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**FAIRBANKS ENVIRONMENTAL SERVICES**

DATE: August 22, 2016

TO: Mr. Russell Grandel, Alaska Railroad Corporation

FROM: Michael Boese, Fairbanks Environmental Services

RE: 2016 Groundwater Monitoring Report  
Hurricane Siding  
Alaska Railroad Milepost 281.5, Alaska  
ADEC Hazard ID – 23545 / File ID – 2258.26.008

## EXECUTIVE SUMMARY

On July 7, 2016, 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); and residual range organics (RRO). All sample results were below Alaska Department of Environmental Conservation (ADEC) Table C groundwater cleanup levels. The decrease in contaminant concentrations noted in groundwater samples between 2014 and 2016 may be due, in part, to the 2015 removal action when 100 cubic yards of petroleum-contaminated soil was removed from the source area.

Groundwater samples were also analyzed for natural attenuation indicator parameters including dissolved iron and sulfate. Changes noted in natural attenuation parameter concentrations suggest that anaerobic biodegradation of petroleum hydrocarbons continues to occur at the site.

## 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 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).

Annual groundwater monitoring was performed in September 2012, June 2013, and September 2014 to update groundwater conditions at the site. Groundwater samples were collected from monitoring wells RSE-1 through RSE-4 and analyzed for BTEX, GRO, DRO, and RRO. All analytes were below Table C cleanup levels during 2012 (FES 2012); however, DRO and/or RRO exceeded cleanup levels in one well, RSE-3, during subsequent monitoring events in June 2013 (FES 2013) and September 2014 (FES 2014). Groundwater flow direction remained to the north-northwest.

In July 2015, approximately 100 cubic yards of contaminated soil was excavated and removed from the site. Although laboratory results from the limits of excavation indicated that residual soil contamination remained onsite, the removal action was generally successful at removing accessible soil in excess of the ADEC Method Two soil inhalation and ingestion exposure routes 12,500 mg/kg and 10,250 mg/kg, respectively, from above the water table (FES 2016).

## 2.0 WORK PERFORMED

Field work was performed in accordance with the approved work plan (FES 2016) with no deviations. ADEC-qualified environmental professional Mike Boese provided environmental sampling services.

### 2.1 Well Condition

All wells were found to be in good condition with the exception well RSE-3; the casing from RSE-3 had jacked up approximately 2 to 3 inches and pushed the steel flush-mounted monument upward and out of the concrete base. Approximately 2 inches of the casing was cut off so that the lid would sit flush; however the monument is still above grade and is vulnerable to snow plowing activities.

## 2.2 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 depths observed at the site varied between approximately 1.6 to 4.4 feet bgs and are presented in Table 1. No floating product was identified.

The groundwater measurements were used to calculate relative groundwater elevations. Groundwater contours for July 7, 2016 are displayed in Figure 2; inferred groundwater flow is to the north-northwest with a gradient of approximately 0.01 feet per foot. The inferred flow direction is slightly more northerly than previously calculated (Restoration Science and Engineering 2012 and FES 2012, 2013, 2014), and the variation in direction is likely the result of elevation changes noted in well RSE-3. As mentioned in Section 2.1, well RSE-3 was found to have jacked so the calculated groundwater elevation in that well is likely high-biased and the actual groundwater flow direction is likely slightly more westerly (approximately 5°) than the flow direction shown on Figure 2.

## 2.3 Groundwater Sample Collection

Four existing monitoring wells (RSE-1, RSE-2, RSE-3, and RSE-4; shown on Figure 2) were sampled using low-flow techniques. The wells were purged and sampled using disposable tubing and a submersible pump. The pump intake was set at approximately 1 foot below the top of the water column, and due to the size of the pump (1-foot-long), the water level could not be measured during well purging. However, based on continuous water flow during sampling efforts, drawdown was less than 1 foot for all wells.

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 (ADEC 2016b). Groundwater parameters are summarized in Table 1. Groundwater samples were collected by disconnecting the flow through cell and pumping directly into sample containers at the lowest flow rate (approximately 0.25 gallons per minute) 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. Groundwater samples were placed in a cooler containing frozen gel ice and maintained at 4 degrees Celsius and submitted to SGS North America (SGS). Samples were analyzed for BTEX, GRO, DRO, and RRO using SW8021B, AK101, AK102, and AK103, respectively, and natural attenuation indicator parameters iron (field-filtered) by 6020A and sulfate by 300.0. Filtered iron samples were used to estimate ferrous iron concentrations. A trip blank accompanied project samples to the laboratory and was analyzed for BTEX and GRO. An equipment rinsate was collected from the decontaminated submersible pump after sampling well RSE-4 and was analyzed for BTEX, GRO, DRO, and RRO.

## 3.0 GROUNDWATER RESULTS

Field parameters, including depth to groundwater, are summarized in Table 1. Groundwater samples are summarized in Table 2. Laboratory results are shown in Table 3 and summarized on Figure 3. Historical groundwater results are also shown on Figure 3 for comparison.

No sheen was observed during purging or sampling any of the four monitoring wells during the monitoring event. However, a petroleum odor was noted on the purge water removed from well RSE-3.

Groundwater sample results were compared to cleanup levels listed in Table C of 18 AAC 75 (ADEC 2016a). All groundwater samples had results below Table C cleanup levels during 2016.

Natural attenuation parameters indicate that anaerobic biodegradation of petroleum hydrocarbons has occurred at the site. Microorganisms degrade organic compounds to obtain energy and carbon for growth and reproduction. Dissolved oxygen (DO), nitrate, carbon dioxide, and ferric iron are used as electron acceptors during the oxidation/reduction reactions and can, therefore, be used (directly or indirectly) as indicators of biodegradation. Indications of microbial degradation at the Hurricane Siding site include the following:

- Low DO concentrations (less than 1 mg/L) were noted in downgradient wells RSE-3 and RSE-4 and in upgradient well RSE-1 (1.30 mg/L). The low DO concentrations are indicative of an anaerobic environment.
- Elevated ferrous iron concentrations noted in RSE-2, RSE-3, and RSE-4 (1 to 6.6 mg/L) when compared to iron concentrations in upgradient well RSE-1 (ND[0.25]) are indicative of iron reduction.
- Sulfate concentrations in downgradient wells RSE-3 and RSE-4 are slightly less than sulfate concentrations in upgradient wells (RSE-1 and RSE-2). The slight decrease in sulfate concentrations along the groundwater flow path indicates that sulfate reduction may have occurred but that the biodegradation mechanism is not significant.

#### 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 well RSE-3 had a petroleum odor but no sheen.

#### 5.0 DATA QUALITY SUMMARY

Groundwater samples were collected and analyzed in accordance with the approved Work Plan (FES 2016). 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 stored and transported in a single cooler and assigned the SGS report number 116824. 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 rejected pursuant to FES's data quality review, and all analytical data may be used, as qualified, for project purposes.

The following data quality issue may have impacted analytical results:

- RRO was detected in the method blank sample associated with extraction batch XXX35843 and the RRO detections in associated project samples are likely due, in part, to blank contamination. Affected RRO results have been qualified with a “B” to signify the anomaly. Overall impact is minor since the RRO results are less than the ADEC groundwater cleanup level.

## 6.0 CONCLUSION AND RECOMMENDATIONS

All contaminant concentrations were below ADEC groundwater cleanup levels during the July 2016 monitoring event. The decrease in contaminant concentrations noted between 2014 and 2016 may be attributed, in part, to the 2015 removal action in which 100 cubic yards of contaminated soil was removed from the source area. Changes noted in natural attenuation parameter concentrations indicate that anaerobic biodegradation of hydrocarbons continues to occur at the site.

Additional groundwater monitoring is recommended to further evaluate the impact of the 2015 removal action on groundwater. If the 2017 sampling results show that contaminant concentrations remain below groundwater cleanup levels, site closure will be requested from ADEC.

## 7.0 REFERENCES

Alaska Department of Environmental Conservation (ADEC), 2016a. *Oil and Other Hazardous Substances Pollution Control, 18 AAC 75*. January 1.

ADEC, 2016b. *Field Sampling Guidance*. March.

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), 2016. *2015 Soil Removal Report (Rev 1), ARRC Hurricane Siding, Alaska Railroad Milepost 281.5, Alaska*. January.

FES, 2014. *2014 Groundwater Monitoring Report, Hurricane Siding, Alaska Railroad Milepost 281.5, Alaska*. November 26.

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 – 2016 Field Parameters

Table 2 – 2016 Groundwater Sample Summary

Table 3 – 2016 Groundwater Results

Figure 1 – Vicinity Map

Figure 2 – Site Map and Groundwater Contours

Figure 3 – DRO and RRO Concentrations in Groundwater Samples

Appendix A – SGS Report 1168247

Appendix B – ADEC Laboratory Review Checklist

**Table 1 - 2016 Field Parameters  
ARRC Hurricane Siding**

Well	Date	Sheen or Odor?	Relative Elevation of TOC <sup>1</sup>	Depth to Groundwater (feet BTOC)	Relative Groundwater Elevation	Temperature (Degrees Celsius)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	pH	Potential (mV)
RSE-1	7/7/2016	None	99.36	4.09	95.27	5.56	0.126	1.30	5.98	157.3
RSE-2	7/7/2016	None	99.25	4.43	94.82	9.97	0.223	3.25	5.67	181.0
RSE-3	7/7/2016	None	98.56 <sup>2</sup>	4.01	94.55	6.49	0.136	0.99	6.06	29.4
RSE-4	7/7/2016	Petroleum Odor	95.90	1.60	94.30	6.07	0.115	0.48	5.87	-57.3

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

<sup>2</sup> - Approximately 2 inches was cut off of well RSE-3 after to the July 7, 2016, depth to water level measurement. The well casing had jacked preventing the lid from sitting flush.

BTOC - below top of casing

mg/L - milligrams per liter

mS/cm - milliSiemens per centimeter

mV - millivolts

TOC - top of casing

**Table 2 - 2016 Groundwater Sample Summary**  
**ARRC Hurricane Siding**

Sample Number	Location	Sample Type	Date	Time	Sampler	BTEX (8021B)	GRO (AK101)	DRO (AK102)	RRO (AK103)	Iron <sup>1</sup> (6020A)	Sulfate (300.0)	Laboratory Report
<b>Groundwater Samples</b>												
RSE-1	RSE-1	Primary	7/7/2016	1430	MB	x	x	x	x	x	x	1168247
RSE-2	RSE-2	Primary	7/7/2016	1510	MB	x	x	x	x	x	x	1168247
RSE-3	RSE-3	Primary	7/7/2016	1700	MB	x	x	x	x	x	x	1168247
RSE-4	RSE-4	Primary	7/7/2016	1600	MB	x	x	x	x	x	x	1168247
MW-X	RSE-4	Field Duplicate	7/7/2016	"1800"	MB	x	x	x	x	-	-	1168247
<b>Quality Control Samples</b>												
Equip Rinsate	Equipment Rinsate	Equipment Rinsate	7/7/2016	1620	MB	x	x	x	x	-	-	1168247
Trip Blank	Trip Blank	Trip Blank	7/7/2016	800	-	x	x	-	-	-	-	1168247

<sup>1</sup> - Iron samples were filtered immediately upon collection.

X - Indicates that the sample was analyzed for the method listed at the top of the column.

BTEX - benzene, toluene, ethylbenzene, and xylenes

DRO - diesel range organics

GRO - gasoline range organics

RRO - residual range organics



**Table 3 - 2016 Groundwater Results  
ARRC Hurricane Siding**

Location Client Sample Id Lab Sample Id Sample Type Collection Date Matrix:			Cleanup Level <sup>1</sup>	RSE-1 RSE-1 116824001 Primary 7/7/2016 Groundwater	RSE-2 RSE-2 116824002 Primary 7/7/2016 Groundwater	RSE-3 RSE-3 116824003 Primary 7/7/2016 Groundwater	RSE-4				Equip Rinsate Equip Rinsate 116824006 Equip Rinsate 7/7/2016 Water	Trip Blank Trip Blank 116824007 Trip Blank 7/7/2016 Water	
Analyte	Analysis	Units		Result [LOD]	Result [LOD]	Result [LOD]	Result [LOD]	Result [LOD]	Result [LOD]	Result [LOD]	Result [LOD]	Result [LOD]	Result [LOD]
Benzene	SW8021B	mg/L	0.005	ND [0.00025]	ND [0.00025]	ND [0.00025]	ND [0.00025]	ND [0.00025]	ND [0.00025]	ND [0.00025]	ND [0.00025]	ND [0.00025]	ND [0.00025]
Toluene	SW8021B	mg/L	1	ND [0.0005]	ND [0.0005]	ND [0.0005]	ND [0.0005]	ND [0.0005]	ND [0.0005]	ND [0.0005]	ND [0.0005]	ND [0.0005]	ND [0.0005]
Ethylbenzene	SW8021B	mg/L	0.7	ND [0.0005]	ND [0.0005]	ND [0.0005]	ND [0.0005]	0.00034 [0.0005] J	0.00035 [0.0005] J	ND [0.0005]	ND [0.0005]	ND [0.0005]	ND [0.0005]
o-Xylene	SW8021B	mg/L	10 <sup>2</sup>	ND [0.0005]	0.00105 [0.0005]	ND [0.0005]	ND [0.0005]	0.00125 [0.0005]	0.00134 [0.0005]	0.00134 [0.0005]	ND [0.0005]	ND [0.0005]	ND [0.0005]
p & m -Xylene	SW8021B	mg/L		ND [0.001]	0.00137 [0.001] J	ND [0.001]	ND [0.001]	0.0014 [0.001] J	0.00143 [0.001] J	0.00143 [0.001] J	ND [0.001]	ND [0.001]	ND [0.001]
Gasoline Range Organics	AK101	mg/L	2.2	ND [0.05]	ND [0.05]	ND [0.05]	ND [0.05]	0.0541 [0.1] J	0.0459 [0.1] J	ND [0.05]	ND [0.05]	ND [0.05]	ND [0.05]
Diesel Range Organics	AK102	mg/L	1.5	ND [0.300]	0.200 [0.638] J	0.343 [0.638] J	0.343 [0.638] J	0.885 [0.6]	0.828 [0.612]	ND [0.3]	ND [0.3]	-	-
Residual Range Organics	AK103	mg/L	1.1	0.255 [0.5] J,B	0.277 [0.532] J,B	0.263 [0.532] J,B	0.263 [0.532] J,B	0.324 [0.5] J,B	0.268 [0.510] J,B	0.215 [0.5] J,B	0.215 [0.5] J,B	-	-
Iron	6020A	mg/L	NA	ND [0.25]	2.92 [0.5]	3.12 [0.5]	3.12 [0.5]	1.26 [0.5]	6.61 [0.25]	-	-	-	-
Sulfate	300.0	mg/L	NA	1.75 [0.2]	3.46 [0.2]	1.56 [0.2]	1.56 [0.2]	0.726 [0.2]	0.501 [0.2]	-	-	-	-

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

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

B - A similar concentration was detected in a blank sample; result may be due to cross contamination.

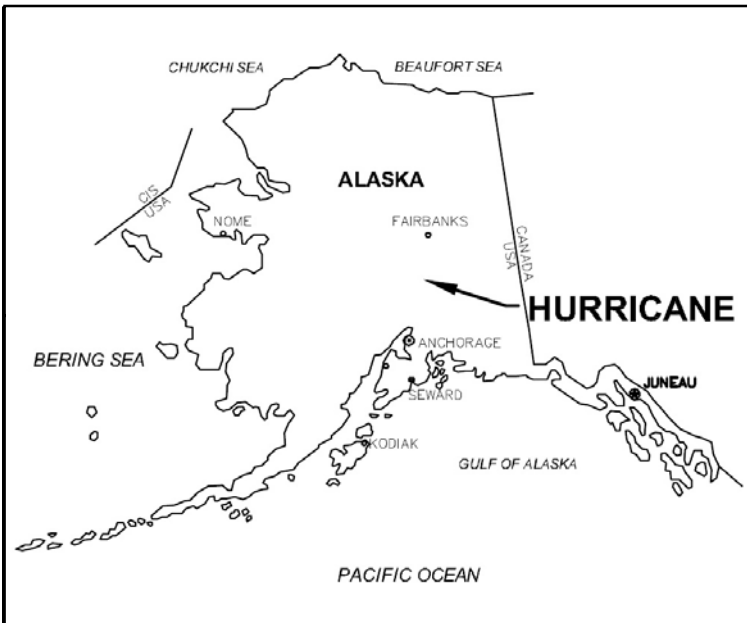
J - Result is an estimated value because it was reported below the limit of quantitation.

LOD - limit of detection

mg/L - milligrams per liter

NA - not applicable

ND - analyte was not detected at the Detection Limit



**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>).

0 0.75 1.5 3  
 Miles

Fairbanks Environmental Services  
 3538 International Street  
 Fairbanks, Alaska 99701



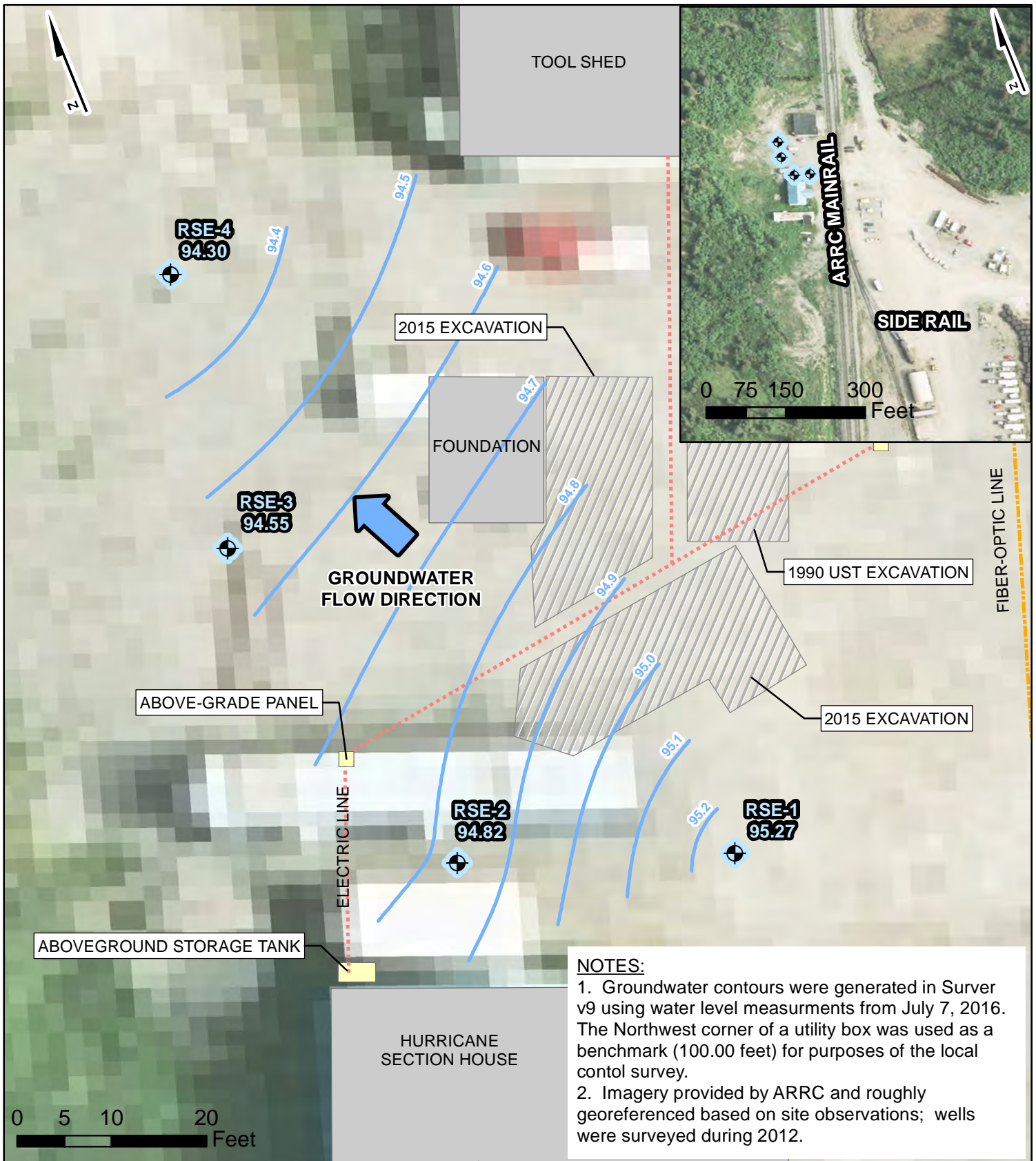
**ALASKA RAILROAD CORPORATION**

**Vicinity Map**  
 2016 Report  
 Hurricane Siding  
 Hurricane, Alaska





CONTRACT: 85304

FIGURE: 1

DATE: 8/16



**LEGEND:**

- RSE-2**  
**94.82**  Monitoring Well  
Groundwater Elevation
-  95.2 Groundwater Contour
-  Buried Fiber-Optic Line
-  Buried Electric Line

Fairbanks Environmental Services  
 3538 International Street  
 Fairbanks, Alaska 99701



**ALASKA RAILROAD CORPORATION**

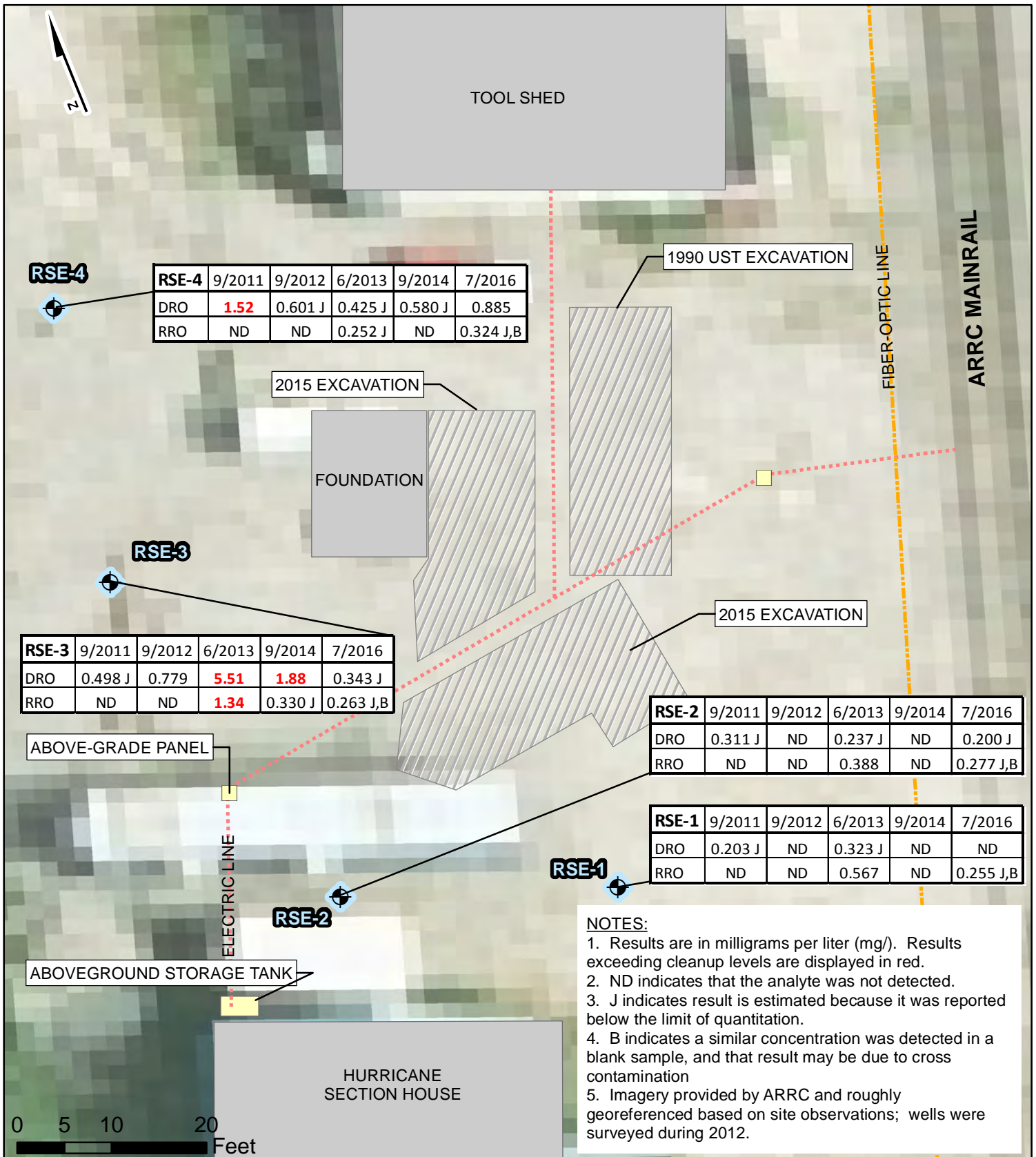
**Site Map and Groundwater Contours**

2016 Report  
 Hurricane Siding  
 Hurricane, Alaska

CONTRACT:  
85304

FIGURE:  
2

DATE:  
8/16



**LEGEND:**



Monitoring Well



Buried Fiber-Optic Line



Buried Electric Line

**ADEC Cleanup Levels**

DRO	1.5 mg/L
RRO	1.1 mg/L

Fairbanks Environmental Services  
3538 International Street  
Fairbanks, Alaska 99701



**ALASKA RAILROAD CORPORATION**

**DRO and RRO Concentrations in Groundwater Samples**

2016 Report  
Hurricane Siding  
Hurricane, Alaska

CONTRACT:

85304

FIGURE:

3

DATE:

8/16

**APPENDIX A**  
**SGS LABORATORY REPORT 1168247**

## Laboratory Report of Analysis

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

Report Number: **1168247**

Client Project: **265-2429 ARRC-2016 Hurricane**

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 ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call 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

**Justin Nelson**

**2016.07.28**

**10:07:14 -08'00'**

Justin Nelson  
Project Manager  
Justin.Nelson@sgs.com

Date

Print Date: 07/27/2016 3:43:06PM

### Case Narrative

SGS Client: **AK Railroad Corp (ARRC)**  
SGS Project: **1168247**  
Project Name/Site: **265-2429 ARRC-2016 Hurricane**  
Project Contact: **Mike Boese**

Refer to sample receipt form for information on sample condition.

**1163850001MS (1337633) MS**

300.0 - Anions - MS recovery is outside of QC criteria for sulfate (86%). Refer to LCS for accuracy requirements.

**1163850001(1337638MS) (1337647) MS**

300.0 - Anions - MS recovery is outside of QC criteria for sulfate (86%). Refer to LCS for accuracy requirements.

**1163850001MSD (1337634) MSD**

300.0 - Anions - MSD recovery is outside of QC criteria for sulfate (86%). Refer to LCS for accuracy requirements.

**1163850001(1337638MSD) (1337648) MSD**

300.0 - Anions - MSD recovery is outside of QC criteria for sulfate (86%). Refer to LCS for accuracy requirements.

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

Print Date: 07/27/2016 3:43:06PM

## Laboratory Qualifiers

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

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

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

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

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

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



### Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
RSE-1	1168247001	07/07/2016	07/09/2016	Water (Surface, Eff., Ground)
RSE-2	1168247002	07/07/2016	07/09/2016	Water (Surface, Eff., Ground)
RSE-3	1168247003	07/07/2016	07/09/2016	Water (Surface, Eff., Ground)
RSE-4	1168247004	07/07/2016	07/09/2016	Water (Surface, Eff., Ground)
MW-X	1168247005	07/07/2016	07/09/2016	Water (Surface, Eff., Ground)
Equip Rinsate	1168247006	07/07/2016	07/09/2016	Water (Surface, Eff., Ground)
Trip Blank	1168247007	07/07/2016	07/09/2016	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: 07/27/2016 3:43:09PM

### Detectable Results Summary

Client Sample ID: <b>RSE-1</b>			
Lab Sample ID: 1168247001			
<b>Semivolatile Organic Fuels</b>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
<b>Waters Department</b>	Residual Range Organics	0.255J	mg/L
	Sulfate	1.75	mg/L
Client Sample ID: <b>RSE-2</b>			
Lab Sample ID: 1168247002			
<b>Dissolved Metals by ICP/MS</b>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
<b>Semivolatile Organic Fuels</b>	Iron	2920	ug/L
	Diesel Range Organics	0.200J	mg/L
	Residual Range Organics	0.277J	mg/L
<b>Volatile Fuels</b>	o-Xylene	1.05	ug/L
	P & M -Xylene	1.37J	ug/L
<b>Waters Department</b>	Sulfate	3.46	mg/L
Client Sample ID: <b>RSE-3</b>			
Lab Sample ID: 1168247003			
<b>Dissolved Metals by ICP/MS</b>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
<b>Semivolatile Organic Fuels</b>	Iron	3120	ug/L
	Diesel Range Organics	0.343J	mg/L
	Residual Range Organics	0.263J	mg/L
<b>Waters Department</b>	Sulfate	1.56	mg/L
Client Sample ID: <b>RSE-4</b>			
Lab Sample ID: 1168247004			
<b>Dissolved Metals by ICP/MS</b>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
<b>Semivolatile Organic Fuels</b>	Iron	1260	ug/L
	Diesel Range Organics	0.885	mg/L
	Residual Range Organics	0.324J	mg/L
<b>Volatile Fuels</b>	Ethylbenzene	0.340J	ug/L
	Gasoline Range Organics	0.0541J	mg/L
	o-Xylene	1.25	ug/L
	P & M -Xylene	1.35J	ug/L
<b>Waters Department</b>	Sulfate	0.726	mg/L
Client Sample ID: <b>MW-X</b>			
Lab Sample ID: 1168247005			
<b>Semivolatile Organic Fuels</b>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
	Diesel Range Organics	0.828	mg/L
	Residual Range Organics	0.268J	mg/L
<b>Volatile Fuels</b>	Ethylbenzene	0.350J	ug/L
	Gasoline Range Organics	0.0459J	mg/L
	o-Xylene	1.34	ug/L
	P & M -Xylene	1.43J	ug/L
Client Sample ID: <b>Equip Rinsate</b>			
Lab Sample ID: 1168247006			
<b>Semivolatile Organic Fuels</b>	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
	Residual Range Organics	0.215J	mg/L

Print Date: 07/27/2016 3:43:10PM

## Results of RSE-1

Client Sample ID: **RSE-1**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247001  
 Lab Project ID: 1168247

Collection Date: 07/07/16 14:30  
 Received Date: 07/09/16 10:16  
 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		07/13/16 11:13

## Batch Information

Analytical Batch: MMS9443  
 Analytical Method: SW6020A  
 Analyst: VDL  
 Analytical Date/Time: 07/13/16 11:13  
 Container ID: 1168247001-F

Prep Batch: MXX29952  
 Prep Method: SW3010A  
 Prep Date/Time: 07/11/16 08:36  
 Prep Initial Wt./Vol.: 25 mL  
 Prep Extract Vol: 25 mL



### Results of RSE-1

Client Sample ID: **RSE-1**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247001  
 Lab Project ID: 1168247

Collection Date: 07/07/16 14:30  
 Received Date: 07/09/16 10:16  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

### Results by Semivolatile Organic 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>
Diesel Range Organics	0.300 U	0.600	0.180	mg/L	1		07/22/16 22:48
<b>Surrogates</b>							
5a Androstane (surr)	87.1	50-150		%	1		07/22/16 22:48

### Batch Information

Analytical Batch: XFC12553  
 Analytical Method: AK102  
 Analyst: NRO  
 Analytical Date/Time: 07/22/16 22:48  
 Container ID: 1168247001-D

Prep Batch: XXX35843  
 Prep Method: SW3520C  
 Prep Date/Time: 07/20/16 15:50  
 Prep Initial Wt./Vol.: 250 mL  
 Prep Extract Vol: 1 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>
Residual Range Organics	0.255 J	0.500	0.150	mg/L	1		07/22/16 22:48
<b>Surrogates</b>							
n-Triacontane-d62 (surr)	87.9	50-150		%	1		07/22/16 22:48

### Batch Information

Analytical Batch: XFC12553  
 Analytical Method: AK103  
 Analyst: NRO  
 Analytical Date/Time: 07/22/16 22:48  
 Container ID: 1168247001-D

Prep Batch: XXX35843  
 Prep Method: SW3520C  
 Prep Date/Time: 07/20/16 15:50  
 Prep Initial Wt./Vol.: 250 mL  
 Prep Extract Vol: 1 mL

## Results of RSE-1

Client Sample ID: **RSE-1**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247001  
 Lab Project ID: 1168247

Collection Date: 07/07/16 14:30  
 Received Date: 07/09/16 10:16  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.0500 U	0.100	0.0310	mg/L	1		07/20/16 23:47

### Surrogates

4-Bromofluorobenzene (surr)	108	50-150		%	1		07/20/16 23:47
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## Batch Information

Analytical Batch: VFC13150  
 Analytical Method: AK101  
 Analyst: ST  
 Analytical Date/Time: 07/20/16 23:47  
 Container ID: 1168247001-A

Prep Batch: VXX29172  
 Prep Method: SW5030B  
 Prep Date/Time: 07/20/16 06:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U	0.500	0.150	ug/L	1		07/20/16 06:41
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/20/16 06:41
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/20/16 06:41
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/20/16 06:41
Toluene	0.500 U	1.00	0.310	ug/L	1		07/20/16 06:41

### Surrogates

1,4-Difluorobenzene (surr)	88.4	77-115		%	1		07/20/16 06:41
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## Batch Information

Analytical Batch: VFC13147  
 Analytical Method: SW8021B  
 Analyst: ST  
 Analytical Date/Time: 07/20/16 06:41  
 Container ID: 1168247001-A

Prep Batch: VXX29166  
 Prep Method: SW5030B  
 Prep Date/Time: 07/19/16 06:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

## Results of RSE-1

Client Sample ID: **RSE-1**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247001  
 Lab Project ID: 1168247

Collection Date: 07/07/16 14:30  
 Received Date: 07/09/16 10:16  
 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	1.75	0.200	0.0620	mg/L	1		07/15/16 23:52

## Batch Information

Analytical Batch: WIC5552  
 Analytical Method: EPA 300.0  
 Analyst: ACF  
 Analytical Date/Time: 07/15/16 23:52  
 Container ID: 1168247001-G

Prep Batch: WXX11556  
 Prep Method: METHOD  
 Prep Date/Time: 07/15/16 13:47  
 Prep Initial Wt./Vol.: 10 mL  
 Prep Extract Vol: 10 mL

## Results of RSE-2

Client Sample ID: **RSE-2**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247002  
 Lab Project ID: 1168247

Collection Date: 07/07/16 15:10  
 Received Date: 07/09/16 10:16  
 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	2920	500	150	ug/L	5		07/13/16 11:18

## Batch Information

Analytical Batch: MMS9443  
 Analytical Method: SW6020A  
 Analyst: VDL  
 Analytical Date/Time: 07/13/16 11:18  
 Container ID: 1168247002-F

Prep Batch: MXX29952  
 Prep Method: SW3010A  
 Prep Date/Time: 07/11/16 08:36  
 Prep Initial Wt./Vol.: 25 mL  
 Prep Extract Vol: 25 mL

## Results of RSE-2

Client Sample ID: **RSE-2**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247002  
 Lab Project ID: 1168247

Collection Date: 07/07/16 15:10  
 Received Date: 07/09/16 10:16  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.200 J	0.638	0.191	mg/L	1		07/22/16 22:58
<b>Surrogates</b>							
5a Androstane (surr)	86.6	50-150		%	1		07/22/16 22:58

## Batch Information

Analytical Batch: XFC12553  
 Analytical Method: AK102  
 Analyst: NRO  
 Analytical Date/Time: 07/22/16 22:58  
 Container ID: 1168247002-D

Prep Batch: XXX35843  
 Prep Method: SW3520C  
 Prep Date/Time: 07/20/16 15:50  
 Prep Initial Wt./Vol.: 235 mL  
 Prep Extract Vol: 1 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.277 J	0.532	0.160	mg/L	1		07/22/16 22:58
<b>Surrogates</b>							
n-Triacontane-d62 (surr)	85.6	50-150		%	1		07/22/16 22:58

## Batch Information

Analytical Batch: XFC12553  
 Analytical Method: AK103  
 Analyst: NRO  
 Analytical Date/Time: 07/22/16 22:58  
 Container ID: 1168247002-D

Prep Batch: XXX35843  
 Prep Method: SW3520C  
 Prep Date/Time: 07/20/16 15:50  
 Prep Initial Wt./Vol.: 235 mL  
 Prep Extract Vol: 1 mL





Results of RSE-2

Client Sample ID: RSE-2
Client Project ID: 265-2429 ARRC-2016 Hurricane
Lab Sample ID: 1168247002
Lab Project ID: 1168247

Collection Date: 07/07/16 15:10
Received Date: 07/09/16 10:16
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, 07/21/16 00:05

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 109, 50-150, %, 1, 07/21/16 00:05

Batch Information

Analytical Batch: VFC13150
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 07/21/16 00:05
Container ID: 1168247002-A

Prep Batch: VXX29172
Prep Method: SW5030B
Prep Date/Time: 07/20/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 92.7, 77-115, %, 1, 07/20/16 07:00

Batch Information

Analytical Batch: VFC13147
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 07/20/16 07:00
Container ID: 1168247002-A

Prep Batch: VXX29166
Prep Method: SW5030B
Prep Date/Time: 07/19/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

## Results of RSE-2

Client Sample ID: **RSE-2**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247002  
 Lab Project ID: 1168247

Collection Date: 07/07/16 15:10  
 Received Date: 07/09/16 10:16  
 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	3.46	0.200	0.0620	mg/L	1		07/16/16 02:32

## Batch Information

Analytical Batch: WIC5552  
 Analytical Method: EPA 300.0  
 Analyst: ACF  
 Analytical Date/Time: 07/16/16 02:32  
 Container ID: 1168247002-G

Prep Batch: WXX11556  
 Prep Method: METHOD  
 Prep Date/Time: 07/15/16 13:47  
 Prep Initial Wt./Vol.: 10 mL  
 Prep Extract Vol: 10 mL

## Results of RSE-3

Client Sample ID: **RSE-3**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247003  
 Lab Project ID: 1168247

Collection Date: 07/07/16 17:00  
 Received Date: 07/09/16 10:16  
 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	3120	500	150	ug/L	5		07/13/16 11:38

## Batch Information

Analytical Batch: MMS9443  
 Analytical Method: SW6020A  
 Analyst: VDL  
 Analytical Date/Time: 07/13/16 11:38  
 Container ID: 1168247003-F

Prep Batch: MXX29952  
 Prep Method: SW3010A  
 Prep Date/Time: 07/11/16 08:36  
 Prep Initial Wt./Vol.: 25 mL  
 Prep Extract Vol: 25 mL



Results of RSE-3

Client Sample ID: RSE-3
Client Project ID: 265-2429 ARRC-2016 Hurricane
Lab Sample ID: 1168247003
Lab Project ID: 1168247

Collection Date: 07/07/16 17:00
Received Date: 07/09/16 10:16
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Semivolatile Organic Fuels

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

Batch Information

Analytical Batch: XFC12553
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 07/22/16 23:09
Container ID: 1168247003-D

Prep Batch: XXX35843
Prep Method: SW3520C
Prep Date/Time: 07/20/16 15:50
Prep Initial Wt./Vol.: 235 mL
Prep Extract Vol: 1 mL

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

Batch Information

Analytical Batch: XFC12553
Analytical Method: AK103
Analyst: NRO
Analytical Date/Time: 07/22/16 23:09
Container ID: 1168247003-D

Prep Batch: XXX35843
Prep Method: SW3520C
Prep Date/Time: 07/20/16 15:50
Prep Initial Wt./Vol.: 235 mL
Prep Extract Vol: 1 mL

## Results of RSE-3

Client Sample ID: **RSE-3**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247003  
 Lab Project ID: 1168247

Collection Date: 07/07/16 17:00  
 Received Date: 07/09/16 10:16  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.0500 U	0.100	0.0310	mg/L	1		07/21/16 00:24

### Surrogates

4-Bromofluorobenzene (surr)	108	50-150		%	1		07/21/16 00:24
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## Batch Information

Analytical Batch: VFC13150  
 Analytical Method: AK101  
 Analyst: ST  
 Analytical Date/Time: 07/21/16 00:24  
 Container ID: 1168247003-A

Prep Batch: VXX29172  
 Prep Method: SW5030B  
 Prep Date/Time: 07/20/16 06:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U	0.500	0.150	ug/L	1		07/20/16 07:19
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/20/16 07:19
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/20/16 07:19
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/20/16 07:19
Toluene	0.500 U	1.00	0.310	ug/L	1		07/20/16 07:19

### Surrogates

1,4-Difluorobenzene (surr)	87.2	77-115		%	1		07/20/16 07:19
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## Batch Information

Analytical Batch: VFC13147  
 Analytical Method: SW8021B  
 Analyst: ST  
 Analytical Date/Time: 07/20/16 07:19  
 Container ID: 1168247003-A

Prep Batch: VXX29166  
 Prep Method: SW5030B  
 Prep Date/Time: 07/19/16 06:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

## Results of RSE-3

Client Sample ID: **RSE-3**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247003  
 Lab Project ID: 1168247

Collection Date: 07/07/16 17:00  
 Received Date: 07/09/16 10:16  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Waters Department

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfate	1.56	0.200	0.0620	mg/L	1		07/16/16 02:55

## Batch Information

Analytical Batch: WIC5552  
 Analytical Method: EPA 300.0  
 Analyst: ACF  
 Analytical Date/Time: 07/16/16 02:55  
 Container ID: 1168247003-G

Prep Batch: WXX11556  
 Prep Method: METHOD  
 Prep Date/Time: 07/15/16 13:47  
 Prep Initial Wt./Vol.: 10 mL  
 Prep Extract Vol: 10 mL

## Results of RSE-4

Client Sample ID: **RSE-4**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247004  
 Lab Project ID: 1168247

Collection Date: 07/07/16 16:00  
 Received Date: 07/09/16 10:16  
 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	1260	500	150	ug/L	5		07/13/16 11:43

## Batch Information

Analytical Batch: MMS9443  
 Analytical Method: SW6020A  
 Analyst: VDL  
 Analytical Date/Time: 07/13/16 11:43  
 Container ID: 1168247004-F

Prep Batch: MXX29952  
 Prep Method: SW3010A  
 Prep Date/Time: 07/11/16 08:36  
 Prep Initial Wt./Vol.: 25 mL  
 Prep Extract Vol: 25 mL

## Results of RSE-4

Client Sample ID: **RSE-4**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247004  
 Lab Project ID: 1168247

Collection Date: 07/07/16 16:00  
 Received Date: 07/09/16 10:16  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.885	0.600	0.180	mg/L	1		07/22/16 23:19
<b>Surrogates</b>							
5a Androstane (surr)	77	50-150		%	1		07/22/16 23:19

## Batch Information

Analytical Batch: XFC12553  
 Analytical Method: AK102  
 Analyst: NRO  
 Analytical Date/Time: 07/22/16 23:19  
 Container ID: 1168247004-D

Prep Batch: XXX35843  
 Prep Method: SW3520C  
 Prep Date/Time: 07/20/16 15:50  
 Prep Initial Wt./Vol.: 250 mL  
 Prep Extract Vol: 1 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.324 J	0.500	0.150	mg/L	1		07/22/16 23:19
<b>Surrogates</b>							
n-Triacontane-d62 (surr)	72.6	50-150		%	1		07/22/16 23:19

## Batch Information

Analytical Batch: XFC12553  
 Analytical Method: AK103  
 Analyst: NRO  
 Analytical Date/Time: 07/22/16 23:19  
 Container ID: 1168247004-D

Prep Batch: XXX35843  
 Prep Method: SW3520C  
 Prep Date/Time: 07/20/16 15:50  
 Prep Initial Wt./Vol.: 250 mL  
 Prep Extract Vol: 1 mL





Results of RSE-4

Client Sample ID: RSE-4
Client Project ID: 265-2429 ARRC-2016 Hurricane
Lab Sample ID: 1168247004
Lab Project ID: 1168247

Collection Date: 07/07/16 16:00
Received Date: 07/09/16 10:16
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, 0.0541 J, 0.100, 0.0310, mg/L, 1, 07/21/16 00:43

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 111, 50-150, %, 1, 07/21/16 00:43

Batch Information

Analytical Batch: VFC13150
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 07/21/16 00:43
Container ID: 1168247004-A

Prep Batch: VXX29172
Prep Method: SW5030B
Prep Date/Time: 07/20/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 90.3, 77-115, %, 1, 07/20/16 07:38

Batch Information

Analytical Batch: VFC13147
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 07/20/16 07:38
Container ID: 1168247004-A

Prep Batch: VXX29166
Prep Method: SW5030B
Prep Date/Time: 07/19/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of **RSE-4**

Client Sample ID: **RSE-4**  
Client Project ID: **265-2429 ARRC-2016 Hurricane**  
Lab Sample ID: 1168247004  
Lab Project ID: 1168247

Collection Date: 07/07/16 16:00  
Received Date: 07/09/16 10:16  
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	0.726	0.200	0.0620	mg/L	1		07/16/16 03:17

**Batch Information**

Analytical Batch: WIC5552  
Analytical Method: EPA 300.0  
Analyst: ACF  
Analytical Date/Time: 07/16/16 03:17  
Container ID: 1168247004-G

Prep Batch: WXX11556  
Prep Method: METHOD  
Prep Date/Time: 07/15/16 13:47  
Prep Initial Wt./Vol.: 10 mL  
Prep Extract Vol: 10 mL

## Results of MW-X

Client Sample ID: **MW-X**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247005  
 Lab Project ID: 1168247

Collection Date: 07/07/16 18:00  
 Received Date: 07/09/16 10:16  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.828	0.612	0.184	mg/L	1		07/22/16 23:51
<b>Surrogates</b>							
5a Androstane (surr)	74.1	50-150		%	1		07/22/16 23:51

## Batch Information

Analytical Batch: XFC12553  
 Analytical Method: AK102  
 Analyst: NRO  
 Analytical Date/Time: 07/22/16 23:51  
 Container ID: 1168247005-D

Prep Batch: XXX35843  
 Prep Method: SW3520C  
 Prep Date/Time: 07/20/16 15:50  
 Prep Initial Wt./Vol.: 245 mL  
 Prep Extract Vol: 1 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.268 J	0.510	0.153	mg/L	1		07/22/16 23:51
<b>Surrogates</b>							
n-Triacontane-d62 (surr)	70.7	50-150		%	1		07/22/16 23:51

## Batch Information

Analytical Batch: XFC12553  
 Analytical Method: AK103  
 Analyst: NRO  
 Analytical Date/Time: 07/22/16 23:51  
 Container ID: 1168247005-D

Prep Batch: XXX35843  
 Prep Method: SW3520C  
 Prep Date/Time: 07/20/16 15:50  
 Prep Initial Wt./Vol.: 245 mL  
 Prep Extract Vol: 1 mL

## Results of MW-X

Client Sample ID: **MW-X**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247005  
 Lab Project ID: 1168247

Collection Date: 07/07/16 18:00  
 Received Date: 07/09/16 10:16  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.0459 J	0.100	0.0310	mg/L	1		07/21/16 01:02

### Surrogates

4-Bromofluorobenzene (surr)	112	50-150		%	1		07/21/16 01:02
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## Batch Information

Analytical Batch: VFC13150  
 Analytical Method: AK101  
 Analyst: ST  
 Analytical Date/Time: 07/21/16 01:02  
 Container ID: 1168247005-A

Prep Batch: VXX29172  
 Prep Method: SW5030B  
 Prep Date/Time: 07/20/16 06:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U	0.500	0.150	ug/L	1		07/20/16 07:57
Ethylbenzene	0.350 J	1.00	0.310	ug/L	1		07/20/16 07:57
o-Xylene	1.34	1.00	0.310	ug/L	1		07/20/16 07:57
P & M -Xylene	1.43 J	2.00	0.620	ug/L	1		07/20/16 07:57
Toluene	0.500 U	1.00	0.310	ug/L	1		07/20/16 07:57

### Surrogates

1,4-Difluorobenzene (surr)	87.9	77-115		%	1		07/20/16 07:57
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## Batch Information

Analytical Batch: VFC13147  
 Analytical Method: SW8021B  
 Analyst: ST  
 Analytical Date/Time: 07/20/16 07:57  
 Container ID: 1168247005-A

Prep Batch: VXX29166  
 Prep Method: SW5030B  
 Prep Date/Time: 07/19/16 06:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

## Results of Equip Rinsate

Client Sample ID: **Equip Rinsate**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247006  
 Lab Project ID: 1168247

Collection Date: 07/07/16 16:20  
 Received Date: 07/09/16 10:16  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Semivolatile Organic Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.300 U	0.600	0.180	mg/L	1		07/23/16 00:02
<b>Surrogates</b>							
5a Androstane (surr)	83.3	50-150		%	1		07/23/16 00:02

## Batch Information

Analytical Batch: XFC12553  
 Analytical Method: AK102  
 Analyst: NRO  
 Analytical Date/Time: 07/23/16 00:02  
 Container ID: 1168247006-D

Prep Batch: XXX35843  
 Prep Method: SW3520C  
 Prep Date/Time: 07/20/16 15:50  
 Prep Initial Wt./Vol.: 250 mL  
 Prep Extract Vol: 1 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.215 J	0.500	0.150	mg/L	1		07/23/16 00:02
<b>Surrogates</b>							
n-Triacontane-d62 (surr)	81.2	50-150		%	1		07/23/16 00:02

## Batch Information

Analytical Batch: XFC12553  
 Analytical Method: AK103  
 Analyst: NRO  
 Analytical Date/Time: 07/23/16 00:02  
 Container ID: 1168247006-D

Prep Batch: XXX35843  
 Prep Method: SW3520C  
 Prep Date/Time: 07/20/16 15:50  
 Prep Initial Wt./Vol.: 250 mL  
 Prep Extract Vol: 1 mL



### Results of Equip Rinsate

Client Sample ID: **Equip Rinsate**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247006  
 Lab Project ID: 1168247

Collection Date: 07/07/16 16:20  
 Received Date: 07/09/16 10:16  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

### Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.0500 U	0.100	0.0310	mg/L	1		07/21/16 01:20

#### Surrogates

4-Bromofluorobenzene (surr)	107	50-150		%	1		07/21/16 01:20
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### Batch Information

Analytical Batch: VFC13150  
 Analytical Method: AK101  
 Analyst: ST  
 Analytical Date/Time: 07/21/16 01:20  
 Container ID: 1168247006-A

Prep Batch: VXX29172  
 Prep Method: SW5030B  
 Prep Date/Time: 07/20/16 06:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U	0.500	0.150	ug/L	1		07/20/16 08:15
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/20/16 08:15
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/20/16 08:15
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/20/16 08:15
Toluene	0.500 U	1.00	0.310	ug/L	1		07/20/16 08:15

#### Surrogates

1,4-Difluorobenzene (surr)	91.9	77-115		%	1		07/20/16 08:15
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### Batch Information

Analytical Batch: VFC13147  
 Analytical Method: SW8021B  
 Analyst: ST  
 Analytical Date/Time: 07/20/16 08:15  
 Container ID: 1168247006-A

Prep Batch: VXX29166  
 Prep Method: SW5030B  
 Prep Date/Time: 07/19/16 06:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

## Results of Trip Blank

Client Sample ID: **Trip Blank**  
 Client Project ID: **265-2429 ARRC-2016 Hurricane**  
 Lab Sample ID: 1168247007  
 Lab Project ID: 1168247

Collection Date: 07/07/16 08:00  
 Received Date: 07/09/16 10:16  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.0500 U	0.100	0.0310	mg/L	1		07/20/16 21:17

### Surrogates

4-Bromofluorobenzene (surr)	108	50-150		%	1		07/20/16 21:17
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## Batch Information

Analytical Batch: VFC13150  
 Analytical Method: AK101  
 Analyst: ST  
 Analytical Date/Time: 07/20/16 21:17  
 Container ID: 1168247007-A

Prep Batch: VXX29172  
 Prep Method: SW5030B  
 Prep Date/Time: 07/20/16 06:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U	0.500	0.150	ug/L	1		07/20/16 04:11
Ethylbenzene	0.500 U	1.00	0.310	ug/L	1		07/20/16 04:11
o-Xylene	0.500 U	1.00	0.310	ug/L	1		07/20/16 04:11
P & M -Xylene	1.00 U	2.00	0.620	ug/L	1		07/20/16 04:11
Toluene	0.500 U	1.00	0.310	ug/L	1		07/20/16 04:11

### Surrogates

1,4-Difluorobenzene (surr)	84.1	77-115		%	1		07/20/16 04:11
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## Batch Information

Analytical Batch: VFC13147  
 Analytical Method: SW8021B  
 Analyst: ST  
 Analytical Date/Time: 07/20/16 04:11  
 Container ID: 1168247007-A

Prep Batch: VXX29166  
 Prep Method: SW5030B  
 Prep Date/Time: 07/19/16 06:00  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

## Method Blank

Blank ID: MB for HBN 1738922 [MXX/29952]  
Blank Lab ID: 1335698

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1168247001, 1168247002, 1168247003, 1168247004

## 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: MMS9443  
Analytical Method: SW6020A  
Instrument: Perkin Elmer Nexlon P5  
Analyst: VDL  
Analytical Date/Time: 7/13/2016 10:55:39AM

Prep Batch: MXX29952  
Prep Method: SW3010A  
Prep Date/Time: 7/11/2016 8:36:17AM  
Prep Initial Wt./Vol.: 25 mL  
Prep Extract Vol: 25 mL

Print Date: 07/27/2016 3:43:13PM



## Blank Spike Summary

Blank Spike ID: LCS for HBN 1168247 [MXX29952]

Blank Spike Lab ID: 1335699

Date Analyzed: 07/13/2016 11:00

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1168247001, 1168247002, 1168247003, 1168247004

## Results by SW6020A

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Iron	5000	5070	101	( 87-118 )

## Batch Information

Analytical Batch: **MMS9443**

Analytical Method: **SW6020A**

Instrument: **Perkin Elmer Nexlon P5**

Analyst: **VDL**

Prep Batch: **MXX29952**

Prep Method: **SW3010A**

Prep Date/Time: **07/11/2016 08:36**

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

Dupe Init Wt./Vol.: Extract Vol:

## Matrix Spike Summary

Original Sample ID: 1335700  
 MS Sample ID: 1335701 MS  
 MSD Sample ID: 1335702 MSD

Analysis Date: 07/13/2016 10:37  
 Analysis Date: 07/13/2016 10:42  
 Analysis Date: 07/13/2016 10:46  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1168247001, 1168247002, 1168247003, 1168247004

## Results by SW6020A

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Iron	528	5000	5490	99	5000	5800	105	87-118	5.40	(< 20 )

## Batch Information

Analytical Batch: MMS9443  
 Analytical Method: SW6020A  
 Instrument: Perkin Elmer Nexlon P5  
 Analyst: VDL  
 Analytical Date/Time: 7/13/2016 10:42:14AM

Prep Batch: MXX29952  
 Prep Method: 3010 H2O Digest for Metals ICP-MS  
 Prep Date/Time: 7/11/2016 8:36:17AM  
 Prep Initial Wt./Vol.: 25.00mL  
 Prep Extract Vol: 25.00mL

## Method Blank

Blank ID: MB for HBN 1739693 [VXX/29166]  
 Blank Lab ID: 1338130

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1168247001, 1168247002, 1168247003, 1168247004, 1168247005, 1168247006, 1168247007

## Results by SW8021B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	0.250U	0.500	0.150	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
Toluene	0.500U	1.00	0.310	ug/L
<b>Surrogates</b>				
1,4-Difluorobenzene (surr)	87.1	77-115		%

## Batch Information

Analytical Batch: VFC13147  
 Analytical Method: SW8021B  
 Instrument: Agilent 7890 PID/FID  
 Analyst: ST  
 Analytical Date/Time: 7/20/2016 3:33:00AM

Prep Batch: VXX29166  
 Prep Method: SW5030B  
 Prep Date/Time: 7/19/2016 6:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 07/27/2016 3:43:19PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1168247 [VXX29166]  
 Blank Spike Lab ID: 1338131  
 Date Analyzed: 07/20/2016 02:37

Spike Duplicate ID: LCSD for HBN 1168247 [VXX29166]  
 Spike Duplicate Lab ID: 1338132  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1168247001, 1168247002, 1168247003, 1168247004, 1168247005, 1168247006, 1168247007

## 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	101	101	( 80-120 )	1.30	(< 20 )
Ethylbenzene	100	86.2	86	100	85.6	86	( 75-125 )	0.66	(< 20 )
o-Xylene	100	87.2	87	100	85.7	86	( 80-120 )	1.80	(< 20 )
P & M -Xylene	200	171	86	200	169	84	( 75-130 )	1.50	(< 20 )
Toluene	100	94.4	94	100	94.3	94	( 75-120 )	0.13	(< 20 )
<b>Surrogates</b>									
1,4-Difluorobenzene (surr)	50	101	101	50	99.5	100	( 77-115 )	1.40	

## Batch Information

Analytical Batch: **VFC13147**  
 Analytical Method: **SW8021B**  
 Instrument: **Agilent 7890 PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX29166**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **07/19/2016 06:00**  
 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 1739786 [VXX/29172]  
 Blank Lab ID: 1338377

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1168247001, 1168247002, 1168247003, 1168247004, 1168247005, 1168247006, 1168247007

## Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.0500U	0.100	0.0310	mg/L
<b>Surrogates</b>				
4-Bromofluorobenzene (surr)	108	50-150		%

## Batch Information

Analytical Batch: VFC13150  
 Analytical Method: AK101  
 Instrument: Agilent 7890A PID/FID  
 Analyst: ST  
 Analytical Date/Time: 7/20/2016 8:39:00PM

Prep Batch: VXX29172  
 Prep Method: SW5030B  
 Prep Date/Time: 7/20/2016 6:00:00AM  
 Prep Initial Wt./Vol.: 5 mL  
 Prep Extract Vol: 5 mL

Print Date: 07/27/2016 3:43:25PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1168247 [VXX29172]  
 Blank Spike Lab ID: 1338380  
 Date Analyzed: 07/20/2016 20:01

Spike Duplicate ID: LCSD for HBN 1168247 [VXX29172]  
 Spike Duplicate Lab ID: 1338381  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1168247001, 1168247002, 1168247003, 1168247004, 1168247005, 1168247006, 1168247007

## Results by AK101

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	1.00	1.02	102	1.00	1.04	104	( 60-120 )	1.60	(< 20 )
<b>Surrogates</b>									
4-Bromofluorobenzene (surr)	0.0500	117	117	0.0500	115	115	( 50-150 )	1.60	

## Batch Information

Analytical Batch: **VFC13150**  
 Analytical Method: **AK101**  
 Instrument: **Agilent 7890A PID/FID**  
 Analyst: **ST**

Prep Batch: **VXX29172**  
 Prep Method: **SW5030B**  
 Prep Date/Time: **07/20/2016 06:00**  
 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 1739593 [WXX/11556]  
Blank Lab ID: 1337631

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1168247001, 1168247002, 1168247003, 1168247004

## Results by EPA 300.0

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Sulfate	0.100U	0.200	0.0620	mg/L

## Batch Information

Analytical Batch: WIC5552  
Analytical Method: EPA 300.0  
Instrument: Metrohm 733 DX2  
Analyst: ACF  
Analytical Date/Time: 7/15/2016 3:59:33PM

Prep Batch: WXX11556  
Prep Method: METHOD  
Prep Date/Time: 7/15/2016 1:47:00PM  
Prep Initial Wt./Vol.: 10 mL  
Prep Extract Vol: 10 mL

Print Date: 07/27/2016 3:43:29PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1168247 [WXX11556]

Blank Spike Lab ID: 1337632

Date Analyzed: 07/15/2016 16:21

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1168247001, 1168247002, 1168247003, 1168247004

## Results by EPA 300.0

Parameter	Blank Spike (mg/L)			CL ( 90-110 )
	Spike	Result	Rec (%)	
Sulfate	5	5.18	104	

## Batch Information

Analytical Batch: **WIC5552**

Analytical Method: **EPA 300.0**

Instrument: **Metrohm 733 DX2**

Analyst: **ACF**

Prep Batch: **WXX11556**

Prep Method: **METHOD**

Prep Date/Time: **07/15/2016 13:47**

Spike Init Wt./Vol.: 5 mg/L Extract Vol: 10 mL

Dupe Init Wt./Vol.: Extract Vol:



## Matrix Spike Summary

Original Sample ID: 1163850001  
 MS Sample ID: 1337633 MS  
 MSD Sample ID: 1337634 MSD

Analysis Date: 07/15/2016 16:44  
 Analysis Date: 07/15/2016 17:06  
 Analysis Date: 07/15/2016 17:33  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1168247001, 1168247002, 1168247003, 1168247004

## 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	14.4	5.00	18.6	86 *	5.00	18.7	86 *	90-110	0.07	(< 15)

## Batch Information

Analytical Batch: WIC5552  
 Analytical Method: EPA 300.0  
 Instrument: Metrohm 733 DX2  
 Analyst: ACF  
 Analytical Date/Time: 7/15/2016 5:06:24PM

Prep Batch: WXX11556  
 Prep Method: EPA 300.0 Extraction Waters/Liquids  
 Prep Date/Time: 7/15/2016 1:47:00PM  
 Prep Initial Wt./Vol.: 10.00mL  
 Prep Extract Vol: 10.00mL

Print Date: 07/27/2016 3:43:33PM

## Matrix Spike Summary

Original Sample ID: 1337638  
 MS Sample ID: 1337647 MS  
 MSD Sample ID: 1337648 MSD

Analysis Date: 07/15/2016 16:44  
 Analysis Date: 07/15/2016 17:06  
 Analysis Date: 07/15/2016 17:33  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1168247001, 1168247002, 1168247003, 1168247004

## 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	14.4	5.00	18.6	86 *	5.00	18.7	86 *	90-110	0.07	(< 15)

## Batch Information

Analytical Batch: WIC5552  
 Analytical Method: EPA 300.0  
 Instrument: Metrohm 733 DX2  
 Analyst: ACF  
 Analytical Date/Time: 7/15/2016 5:06:24PM

Prep Batch: WXX11556  
 Prep Method: EPA 300.0 Extraction Waters/Liquids  
 Prep Date/Time: 7/15/2016 1:47:00PM  
 Prep Initial Wt./Vol.: 10.00mL  
 Prep Extract Vol: 10.00mL

## Method Blank

Blank ID: MB for HBN 1739725 [XXX/35843]  
Blank Lab ID: 1338308

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1168247001, 1168247002, 1168247003, 1168247004, 1168247005, 1168247006

## Results by AK102

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Diesel Range Organics	0.300U	0.600	0.180	mg/L
<b>Surrogates</b>				
5a Androstane (surr)	92.8	60-120		%

## Batch Information

Analytical Batch: XFC12553  
Analytical Method: AK102  
Instrument: Agilent 7890B R  
Analyst: NRO  
Analytical Date/Time: 7/22/2016 8:21:00PM

Prep Batch: XXX35843  
Prep Method: SW3520C  
Prep Date/Time: 7/20/2016 3:50:38PM  
Prep Initial Wt./Vol.: 250 mL  
Prep Extract Vol: 1 mL

Print Date: 07/27/2016 3:43:34PM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1168247 [XXX35843]  
 Blank Spike Lab ID: 1338309  
 Date Analyzed: 07/22/2016 20:32

Spike Duplicate ID: LCSD for HBN 1168247 [XXX35843]  
 Spike Duplicate Lab ID: 1338310  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1168247001, 1168247002, 1168247003, 1168247004, 1168247005, 1168247006

### 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	20.3	101	20	21.9	109	( 75-125 )	7.60	(< 20 )
<b>Surrogates</b>									
5a Androstane (surr)	0.4	96.4	96	0.4	104	104	( 60-120 )	8.00	

### Batch Information

Analytical Batch: **XFC12553**  
 Analytical Method: **AK102**  
 Instrument: **Agilent 7890B R**  
 Analyst: **NRO**

Prep Batch: **XXX35843**  
 Prep Method: **SW3520C**  
 Prep Date/Time: **07/20/2016 15:50**  
 Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL  
 Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

Print Date: 07/27/2016 3:43:36PM

## Method Blank

Blank ID: MB for HBN 1739725 [XXX/35843]  
Blank Lab ID: 1338308

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1168247001, 1168247002, 1168247003, 1168247004, 1168247005, 1168247006

## Results by AK103

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Residual Range Organics	0.211J	0.500	0.150	mg/L
<b>Surrogates</b>				
n-Triacontane-d62 (surr)	89.1	60-120		%

## Batch Information

Analytical Batch: XFC12553  
Analytical Method: AK103  
Instrument: Agilent 7890B R  
Analyst: NRO  
Analytical Date/Time: 7/22/2016 8:21:00PM

Prep Batch: XXX35843  
Prep Method: SW3520C  
Prep Date/Time: 7/20/2016 3:50:38PM  
Prep Initial Wt./Vol.: 250 mL  
Prep Extract Vol: 1 mL

Print Date: 07/27/2016 3:43:38PM

## Blank Spike Summary

Blank Spike ID: LCS for HBN 1168247 [XXX35843]  
 Blank Spike Lab ID: 1338309  
 Date Analyzed: 07/22/2016 20:32

Spike Duplicate ID: LCSD for HBN 1168247 [XXX35843]  
 Spike Duplicate Lab ID: 1338310  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1168247001, 1168247002, 1168247003, 1168247004, 1168247005, 1168247006

## 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	21.0	105	20	22.7	114	( 60-120 )	8.10	(< 20 )
<b>Surrogates</b>									
n-Triacontane-d62 (surr)	0.4	85	85	0.4	92.6	93	( 60-120 )	8.50	

## Batch Information

Analytical Batch: **XFC12553**  
 Analytical Method: **AK103**  
 Instrument: **Agilent 7890B R**  
 Analyst: **NRO**

Prep Batch: **XXX35843**  
 Prep Method: **SW3520C**  
 Prep Date/Time: **07/20/2016 15:50**  
 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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1168247



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: 907-441-1346  
 PROJECT/SITE: Hurricane Siding (ARRC)  
 REPORTS TO: Mike Boese E-MAIL: MBoese@FESalaska.com  
 INVOICE TO: ARRC Project: ARRC-2016 Hurricane  
 CONTRACT NUMBER: ARRC - 265-2429

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX/ MATRIX CODE	Preser- vative	HCl	HCl	HNO <sub>3</sub>	None	REMARKS
1A-G	RSE-1	7/7/2016	1430	Water	G	X	X	X	X	
2A-G	RSE-2	7/7/2016	1510	Water	G	X	X	X	X	
3A-G	RSE-3	7/7/2016	1700	Water	G	X	X	X	X	
4A-G	RSE-4	7/7/2016	1600	Water	G	X	X	X	X	
5A-E	MW-X	7/7/2016	1800	Water	G	X	X	X	X	
6A-E	Equip Rinsate	7/7/2016	1620	Water	G	X	X	X	X	
7A-C	Trip Blank	7/7/2016	800	Water	G	X	X	X	X	

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

Received By: *Mike Boese* 7/8/16 10:00  
 Received By: \_\_\_\_\_  
 Received By: \_\_\_\_\_  
 Received For Laboratory By: *Mike Boese*

Collected/Relinquished By: (1) *Mike Boese* 7/7/16 2000  
 Relinquished By: (2) \_\_\_\_\_  
 Relinquished By: (3) \_\_\_\_\_  
 Relinquished By: (4) \_\_\_\_\_

DOD Project? NO  
 Cooler ID \_\_\_\_\_  
 Cooler Temp °C \_\_\_\_\_  
 Special Deliverable Requirements:  
 Level 2 Data Package, EQUiS, and PDF. No hard copy required.  
 Requested Turnaround Time and/or Special Instructions:  
 Quote 12537a, Normal TAT, Bill ARRC directly (265-2429)

Temperature Blank °C: 1.4  
 Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

ANC: Inact IF 18 0.9 #D7

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)







e-SAMPLE RECEIPT FORM

1168247



Review Criteria	Y/N (yes/no)	Exceptions Noted below
Were Custody Seals intact? Note # & location	<input checked="" type="checkbox"/>	<input type="checkbox"/> exemption permitted if sampler hand carries/delivers.
COC accompanied samples?	<input checked="" type="checkbox"/>	1-F, 1-B
<input type="checkbox"/> **exemption permitted if chilled & collected <8hrs ago or chilling not required (i.e., waste, oil)	<input checked="" type="checkbox"/>	
Temperature blank compliant* (i.e., 0-6 °C after CF)?	<input checked="" type="checkbox"/>	Cooler ID: 1 @ 0.9 °C Therm ID: D7
	<input type="checkbox"/>	Cooler ID: @ °C Therm ID:
	<input type="checkbox"/>	Cooler ID: @ °C Therm ID:
	<input type="checkbox"/>	Cooler ID: @ °C Therm ID:
	<input type="checkbox"/>	Cooler ID: @ °C Therm ID:
*If >6°C, were samples collected <8 hours ago?	<input type="checkbox"/>	
If <0°C, were sample containers ice free?	<input type="checkbox"/>	
If samples 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 nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Note: Refer to form F-083 "Sample Guide" for hold times.		
Were samples received within hold time?	<input checked="" type="checkbox"/>	
Do samples <b>match COC**</b> (i.e., sample IDs, dates/times collected)?	<input checked="" type="checkbox"/>	Sample 5 (MW-X) was marked to receive dissolved iron and sulfate analysis. The containers for these analyses were not received. The sample was logged in*
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous?	<input checked="" type="checkbox"/>	
Were proper containers (type/mass/volume/preservative***) used?	<input checked="" type="checkbox"/>	<input type="checkbox"/> ***Exemption permitted for metals (e.g.200.8/6020A).
<b>IF APPLICABLE</b>		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	<input checked="" type="checkbox"/>	
Were all VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	<input checked="" type="checkbox"/>	
Were all soil VOAs field extracted with MeOH+BFB?	<input type="checkbox"/>	
<b>Note to Client:</b> Any "no" answer above indicates non-compliance with standard procedures and may impact data quality.		
Additional notes (if applicable):		
* without these analyses.		



### 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>
1168247001-A	HCL to pH < 2	OK			
1168247001-B	HCL to pH < 2	OK			
1168247001-C	HCL to pH < 2	OK			
1168247001-D	HCL to pH < 2	OK			
1168247001-E	HCL to pH < 2	OK			
1168247001-F	HNO3 to pH < 2	OK			
1168247001-G	No Preservative Required	OK			
1168247002-A	HCL to pH < 2	OK			
1168247002-B	HCL to pH < 2	OK			
1168247002-C	HCL to pH < 2	OK			
1168247002-D	HCL to pH < 2	OK			
1168247002-E	HCL to pH < 2	OK			
1168247002-F	HNO3 to pH < 2	OK			
1168247002-G	No Preservative Required	OK			
1168247003-A	HCL to pH < 2	OK			
1168247003-B	HCL to pH < 2	OK			
1168247003-C	HCL to pH < 2	OK			
1168247003-D	HCL to pH < 2	OK			
1168247003-E	HCL to pH < 2	OK			
1168247003-F	HNO3 to pH < 2	OK			
1168247003-G	No Preservative Required	OK			
1168247004-A	HCL to pH < 2	OK			
1168247004-B	HCL to pH < 2	OK			
1168247004-C	HCL to pH < 2	OK			
1168247004-D	HCL to pH < 2	OK			
1168247004-E	HCL to pH < 2	OK			
1168247004-F	HNO3 to pH < 2	OK			
1168247004-G	No Preservative Required	OK			
1168247005-A	HCL to pH < 2	OK			
1168247005-B	HCL to pH < 2	OK			
1168247005-C	HCL to pH < 2	OK			
1168247005-D	HCL to pH < 2	OK			
1168247005-E	HCL to pH < 2	OK			
1168247006-A	HCL to pH < 2	OK			
1168247006-B	HCL to pH < 2	OK			
1168247006-C	HCL to pH < 2	OK			
1168247006-D	HCL to pH < 2	OK			
1168247006-E	HCL to pH < 2	OK			
1168247007-A	HCL to pH < 2	OK			
1168247007-B	HCL to pH < 2	OK			
1168247007-C	HCL to pH < 2	OK			

Container Id

Preservative

Container  
Condition

Container Id

Preservative

Container  
Condition

#### Container Condition Glossary

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

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

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

DM- The container was received damaged.

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

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

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

**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 ( $4^{\circ} \pm 2^{\circ}$  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:

Samples were listed as being in good condition on the sample receipt form.

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 2b.

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

Comments:

There was no impact to data quality; See 2b for details regarding COC discrepancy.

#### 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:

The MS/MSD recovery failures identified in the Case Narrative did not pertain to ARRC Hurricane project samples (they were associated with other projects analyzed in the same sulfate batch). However, the RPD calculated from these MS/MSD samples **was acceptable** and did pertain to batch QC (precision) and Hurricane project samples.

c. Were all corrective actions documented?

Yes No ■NA (Please explain.) Comments:

No corrective action was performed; the Case Narrative indicated that LCS should be used for evaluating accuracy in Sulfate batch WXXX11556. Note that the LCS was used and that accuracy was acceptable.

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:

Yes; however, iron and sulfate analysis was inadvertently requested on the field duplicate sample. See Section 2b for details.

b. All applicable holding times met?

Yes   No   NA (Please explain.)                      Comments:

c. All soils reported on a dry weight basis?

Yes   No    NA (Please explain.)                      Comments:

No soil samples were submitted 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:

However, RRO was detected in the Method Blank below the LOQ at 0.211 mg/L. RRO results in all project samples including the Equipment Blank were qualified (B) as blank contamination. Impact to data was minor as the RRO results were all below the ADEC groundwater cleanup level of 1.1 mg/L.

iii. If above PQL, what samples are affected?

See 6a ii for details.

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:

See 6a ii for details.

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

Comments:

See 6a ii for details.

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

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

■ Yes No NA (Please explain.)

Comments:

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

■ Yes No NA (Please explain.)

Comments:

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

■ Yes No NA (Please explain.)

Comments:

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 or were adversely impacted by 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 MW-X was a field duplicate sample for project sample RSE-4.

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

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

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).

An Equipment Blank was collected by pumping distilled water through the decontaminated submersible pump following the sampling of well RSE-4, and before sampling well RSE-3.

■Yes      No      NA (Please explain.)      Comments:

i. All results less than PQL?

■Yes      No      NA (Please explain.)      Comments:

However, RRO was detected in the Equipment Rinsate below the LOQ at 0.215 mg/L. The RRO result in the Equipment Blank was attributed to Method Blank contamination (see Section 6aii)

ii. If above PQL, what samples are affected?

Comments:

No samples were affected. See discussion in Section 6fi.

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

Comments:

No adverse impact to data quality. See discussion in Section 6fi.

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.