1	06/24/13 20:53

## Batch Information

Analytical Batch: MMS8010  
Analytical Method: EP200.8  
Analyst: ACF  
Analytical Date/Time: 06/24/13 20:53  
Container ID: 1132384003-F

Prep Batch: MX26603  
Prep Method: E200.2  
Prep Date/Time: 06/24/13 09:25  
Prep Initial Wt./Vol.: 20 mL  
Prep Extract Vol: 50 mL



Results of RSE-3

Client Sample ID: RSE-3
Client Project ID: Hurricane Siding (ARRC)
Lab Sample ID: 1132384003
Lab Project ID: 1132384

Collection Date: 06/13/13 13:45
Received Date: 06/14/13 09:03
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by Semivolatile Organic Fuels

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

Batch Information

Analytical Batch: XFC10932
Analytical Method: AK102
Analyst: HM
Analytical Date/Time: 06/20/13 20:11
Container ID: 1132384003-D

Prep Batch: XXX29187
Prep Method: SW3520C
Prep Date/Time: 06/18/13 09:45
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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

Batch Information

Analytical Batch: XFC10932
Analytical Method: AK103
Analyst: HM
Analytical Date/Time: 06/20/13 20:11
Container ID: 1132384003-D

Prep Batch: XXX29187
Prep Method: SW3520C
Prep Date/Time: 06/18/13 09:45
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL



Results of **RSE-3**

Client Sample ID: **RSE-3**  
Client Project ID: **Hurricane Siding (ARRC)**  
Lab Sample ID: 1132384003  
Lab Project ID: 1132384

Collection Date: 06/13/13 13:45  
Received Date: 06/14/13 09:03  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

Results by **Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0620	U	0.100	0.0310	mg/L	1	06/20/13 13:30

**Surrogates**

4-Bromofluorobenzene	92		50-150		%	1	06/20/13 13:30
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**Batch Information**

Analytical Batch: VFC11474  
Analytical Method: AK101  
Analyst: ST  
Analytical Date/Time: 06/20/13 13:30  
Container ID: 1132384003-B

Prep Batch: VXX24831  
Prep Method: SW5030B  
Prep Date/Time: 06/20/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Benzene	0.300	U	0.500	0.150	ug/L	1	06/20/13 13:30
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	06/20/13 13:30
o-Xylene	0.620	U	1.00	0.310	ug/L	1	06/20/13 13:30
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	06/20/13 13:30
Toluene	0.780	J	1.00	0.310	ug/L	1	06/20/13 13:30

**Surrogates**

1,4-Difluorobenzene	91.2		77-115		%	1	06/20/13 13:30
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**Batch Information**

Analytical Batch: VFC11474  
Analytical Method: SW8021B  
Analyst: ST  
Analytical Date/Time: 06/20/13 13:30  
Container ID: 1132384003-B

Prep Batch: VXX24831  
Prep Method: SW5030B  
Prep Date/Time: 06/20/13 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 06/28/2013 3:41:10PM

## Results of RSE-3

Client Sample ID: **RSE-3**  
Client Project ID: **Hurricane Siding (ARRC)**  
Lab Sample ID: 1132384003  
Lab Project ID: 1132384

Collection Date: 06/13/13 13:45  
Received Date: 06/14/13 09:03  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

## Results by Waters Department

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Sulfate	0.600		0.100	0.0310	mg/L	1	06/21/13 08:38

## Batch Information

Analytical Batch: WIC5110  
Analytical Method: EPA 300.0  
Analyst: SDP  
Analytical Date/Time: 06/21/13 08:38  
Container ID: 1132384003-G

Prep Batch: WXX9860  
Prep Method: METHOD  
Prep Date/Time: 06/20/13 09:45  
Prep Initial Wt./Vol.: 10 mL  
Prep Extract Vol: 10 mL

## Results of RSE-4

Client Sample ID: **RSE-4**  
Client Project ID: **Hurricane Siding (ARRC)**  
Lab Sample ID: 1132384004  
Lab Project ID: 1132384

Collection Date: 06/12/13 15:30  
Received Date: 06/14/13 09:03  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

## Results by Dissolved Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Iron	306		250	78.0	ug/L	1	06/24/13 20:55

## Batch Information

Analytical Batch: MMS8010  
Analytical Method: EP200.8  
Analyst: ACF  
Analytical Date/Time: 06/24/13 20:55  
Container ID: 1132384004-F

Prep Batch: MXX26603  
Prep Method: E200.2  
Prep Date/Time: 06/24/13 09:25  
Prep Initial Wt./Vol.: 20 mL  
Prep Extract Vol: 50 mL

Print Date: 06/28/2013 3:41:10PM



### Results of RSE-4

Client Sample ID: **RSE-4**  
 Client Project ID: **Hurricane Siding (ARRC)**  
 Lab Sample ID: 1132384004  
 Lab Project ID: 1132384

Collection Date: 06/12/13 15:30  
 Received Date: 06/14/13 09:03  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.425	J	0.577	0.173	mg/L	1	06/20/13 20:31
<b>Surrogates</b>							
5a Androstane	86.2		50-150		%	1	06/20/13 20:31

### Batch Information

Analytical Batch: XFC10932  
 Analytical Method: AK102  
 Analyst: HM  
 Analytical Date/Time: 06/20/13 20:31  
 Container ID: 1132384004-D

Prep Batch: XXX29187  
 Prep Method: SW3520C  
 Prep Date/Time: 06/18/13 09:45  
 Prep Initial Wt./Vol.: 260 mL  
 Prep Extract Vol: 1 mL

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Residual Range Organics	0.252	J	0.481	0.144	mg/L	1	06/20/13 20:31
<b>Surrogates</b>							
n-Triacontane-d62	94.5		50-150		%	1	06/20/13 20:31

### Batch Information

Analytical Batch: XFC10932  
 Analytical Method: AK103  
 Analyst: HM  
 Analytical Date/Time: 06/20/13 20:31  
 Container ID: 1132384004-D

Prep Batch: XXX29187  
 Prep Method: SW3520C  
 Prep Date/Time: 06/18/13 09:45  
 Prep Initial Wt./Vol.: 260 mL  
 Prep Extract Vol: 1 mL

Print Date: 06/28/2013 3:41:10PM

## Results of RSE-4

Client Sample ID: **RSE-4**  
 Client Project ID: **Hurricane Siding (ARRC)**  
 Lab Sample ID: 1132384004  
 Lab Project ID: 1132384

Collection Date: 06/12/13 15:30  
 Received Date: 06/14/13 09:03  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):

## Results by Volatile Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	0.0341	J	0.100	0.0310	mg/L	1	06/19/13 03:18

### Surrogates

4-Bromofluorobenzene	77.9		50-150		%	1	06/19/13 03:18
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## Batch Information

Analytical Batch: VFC11469  
 Analytical Method: AK101  
 Analyst: ST  
 Analytical Date/Time: 06/19/13 03:18  
 Container ID: 1132384004-A

Prep Batch: VXX24822  
 Prep Method: SW5030B  
 Prep Date/Time: 06/18/13 08:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	0.300	U	0.500	0.150	ug/L	1	06/19/13 03:18
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	06/19/13 03:18
o-Xylene	0.620	U	1.00	0.310	ug/L	1	06/19/13 03:18
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	06/19/13 03:18
Toluene	0.620	U	1.00	0.310	ug/L	1	06/19/13 03:18

### Surrogates

1,4-Difluorobenzene	93.6		77-115		%	1	06/19/13 03:18
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## Batch Information

Analytical Batch: VFC11469  
 Analytical Method: SW8021B  
 Analyst: ST  
 Analytical Date/Time: 06/19/13 03:18  
 Container ID: 1132384004-A

Prep Batch: VXX24822  
 Prep Method: SW5030B  
 Prep Date/Time: 06/18/13 08:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL



## Results of RSE-4

Client Sample ID: **RSE-4**  
Client Project ID: **Hurricane Siding (ARRC)**  
Lab Sample ID: 1132384004  
Lab Project ID: 1132384

Collection Date: 06/12/13 15:30  
Received Date: 06/14/13 09:03  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):

## Results by Waters Department

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Sulfate	1.53		0.100	0.0310	mg/L	1	06/21/13 08:17

## Batch Information

Analytical Batch: WIC5110  
Analytical Method: EPA 300.0  
Analyst: SDP  
Analytical Date/Time: 06/21/13 08:17  
Container ID: 1132384004-G

Prep Batch: WXX9860  
Prep Method: METHOD  
Prep Date/Time: 06/20/13 09:45  
Prep Initial Wt./Vol.: 10 mL  
Prep Extract Vol: 10 mL

## Results of RSE-X

Client Sample ID: **RSE-X**  
 Client Project ID: **Hurricane Siding (ARRC)**  
 Lab Sample ID: 1132384005  
 Lab Project ID: 1132384

Collection Date: 06/12/13 15:15  
 Received Date: 06/14/13 09:03  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):

## Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.385	J	0.600	0.180	mg/L	1	06/20/13 20:50
<b>Surrogates</b>							
5a Androstane	88.2		50-150		%	1	06/20/13 20:50

## Batch Information

Analytical Batch: XFC10932  
 Analytical Method: AK102  
 Analyst: HM  
 Analytical Date/Time: 06/20/13 20:50  
 Container ID: 1132384005-D

Prep Batch: XXX29187  
 Prep Method: SW3520C  
 Prep Date/Time: 06/18/13 09:45  
 Prep Initial Wt./Vol.: 250 mL  
 Prep Extract Vol: 1 mL

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Residual Range Organics	0.188	J	0.500	0.150	mg/L	1	06/20/13 20:50
<b>Surrogates</b>							
n-Triacontane-d62	96.3		50-150		%	1	06/20/13 20:50

## Batch Information

Analytical Batch: XFC10932  
 Analytical Method: AK103  
 Analyst: HM  
 Analytical Date/Time: 06/20/13 20:50  
 Container ID: 1132384005-D

Prep Batch: XXX29187  
 Prep Method: SW3520C  
 Prep Date/Time: 06/18/13 09:45  
 Prep Initial Wt./Vol.: 250 mL  
 Prep Extract Vol: 1 mL

## Results of RSE-X

Client Sample ID: **RSE-X**  
 Client Project ID: **Hurricane Siding (ARRC)**  
 Lab Sample ID: 1132384005  
 Lab Project ID: 1132384

Collection Date: 06/12/13 15:15  
 Received Date: 06/14/13 09:03  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):

## Results by Volatile Fuels

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	0.0620	U	0.100	0.0310	mg/L	1	06/19/13 02:20

### Surrogates

4-Bromofluorobenzene	98.7		50-150		%	1	06/19/13 02:20
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## Batch Information

Analytical Batch: VFC11468  
 Analytical Method: AK101  
 Analyst: ST  
 Analytical Date/Time: 06/19/13 02:20  
 Container ID: 1132384005-A

Prep Batch: VXX24821  
 Prep Method: SW5030B  
 Prep Date/Time: 06/18/13 08:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	0.300	U	0.500	0.150	ug/L	1	06/19/13 02:20
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	06/19/13 02:20
o-Xylene	0.620	U	1.00	0.310	ug/L	1	06/19/13 02:20
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	06/19/13 02:20
Toluene	0.620	U	1.00	0.310	ug/L	1	06/19/13 02:20

### Surrogates

1,4-Difluorobenzene	90.1		77-115		%	1	06/19/13 02:20
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## Batch Information

Analytical Batch: VFC11468  
 Analytical Method: SW8021B  
 Analyst: ST  
 Analytical Date/Time: 06/19/13 02:20  
 Container ID: 1132384005-A

Prep Batch: VXX24821  
 Prep Method: SW5030B  
 Prep Date/Time: 06/18/13 08:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL



### Results of Trip Blank

Client Sample ID: **Trip Blank**  
 Client Project ID: **Hurricane Siding (ARRC)**  
 Lab Sample ID: 1132384006  
 Lab Project ID: 1132384

Collection Date: 06/12/13 09:00  
 Received Date: 06/14/13 09:03  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):

### Results by Volatile Fuels

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.0620	U	0.100	0.0310	mg/L	1	06/18/13 18:33

#### Surrogates

4-Bromofluorobenzene	98.6		50-150		%	1	06/18/13 18:33
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### Batch Information

Analytical Batch: VFC11468  
 Analytical Method: AK101  
 Analyst: ST  
 Analytical Date/Time: 06/18/13 18:33  
 Container ID: 1132384006-A

Prep Batch: VXX24820  
 Prep Method: SW5030B  
 Prep Date/Time: 06/18/13 08:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Date Analyzed</u>
Benzene	0.300	U	0.500	0.150	ug/L	1	06/18/13 18:33
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	06/18/13 18:33
o-Xylene	0.620	U	1.00	0.310	ug/L	1	06/18/13 18:33
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	06/18/13 18:33
Toluene	0.620	U	1.00	0.310	ug/L	1	06/18/13 18:33

#### Surrogates

1,4-Difluorobenzene	92.1		77-115		%	1	06/18/13 18:33
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### Batch Information

Analytical Batch: VFC11468  
 Analytical Method: SW8021B  
 Analyst: ST  
 Analytical Date/Time: 06/18/13 18:33  
 Container ID: 1132384006-A

Prep Batch: VXX24820  
 Prep Method: SW5030B  
 Prep Date/Time: 06/18/13 08:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 06/28/2013 3:41:10PM

## Method Blank

Blank ID: MB for HBN 1456601 [MXX/26603]  
Blank Lab ID: 1154707

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1132384001, 1132384002, 1132384003, 1132384004

## Results by EP200.8

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Iron	156U	250	78.0	ug/L

## Batch Information

Analytical Batch: MMS8010  
Analytical Method: EP200.8  
Instrument: Perkin Elmer Sciex ICP-MS P3  
Analyst: ACF  
Analytical Date/Time: 6/24/2013 7:42:42PM

Prep Batch: MXX26603  
Prep Method: E200.2  
Prep Date/Time: 6/24/2013 9:25:00AM  
Prep Initial Wt./Vol.: 20 mL  
Prep Extract Vol: 50 mL

Print Date: 06/28/2013 3:41:12PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1132384 [MXX26603]

Blank Spike Lab ID: 1154708

Date Analyzed: 06/24/2013 19:44

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384001, 1132384002, 1132384003, 1132384004

## Results by EP200.8

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Iron	5000	5050	101	( 85-115 )

## Batch Information

Analytical Batch: **MMS8010**

Analytical Method: **EP200.8**

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

Analyst: **ACF**

Prep Batch: **MXX26603**

Prep Method: **E200.2**

Prep Date/Time: **06/24/2013 09:25**

Spike Init Wt./Vol.: 5000 ug/L Extract Vol: 50 mL

Dupe Init Wt./Vol.: Extract Vol:

## Matrix Spike Summary

Original Sample ID: 1137930002  
 MS Sample ID: 1154711 MS  
 MSD Sample ID:

Analysis Date: 06/24/2013 19:51  
 Analysis Date: 06/24/2013 19:53  
 Analysis Date:  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384001, 1132384002, 1132384003, 1132384004

## Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Iron	4240	5000	9360	103				70-130		

## Batch Information

Analytical Batch: MMS8010  
 Analytical Method: EP200.8  
 Instrument: Perkin Elmer Sciex ICP-MS P3  
 Analyst: ACF  
 Analytical Date/Time: 6/24/2013 7:53:07PM

Prep Batch: MXX26603  
 Prep Method: DW Digest for Metals on ICP-MS  
 Prep Date/Time: 6/24/2013 9:25:00AM  
 Prep Initial Wt./Vol.: 20.00mL  
 Prep Extract Vol: 50.00mL

Print Date: 06/28/2013 3:41:14PM

## Method Blank

Blank ID: MB for HBN 1455680 [VXX/24820]

Blank Lab ID: 1153655

QC for Samples:

1132384006

Matrix: Water (Surface, Eff., Ground)

## Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.0310J	0.100	0.0310	mg/L
<b>Surrogates</b>				
4-Bromofluorobenzene	93.7	50-150		%

## Batch Information

Analytical Batch: VFC11468

Analytical Method: AK101

Instrument: Agilent 7890A PID/FID

Analyst: ST

Analytical Date/Time: 6/18/2013 9:02:00AM

Prep Batch: VXX24820

Prep Method: SW5030B

Prep Date/Time: 6/18/2013 8:00:00AM

Prep Initial Wt./Vol.: 5 mL

Prep Extract Vol: 5 mL

Print Date: 06/28/2013 3:41:14PM



## Blank Spike Summary

Blank Spike ID: LCS for HBN 1132384 [VXX24820]  
 Blank Spike Lab ID: 1153658  
 Date Analyzed: 06/18/2013 09:58

Spike Duplicate ID: LCSD for HBN 1132384 [VXX24820]  
 Spike Duplicate Lab ID: 1153659  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384006

## 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	0.922	92	1.00	0.972	97	( 60-120 )	5.20	(< 20 )
<b>Surrogates</b>									
4-Bromofluorobenzene	0.0500	105	105	0.0500	105	105	( 50-150 )	0.02	

## Batch Information

Analytical Batch: **VFC11468**  
 Analytical Method: **AK101**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX24820**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **06/18/2013 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 1455680 [VXX/24820]  
 Blank Lab ID: 1153655

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1132384006

## Results by SW8021B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	0.300U	0.500	0.150	ug/L
Ethylbenzene	0.620U	1.00	0.310	ug/L
o-Xylene	0.620U	1.00	0.310	ug/L
P & M -Xylene	1.24U	2.00	0.620	ug/L
Toluene	0.620U	1.00	0.310	ug/L
<b>Surrogates</b>				
1,4-Difluorobenzene	94.4	77-115		%

## Batch Information

Analytical Batch: VFC11468  
 Analytical Method: SW8021B  
 Instrument: Agilent 7890A PID/FID  
 Analyst: ST  
 Analytical Date/Time: 6/18/2013 9:02:00AM

Prep Batch: VXX24820  
 Prep Method: SW5030B  
 Prep Date/Time: 6/18/2013 8:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1132384 [VXX24820]  
 Blank Spike Lab ID: 1153656  
 Date Analyzed: 06/18/2013 09:39

Spike Duplicate ID: LCSD for HBN 1132384 [VXX24820]  
 Spike Duplicate Lab ID: 1153657  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384006

## Results by SW8021B

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	100	88.9	89	100	99.6	100	( 80-120 )	11.40	(< 20 )
Ethylbenzene	100	99.3	99	100	106	106	( 75-125 )	6.40	(< 20 )
o-Xylene	100	95.2	95	100	101	101	( 80-120 )	6.00	(< 20 )
P & M -Xylene	200	196	98	200	212	106	( 75-130 )	8.20	(< 20 )
Toluene	100	97.6	98	100	103	103	( 75-120 )	5.60	(< 20 )
<b>Surrogates</b>									
1,4-Difluorobenzene	50	96	96	50	97.6	98	( 77-115 )	1.70	

## Batch Information

Analytical Batch: **VFC11468**  
 Analytical Method: **SW8021B**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX24820**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **06/18/2013 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 1455682 [VXX/24821]  
Blank Lab ID: 1153662

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1132384005

## Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.0320J	0.100	0.0310	mg/L
<b>Surrogates</b>				
4-Bromofluorobenzene	99.4	50-150		%

## Batch Information

Analytical Batch: VFC11468  
Analytical Method: AK101  
Instrument: Agilent 7890A PID/FID  
Analyst: ST  
Analytical Date/Time: 6/18/2013 6:52:00PM

Prep Batch: VXX24821  
Prep Method: SW5030B  
Prep Date/Time: 6/18/2013 8:00:00AM  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 06/28/2013 3:41:17PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1132384 [VXX24821]  
 Blank Spike Lab ID: 1153665  
 Date Analyzed: 06/18/2013 23:52

Spike Duplicate ID: LCSD for HBN 1132384 [VXX24821]  
 Spike Duplicate Lab ID: 1153666  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384005

## 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	0.901	90	1.00	0.900	90	( 60-120 )	0.05	(< 20 )
<b>Surrogates</b>									
4-Bromofluorobenzene	0.0500	110	110	0.0500	97.8	98	( 50-150 )	11.80	

## Batch Information

Analytical Batch: **VFC11468**  
 Analytical Method: **AK101**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX24821**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **06/18/2013 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 1455682 [VXX/24821]  
 Blank Lab ID: 1153662

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1132384005

## Results by SW8021B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	0.300U	0.500	0.150	ug/L
Ethylbenzene	0.620U	1.00	0.310	ug/L
o-Xylene	0.620U	1.00	0.310	ug/L
P & M -Xylene	1.24U	2.00	0.620	ug/L
Toluene	0.620U	1.00	0.310	ug/L
<b>Surrogates</b>				
1,4-Difluorobenzene	92.4	77-115		%

## Batch Information

Analytical Batch: VFC11468  
 Analytical Method: SW8021B  
 Instrument: Agilent 7890A PID/FID  
 Analyst: ST  
 Analytical Date/Time: 6/18/2013 6:52:00PM

Prep Batch: VXX24821  
 Prep Method: SW5030B  
 Prep Date/Time: 6/18/2013 8:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 06/28/2013 3:41:19PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1132384 [VXX24821]  
 Blank Spike Lab ID: 1153663  
 Date Analyzed: 06/18/2013 23:33

Spike Duplicate ID: LCSD for HBN 1132384 [VXX24821]  
 Spike Duplicate Lab ID: 1153664  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384005

## Results by SW8021B

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	100	102	102	100	96.8	97	( 80-120 )	5.20	(< 20 )
Ethylbenzene	100	110	110	100	106	106	( 75-125 )	3.90	(< 20 )
o-Xylene	100	104	104	100	99.4	99	( 80-120 )	4.50	(< 20 )
P & M -Xylene	200	219	109	200	210	105	( 75-130 )	4.20	(< 20 )
Toluene	100	109	109	100	106	106	( 75-120 )	3.30	(< 20 )
<b>Surrogates</b>									
1,4-Difluorobenzene	50	96.3	96	50	94.8	95	( 77-115 )	1.60	

## Batch Information

Analytical Batch: **VFC11468**  
 Analytical Method: **SW8021B**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX24821**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **06/18/2013 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 1455688 [VXX/24822]  
Blank Lab ID: 1153735

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1132384001, 1132384002, 1132384004

## Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.0620U	0.100	0.0310	mg/L
<b>Surrogates</b>				
4-Bromofluorobenzene	77.7	50-150		%

## Batch Information

Analytical Batch: VFC11469  
Analytical Method: AK101  
Instrument: Agilent 7890 PID/FID  
Analyst: ST  
Analytical Date/Time: 6/18/2013 11:35:00PM

Prep Batch: VXX24822  
Prep Method: SW5030B  
Prep Date/Time: 6/18/2013 8:00:00AM  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 06/28/2013 3:41:21PM



## Blank Spike Summary

Blank Spike ID: LCS for HBN 1132384 [VXX24822]  
 Blank Spike Lab ID: 1153738  
 Date Analyzed: 06/19/2013 00:12

Spike Duplicate ID: LCSD for HBN 1132384 [VXX24822]  
 Spike Duplicate Lab ID: 1153739  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384001, 1132384002, 1132384004

## 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	0.908	91	1.00	0.908	91	( 60-120 )	0.02	(< 20 )
<b>Surrogates</b>									
4-Bromofluorobenzene	0.0500	83.1	83	0.0500	82.7	83	( 50-150 )	0.48	

## Batch Information

Analytical Batch: **VFC11469**  
 Analytical Method: **AK101**  
 Instrument: **Agilent 7890 PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX24822**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **06/18/2013 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 1455688 [VXX/24822]  
 Blank Lab ID: 1153735

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1132384001, 1132384002, 1132384004

## Results by SW8021B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	0.300U	0.500	0.150	ug/L
Ethylbenzene	0.620U	1.00	0.310	ug/L
o-Xylene	0.620U	1.00	0.310	ug/L
P & M -Xylene	1.24U	2.00	0.620	ug/L
Toluene	0.620U	1.00	0.310	ug/L
<b>Surrogates</b>				
1,4-Difluorobenzene	93.4	77-115		%

## Batch Information

Analytical Batch: VFC11469  
 Analytical Method: SW8021B  
 Instrument: Agilent 7890 PID/FID  
 Analyst: ST  
 Analytical Date/Time: 6/18/2013 11:35:00PM

Prep Batch: VXX24822  
 Prep Method: SW5030B  
 Prep Date/Time: 6/18/2013 8:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 06/28/2013 3:41:22PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1132384 [VXX24822]  
 Blank Spike Lab ID: 1153736  
 Date Analyzed: 06/18/2013 23:54

Spike Duplicate ID: LCSD for HBN 1132384 [VXX24822]  
 Spike Duplicate Lab ID: 1153737  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384001, 1132384002, 1132384004

## Results by SW8021B

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	100	111	111	100	115	115	( 80-120 )	3.30	(< 20 )
Ethylbenzene	100	118	118	100	122	122	( 75-125 )	3.90	(< 20 )
o-Xylene	100	108	108	100	111	111	( 80-120 )	2.40	(< 20 )
P & M -Xylene	200	231	115	200	240	120	( 75-130 )	3.80	(< 20 )
Toluene	100	118	118	100	122	122	* ( 75-120 )	3.60	(< 20 )
<b>Surrogates</b>									
1,4-Difluorobenzene	50	101	101	50	102	102	( 77-115 )	0.39	

## Batch Information

Analytical Batch: VFC11469  
 Analytical Method: SW8021B  
 Instrument: Agilent 7890 PID/FID  
 Analyst: ST

Prep Batch: VXX24822  
 Prep Method: SW5030B  
 Prep Date/Time: 06/18/2013 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 1455982 [VXX/24831]

Blank Lab ID: 1154232

QC for Samples:

1132384003

Matrix: Water (Surface, Eff., Ground)

## Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.0376J	0.100	0.0310	mg/L
<b>Surrogates</b>				
4-Bromofluorobenzene	91.9	50-150		%

## Batch Information

Analytical Batch: VFC11474

Analytical Method: AK101

Instrument: Agilent 7890A PID/FID

Analyst: ST

Analytical Date/Time: 6/20/2013 9:58:00AM

Prep Batch: VXX24831

Prep Method: SW5030B

Prep Date/Time: 6/20/2013 8:00:00AM

Prep Initial Wt./Vol.: 5 mL

Prep Extract Vol: 5 mL

Print Date: 06/28/2013 3:41:24PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1132384 [VXX24831]  
 Blank Spike Lab ID: 1154235  
 Date Analyzed: 06/20/2013 10:54

Spike Duplicate ID: LCSD for HBN 1132384 [VXX24831]  
 Spike Duplicate Lab ID: 1154236  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384003

## 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	0.890	89	1.00	0.896	90	( 60-120 )	0.75	(< 20 )
<b>Surrogates</b>									
4-Bromofluorobenzene	0.0500	107	107	0.0500	96.7	97	( 50-150 )	10.40	

## Batch Information

Analytical Batch: **VFC11474**  
 Analytical Method: **AK101**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX24831**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **06/20/2013 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 1455982 [VXX/24831]  
 Blank Lab ID: 1154232

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
 1132384003

## Results by SW8021B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	0.300U	0.500	0.150	ug/L
Ethylbenzene	0.620U	1.00	0.310	ug/L
o-Xylene	0.620U	1.00	0.310	ug/L
P & M -Xylene	1.24U	2.00	0.620	ug/L
Toluene	0.620U	1.00	0.310	ug/L
<b>Surrogates</b>				
1,4-Difluorobenzene	91.5	77-115		%

## Batch Information

Analytical Batch: VFC11474  
 Analytical Method: SW8021B  
 Instrument: Agilent 7890A PID/FID  
 Analyst: ST  
 Analytical Date/Time: 6/20/2013 9:58:00AM

Prep Batch: VXX24831  
 Prep Method: SW5030B  
 Prep Date/Time: 6/20/2013 8:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 06/28/2013 3:41:25PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1132384 [VXX24831]  
 Blank Spike Lab ID: 1154233  
 Date Analyzed: 06/20/2013 10:35

Spike Duplicate ID: LCSD for HBN 1132384 [VXX24831]  
 Spike Duplicate Lab ID: 1154234  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384003

## Results by SW8021B

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	100	91.7	92	100	103	103	( 80-120 )	12.10	(< 20 )
Ethylbenzene	100	99.8	100	100	111	111	( 75-125 )	10.40	(< 20 )
o-Xylene	100	91.4	91	100	101	101	( 80-120 )	10.40	(< 20 )
P & M -Xylene	200	194	97	200	217	109	( 75-130 )	11.50	(< 20 )
Toluene	100	101	101	100	110	110	( 75-120 )	8.30	(< 20 )
<b>Surrogates</b>									
1,4-Difluorobenzene	50	92.5	93	50	95.9	96	( 77-115 )	3.50	

## Batch Information

Analytical Batch: **VFC11474**  
 Analytical Method: **SW8021B**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX24831**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **06/20/2013 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 1456620 [WXX/9860]

Blank Lab ID: 1154819

QC for Samples:

1132384001, 1132384002, 1132384003, 1132384004

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	0.0620U	0.100	0.0310	mg/L

## Batch Information

Analytical Batch: WIC5110

Analytical Method: EPA 300.0

Instrument: Metrohm 733 IC3

Analyst: SDP

Analytical Date/Time: 6/21/2013 4:28:46AM

Prep Batch: WXX9860

Prep Method: METHOD

Prep Date/Time: 6/20/2013 9:45:00AM

Prep Initial Wt./Vol.: 10 mL

Prep Extract Vol: 10 mL

Print Date: 06/28/2013 3:41:27PM



## Duplicate Sample Summary

Original Sample ID: 1132444015

Duplicate Sample ID: 1154821

QC for Samples:

1132384001, 1132384002, 1132384003, 1132384004

Analysis Date: 06/21/2013 05:31

Matrix: Water (Surface, Eff., Ground)

## Results by EPA 300.0

<u>NAME</u>	<u>Original (20.00)</u>	<u>Duplicate (20.00)</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Sulfate	1.35	1.38	2.30	20.00

## Batch Information

Analytical Batch: WIC5110

Analytical Method: EPA 300.0

Instrument: Metrohm 733 IC3

Analyst: SDP

Prep Batch: Water (Surface, Eff., Ground)

Prep Method: WIC5110

Prep Date/Time: WXX9860

Print Date: 06/28/2013 3:41:27PM

## Duplicate Sample Summary

Original Sample ID: 1154823  
Duplicate Sample ID: 1154824

Analysis Date: 06/21/2013 12:29  
Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1132384001, 1132384002, 1132384003, 1132384004

## Results by EPA 300.0

<u>NAME</u>	<u>Original (20.00)</u>	<u>Duplicate (20.00)</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Sulfate	0.638	0.651	2.00	20.00

## Batch Information

Analytical Batch: WIC5110  
Analytical Method: EPA 300.0  
Instrument: Metrohm 733 IC3  
Analyst: SDP

Prep Batch: Water (Surface, Eff., Ground)  
Prep Method: WIC5110  
Prep Date/Time: WXX9860

Print Date: 06/28/2013 3:41:27PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1132384 [WXX9860]

Blank Spike Lab ID: 1154820

Date Analyzed: 06/21/2013 04:49

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384001, 1132384002, 1132384003, 1132384004

## Results by EPA 300.0

Parameter	Blank Spike (mg/L)			CL
	Spike	Result	Rec (%)	
Sulfate	10	10.0	100	( 90-110 )

## Batch Information

Analytical Batch: **WIC5110**

Analytical Method: **EPA 300.0**

Instrument: **Metrohm 733 IC3**

Analyst: **SDP**

Prep Batch: **WXX9860**

Prep Method: **METHOD**

Prep Date/Time: **06/20/2013 09:45**

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

Dupe Init Wt./Vol.: Extract Vol:

## Matrix Spike Summary

Original Sample ID: 1132444015  
 MS Sample ID: 1154822 MS  
 MSD Sample ID:

Analysis Date: 06/21/2013 5:10  
 Analysis Date: 06/21/2013 6:33  
 Analysis Date:  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384001, 1132384002, 1132384003, 1132384004

## 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	1.35	10.0	11.8	105				90-110		

## Batch Information

Analytical Batch: WIC5110  
 Analytical Method: EPA 300.0  
 Instrument: Metrohm 733 IC3  
 Analyst: SDP  
 Analytical Date/Time: 6/21/2013 6:33:34AM

Prep Batch: WXX9860  
 Prep Method: EPA 300.0 Extraction Waters/Liquids  
 Prep Date/Time: 6/20/2013 9:45:00AM  
 Prep Initial Wt./Vol.: 10.00mL  
 Prep Extract Vol: 10.00mL

Print Date: 06/28/2013 3:41:28PM

## Matrix Spike Summary

Original Sample ID: 1154823  
 MS Sample ID: 1154825 MS  
 MSD Sample ID:

Analysis Date: 06/21/2013 12:08  
 Analysis Date: 06/21/2013 12:49  
 Analysis Date:  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384001, 1132384002, 1132384003, 1132384004

## 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	0.638	10.0	11	104				90-110		

## Batch Information

Analytical Batch: WIC5110  
 Analytical Method: EPA 300.0  
 Instrument: Metrohm 733 IC3  
 Analyst: SDP  
 Analytical Date/Time: 6/21/2013 12:49:56PM

Prep Batch: WXX9860  
 Prep Method: EPA 300.0 Extraction Waters/Liquids  
 Prep Date/Time: 6/20/2013 9:45:00AM  
 Prep Initial Wt./Vol.: 10.00mL  
 Prep Extract Vol: 10.00mL

Print Date: 06/28/2013 3:41:28PM

## Method Blank

Blank ID: MB for HBN 1455293 [XXX/29187]  
Blank Lab ID: 1153387

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1132384001, 1132384002, 1132384003, 1132384004, 1132384005

## Results by AK102

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Diesel Range Organics	0.360U	0.600	0.180	mg/L
<b>Surrogates</b>				
5a Androstane	90.9	60-120		%

## Batch Information

Analytical Batch: XFC10932  
Analytical Method: AK102  
Instrument: HP 7890A FID SV E R  
Analyst: HM  
Analytical Date/Time: 6/20/2013 2:14:00PM

Prep Batch: XXX29187  
Prep Method: SW3520C  
Prep Date/Time: 6/18/2013 9:45:00AM  
Prep Initial Wt./Vol.: 250 mL  
Prep Extract Vol: 1 mL

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1132384 [XXX29187]  
 Blank Spike Lab ID: 1153388  
 Date Analyzed: 06/20/2013 14:53

Spike Duplicate ID: LCSD for HBN 1132384 [XXX29187]  
 Spike Duplicate Lab ID: 1153389  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384001, 1132384002, 1132384003, 1132384004, 1132384005

## 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	17.7	88	20	18.0	90	( 75-125 )	1.70	(< 20 )
<b>Surrogates</b>									
5a Androstane	0.4	93.2	93	0.4	93.5	94	( 60-120 )	0.32	

## Batch Information

Analytical Batch: **XFC10932**  
 Analytical Method: **AK102**  
 Instrument: **HP 7890A FID SV E R**  
 Analyst: **HM**

Prep Batch: **XXX29187**  
 Prep Method: **SW3520C**  
 Prep Date/Time: **06/18/2013 09:45**  
 Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL  
 Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

## Method Blank

Blank ID: MB for HBN 1455293 [XXX/29187]  
Blank Lab ID: 1153387

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1132384001, 1132384002, 1132384003, 1132384004, 1132384005

## Results by AK103

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Residual Range Organics	0.300U	0.500	0.150	mg/L
<b>Surrogates</b>				
n-Triacontane-d62	101	60-120		%

## Batch Information

Analytical Batch: XFC10932  
Analytical Method: AK103  
Instrument: HP 7890A FID SV E R  
Analyst: HM  
Analytical Date/Time: 6/20/2013 2:14:00PM

Prep Batch: XXX29187  
Prep Method: SW3520C  
Prep Date/Time: 6/18/2013 9:45:00AM  
Prep Initial Wt./Vol.: 250 mL  
Prep Extract Vol: 1 mL

Print Date: 06/28/2013 3:41:31PM



## Blank Spike Summary

Blank Spike ID: LCS for HBN 1132384 [XXX29187]  
 Blank Spike Lab ID: 1153388  
 Date Analyzed: 06/20/2013 14:53

Spike Duplicate ID: LCSD for HBN 1132384 [XXX29187]  
 Spike Duplicate Lab ID: 1153389  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1132384001, 1132384002, 1132384003, 1132384004, 1132384005

## 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	18.0	90	20	18.2	91	( 60-120 )	1.00	(< 20 )
<b>Surrogates</b>									
n-Triacontane-d62	0.4	87.9	88	0.4	89.1	89	( 60-120 )	1.40	

## Batch Information

Analytical Batch: **XFC10932**  
 Analytical Method: **AK103**  
 Instrument: **HP 7890A FID SV E R**  
 Analyst: **HM**

Prep Batch: **XXX29187**  
 Prep Method: **SW3520C**  
 Prep Date/Time: **06/18/2013 09:45**  
 Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL  
 Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL



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CHAIN OF CUSTODY RECORD

1132384



LIMS PROFILE #241614

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CLIENT: Fairbanks Environmental Services					SGS Reference #:							page <u>1</u> of <u>1</u>			
CONTACT: Mike Boese PHONE NO: 907-452-1006															
PROJECT/SITE: Hurricane Siding (ARRC)					CONTAINER #	Preservative	HCl	HCl	HNO <sub>3</sub>	None					
REPORTS TO: Mike Boese E-MAIL: MBoese@FESalaska.com						SAMPLE TYPE									
INVOICE TO: ARRC Project: ARRC-						C =									
CONTRACT NUMBER: ARRC - 265-2429						COMP									
					G =										
					GRAB										
					MI =										
					Multi										
					Incremental										
					Samples										
LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX/MATRIX CODE										REMARKS	
1A-G	RSE-1	6/12/2013	1300	Water	7	G	X	X	X	X					
2A-G	RSE-2	6/13/2013	1315	Water	7	G	X	X	X	X					
3A-G	RSE-3	6/13/2013	1345	Water	7	G	X	X	X	X					
4A-G	RSE-4	6/12/2013	1530	Water	7	G	X	X	X	X					
5A-G	RSE-X	6/12/2013	1515	Water	5	G	X	X							
6A-C	Trip Blank	6/12/2013	900	Water	3	G	X								
Collected/Relinquished By: (1)					Date	Time	Received By:			DOD Project? NO		Special Deliverable Requirements:			
<i>Michael Boese</i>					6/14/13	0903				Cooler ID _____		Level 2 Data Package, EQuIS, EDF VERSION 1.2a, and PDF. No hard copy required.			
Relinquished By: (2)					Date	Time	Received By:			Requested Turnaround Time and-or Special Instructions:					
										Quote 10402, Normal TAT, Bill ARRC directly (265-2429)					
Relinquished By: (3)					Date	Time	Received By:			Temperature		Chain of Custody Seal: (Circle)			
										Blank °C: <u>5.5</u>		<u>INTACT</u> BROKEN ABSENT			
Relinquished By: (4)					Date	Time	Received For Laboratory By:			Blank °C: <u># 239</u>					
					6/14/13	0903	<i>E. Acrost</i>								

- ☐ 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-[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 custody seals intact? Note # & location, if applicable. COC accompanied samples?	<input checked="" type="radio"/> Yes No N/A <input checked="" type="radio"/> Yes No N/A	
Temperature blank compliant* (i.e., 0-6°C after CF)? <i>* Note: Exemption permitted for chilled samples collected less than 8 hours ago.</i> Cooler ID: _____ @ <u>5.5</u> w/ Therm.ID: <u>239</u> Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ <i>Note: If non-compliant, use form FS-0029 to document affected samples/analyses.</i> 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." If temperature(s) <0°C, were all sample containers ice free?	<input checked="" type="radio"/> Yes No N/A <input checked="" type="radio"/> Yes No N/A <input checked="" type="radio"/> Yes No <u>N/A</u>	
Delivery method (specify all that apply): Client USPS Alert Courier C&D Delivery AK Air Lynden Carlile ERA PenAir FedEx UPS NAC Other: → For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?	Note ABN/tracking #  See Attached or N/A  Yes No <u>N/A</u>	<i>use times on COC ARC 6/14/13</i>
→ For samples received with payment, note amount (\$) and cash / check / CC (circle one) for note: → For samples received in FBKS, ANCH staff will verify all criteria are reviewed.		SRF Initiated by: <u>CS</u> <u>N/A</u> <u>N/A</u>
Were samples received within hold time? <i>Note: Refer to form F-083 "Sample Guide" for hold time information.</i> Do samples match COC* (i.e., sample IDs, dates/times collected)? <i>* Note: Exemption permitted if times differ &lt;1hr; in that case, use times on COC.</i> Were analyses requested unambiguous?	<input checked="" type="radio"/> Yes No N/A Yes <input checked="" type="radio"/> No N/A <input checked="" type="radio"/> Yes No N/A	<i>Sample 4 containers time: 15:15. COC reads 15:30 Sample 5 containers time: 15:30. COC reads 15:15</i>
Were samples in good condition (no leaks/cracks/breakage)? Packing material used (specify all that apply): <u>Bubble Wrap</u> Separate plastic bags Vermiculite Other:	<input checked="" type="radio"/> Yes No N/A	
Were all VOA vials free of headspace (i.e., bubbles ≤6 mm)? Were all soil VOAs field extracted with MeOH+BFB?	Yes <input checked="" type="radio"/> No N/A Yes No <u>N/A</u>	<i>Sample 3C has lg. bubble. Lim up. ARC 6/14/13</i>
Were proper containers (type/mass/volume/preservative*) used? <i>* Note: Exemption permitted for waters to be analyzed for metals.</i> Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	<input checked="" type="radio"/> Yes No N/A <input checked="" type="radio"/> Yes No N/A	
For special handling (e.g., "MP" or foreign soils, lab filter, limited volume, Ref Lab), were bottles/paperwork flagged (e.g., sticker)?	<input checked="" type="radio"/> Yes No N/A	
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was pH verified and compliant? If pH was adjusted, were bottles flagged (i.e., stickers)?	<input checked="" type="radio"/> Yes No N/A Yes No <u>N/A</u>	
For RUSH/SHORT Hold Time, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No <u>N/A</u>	
For SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP, were containers / paperwork flagged accordingly?	<input checked="" type="radio"/> Yes No <u>N/A</u> <u>N/A</u>	<i>SSGC Jan 6/14/13</i>
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	<input checked="" type="radio"/> Yes No N/A	SRF Completed by: <u>JAC</u> PM = <u>Crup</u> N/A
Was PEER REVIEW of sample numbering/labeling completed?	<input checked="" type="radio"/> Yes No N/A	Peer Reviewed by: <u>HLC</u> N/A
Additional notes (if applicable):		

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

**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 an air bubble in 1 of 3 VOA vials associated with sample RSE-3. There was no impact to data since 2 additional VOA vials were available.

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:

The sample times on sample RSE-4 and field duplicate RSE-X were inadvertently switched on the sample labels – the times on the COC form were used for logging in the samples. Other than the likely inadvertent disclosure of field duplicate samples to the laboratory, there was no impact to the data.

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

Comments:

There was no impact to data quality; See 3c and 3d 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:

c. Were all corrective actions documented?

■Yes No NA (Please explain.) Comments:

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

Comments:

The case narrative only described the laboratory qualifications made to the data based on problems encountered during sample receiving and analysis.

#### 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:

Not applicable. No data adversely impacted.

e. Data quality or usability affected?

Comments:

## 6. QC Samples

a. Method Blank

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

Yes  No  NA (Please explain.)

Comments:

ii. All method blank results less than PQL?

Yes  No  NA (Please explain.)

Comments:

iii. If above PQL, what samples are affected?

Comments:

GRO was detected in the method blanks below the LOQ in method AK101 batches VXX24821 and VXX24831. However, GRO results in associated project samples were ND, so no data were impacted.

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 – see 6aiii

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

Comments:

No data were adversely impacted, see 6aiii.

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:

Toluene recovery was slightly above the upper control limit (122%>120%) in the LCSD in Method 8021B batch VXX24822. No data were impacted since the toluene result in the LCSD was high biased and was not detected in associated project samples.

- 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:

With the exception noted in 6biii which did not impact data quality, all batch precision and accuracy 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-4. However, as noted in 3d, the sample times were reversed so the lab was probably able to reveal the identity of MW-X

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:

All field duplicate sample results were comparable ( $\text{RPD} \leq 30\%$  for water matrix samples) to project sample results, with the exception of GRO (58%). The low GRO detection in RSE-4 is the reason for the imprecision since GRO was not detected in the field duplicate sample. Since the reported concentration of GRO in RSE-4 was so far below the cleanup level, there was no impact to data.

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

Comments:

Impact to data quality is minor. See comment above (Section 6eiii).

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

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

Yes No ■NA (Please explain.) Comments:

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:

Sample RSE-3 was reanalyzed by the project laboratory for DRO and RRO at the request of FES (under work order 1132902) because the result was elevated above historical results and because the sample did not exhibit significant odor/sheen. The reanalyzed result (ran 12 days outside of holding time) confirmed the original results.