

The order of this data package is as follows:

1. Chain-of-Custody/Lab Request
2. Copies of field COCs
3. Validation Report
4. Laboratory analysis

Comments:



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11605

EVENT NAME: Water/CdV (TA16 260) Q1 MY2018

SAMPLE ID: CAWA-18-148915

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/6/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1304		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-58		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:	↓		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
↓	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	↓	↓
↓	WSP-8330B-NMED HEXMOD	1 LITER AMBER GLASS	3	ICE	↓	↓
↓	WSP-CN(T)	250 ML POLY	1	NAOH	↓	↓
↓	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS: Windy while sampling, sampled 40 ft. from running diesel generator

LOCATION COMMENTS: HE spot test results negative

## FIELD PARAMETERS:

Sample Time	1304	HH:MM	Discharge Rate	4.34	Dissolved Oxygen	5.69
Groundwater Elevation	6131.40		Oxidation-Reduction Potential	62.9	Period Purge Volume	21.7
pH	8.15		Purge Volume	147.56	Specific Conductance	123.4
Temperature	19.4		Total Volume Pumped	243.04	Turbidity	1.84

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY****EVENT ID:** 11605**EVENT NAME:** Water/CdV (TA16 260) Q1 MY2018**SAMPLE ID:** CAWA-18-148915**WORK ORDER:****COLLECTED BY (PRINT):** K. TOLL, A. Vigil

RELINQUISHED BY (Printed Name) <i>Allyn Stanford</i> (Signature) <i>[Signature]</i>	Date/Time <i>12/6/17</i> <i>1515</i>	RECEIVED BY <i>John Wilcox</i> (Printed Name) <i>John A Wilcox</i> (Signature) <i>[Signature]</i>	Date/Time <i>12/6/17</i> <i>1515</i>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11605

EVENT NAME: Water/CdV (TA16 260) Q1 MY2018

SAMPLE ID: CAWA-18-148916

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/6/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1304		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-58		FIELD PREP:	F	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:	↓		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / <u>(NO)</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
↓	WSP- GENINORG+PerChlorate	1 LITER POLY	1	ICE	↓	↓
↓	WSP- NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time \_\_\_\_\_ HH:MM Discharge Rate \_\_\_\_\_ Dissolved Oxygen \_\_\_\_\_

Groundwater Elevation \_\_\_\_\_ Oxidation-Reduction Potential \_\_\_\_\_ Period Purge Volume \_\_\_\_\_

pH \_\_\_\_\_ Purge Volume \_\_\_\_\_ Specific Conductance \_\_\_\_\_

Temperature \_\_\_\_\_ Total Volume Pumped \_\_\_\_\_ Turbidity \_\_\_\_\_

COLLECTED BY (PRINT): K. Tol, A. Vigil

RELINQUISHED BY (Printed Name) Allison Stanford (Signature) <i>[Signature]</i>	Date/Time 12/6/17 1515	RECEIVED BY (Printed Name) John Wilcox (Signature) <i>[Signature]</i>	Date/Time 12/6/17 1515
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11605

EVENT NAME: Water/CdV (TA16 260) Q1 MY2018

SAMPLE ID: CAWA-18-148901

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/6/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1405		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	RSP	
LOCATION ID:	16-26644		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:	↓		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8330B-NMED HEXMOD	1 LITER AMBER GLASS	3	ICE	Y	NA

SAMPLE COMMENTS: Breezy while sampling

LOCATION COMMENTS: A. Vigil conducts HE spot test; results negative

## FIELD PARAMETERS:

Sample Time	1405	HH:MM	Discharge Rate	0.42	Dissolved Oxygen	7.58
Groundwater Elevation	7454.67		Oxidation-Reduction Potential	129.8	Period Purge Volume	1.26
pH	6.93		Purge Volume	6.30	Specific Conductance	194.5
Temperature	11.0		Total Volume Pumped	9.24	Turbidity	0.1

COLLECTED BY (PRINT): A. Vigil

RELINQUISHED BY (Printed Name) <i>Allyson Stambell</i> (Signature) <i>[Signature]</i>	Date/Time 12/6/17 1515	RECEIVED BY (Printed Name) <i>John Wilcox</i> (Signature) <i>[Signature]</i>	Date/Time 12/6/17 1515
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 11605

EVENT NAME: Water/CdV (TA16 260) Q1 MY2018

SAMPLE ID: CAWA-18-148912

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/6/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1147		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-48		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:	1		SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-83308-NMED HEXMOD	1 LITER AMBER GLASS	3	ICE	Y	NA

SAMPLE COMMENTS: Breezy while sampling, sampled 40 ft. from running diesel generator

LOCATION COMMENTS: HE spot test negative

## FIELD PARAMETERS:

Sample Time	1147	HH:MM	Discharge Rate	6.00	Dissolved Oxygen	7.13
Groundwater Elevation	6092.11		Oxidation-Reduction Potential	167.9	Period Purge Volume	30.00
pH	8.17		Purge Volume	570	Specific Conductance	123.2
Temperature	17.2		Total Volume Pumped	660	Turbidity	1.23

COLLECTED BY (PRINT): A. Vigil, K. Tow

RELINQUISHED BY (Printed Name) Allison Stanfield (Signature)	Date/Time 12/6/17 1515	RECEIVED BY (Printed Name) John Wilcox (Signature)	Date/Time 12/6/17 1515
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11605

EVENT NAME: Water/CdV (TA16 260) Q1 MY2018

SAMPLE ID: CAWA-18-148939

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/6/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1304		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-58		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FTB	
TOP DEPTH:	↓		SAMPLE USAGE:	QC	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	12/4/17	HCL	Y	NA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time	_____	HH:MM	_____	Discharge Rate	_____	Dissolved Oxygen	_____
Groundwater Elevation	_____			Oxidation-Reduction Potential	_____	Period Purge Volume	_____
pH	_____			Purge Volume	_____	Specific Conductance	_____
Temperature	_____			Total Volume Pumped	_____	Turbidity	_____

COLLECTED BY (PRINT): K. Tow, A. Vigil

RELINQUISHED BY (Printed Name) <i>Allynn Stiffed</i> (Signature) <i>[Signature]</i>	Date/Time 12/6/17 1515	RECEIVED BY (Printed Name) <i>John Wilcox</i> (Signature) <i>[Signature]</i>	Date/Time 12/6/17 1515
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time



**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 11605

EVENT NAME: Water/CdV (TA16 260) Q1 MY2018

SAMPLE ID: CAWA-18-148942

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	12/6/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1304		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-58		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / <del>NO</del> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL	Y	NA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time	_____	HH:MM	_____	Discharge Rate	_____	Dissolved Oxygen	_____
Groundwater Elevation	_____			Oxidation-Reduction Potential	_____	Period Purge Volume	_____
pH	_____			Purge Volume	_____	Specific Conductance	_____
Temperature	_____			Total Volume Pumped	_____	Turbidity	_____

COLLECTED BY (PRINT): K. Tolson, A. Vigil

RELINQUISHED BY (Printed Name) Allison Stanfield (Signature) <i>[Signature]</i>	Date/Time 12/6/17 1515	RECEIVED BY (Printed Name) John Wilcox (Signature) <i>[Signature]</i>	Date/Time 12/6/17 1515
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11605

EVENT NAME: Water/CdV (TA16 260) Q1 MY2018

SAMPLE ID: CAWA-18-148944

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	12/6/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	0756		MEDIA:	NA	
PRS ID:	NA		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-48		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	PEB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	Y	NA
	WSP-8270C-SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-8290-D/F	1 LITER AMBER GLASS	2	ICE		
	WSP-8330B-NMED HEXMOD	1 LITER AMBER GLASS	3	ICE		
	WSP-All Metals	1 LITER POLY	1	HNO3 ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP- GENINORG+PerChlorat e	1 LITER POLY	1	ICE		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP- NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4		
	WSP-RAD	1 GAL POLY	1	HNO3		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11605

EVENT NAME: Water/CdV (TA16 260) Q1 MY2018

SAMPLE ID: CAWA-18-148944

WORK ORDER:

SAMPLE COMMENTS:


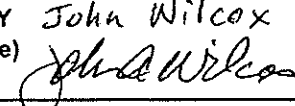
LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time	_____	HH:MM	Discharge Rate	_____	Dissolved Oxygen	_____
Groundwater Elevation	_____		Oxidation-Reduction Potential	_____	Period Purge Volume	_____
pH	_____		Purge Volume	_____	Specific Conductance	_____
Temperature	_____		Total Volume Pumped	_____	Turbidity	_____

12/16/17

COLLECTED BY (PRINT): A. Vigil, K. Tolu

RELINQUISHED BY (Printed Name) Allison Stanfield (Signature) 	Date/Time 12/16/17 1515	RECEIVED BY John Wilcox (Printed Name) (Signature) 	Date/Time 12/16/17 1515
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11605

EVENT NAME: Water/CdV (TA16 260) Q1 MY2018

SAMPLE ID: CAWA-18-148945

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	12/6/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1405		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	RSP	
LOCATION ID:	16-26644		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FD	
TOP DEPTH:	↓		SAMPLE USAGE:	QC	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8330B-NMED HEXMOD	1 LITER AMBER GLASS	3	ICE	Y	NA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time	_____	HH:MM	Discharge Rate	_____	Dissolved Oxygen	_____
Groundwater Elevation	_____		Oxidation-Reduction Potential	_____	Period Purge Volume	_____
pH	_____		Purge Volume	_____	Specific Conductance	_____
Temperature	_____		Total Volume Pumped	_____	Turbidity	_____

COLLECTED BY (PRINT): A. Vigil

RELINQUISHED BY (Printed Name) Allison Stanfield (Signature) <i>[Signature]</i>	Date/Time 12/6/17 1515	RECEIVED BY John Wilcox (Printed Name) <i>[Signature]</i> (Signature)	Date/Time 12/6/17 1515
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

TEST - Explosives		YES	NO
Samples collected from a WFO area? (TAs -08, 09, 11, 14, 15, 16, 22, 36, 37, 39, 40, and 49)			✓
Field Test for Explosives Results		YES	NO
HE SPOT test result positive. If YES - Do not transport.			✓

TEST - Chemical Preservation		YES	NO
Samples are chemically preserved?		✓	
Field Team Member Statement		YES	NO
Chemical preservation exceeds limits given 40 CFR 136, Table II - Required Containers, Preservation Techniques and Holding Times (footnote 3). If YES - Do not ship.			✓

TEST - Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity?				✓
Sample Activity (dpm/100cm <sup>2</sup> )	Shipment Activity (dpm*g/100cm <sup>2</sup> )	Sampled Location	YES	NO
Alpha detectable	AND Alpha ≥ 160,000	AT TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49		✓
Alpha ≥ 125	AND Alpha ≥ 1,250,000	AT other locations		
Beta ≥ 1,500	AND Beta ≥ 15,000,000	AT any location		
The sample Alpha ≥ 16,000,000 dpm*g/100cm <sup>2</sup> or Beta ≥ 160,000,000 dpm*g/100cm <sup>2</sup> . If YES - Do not ship.				
On the external surface of the sample container, alpha activity ≥ 24 dpm/cm <sup>2</sup> , beta activity ≥ 240 dpm/cm <sup>2</sup> , or surface activity ≥ 0.5 mR/hr. If YES - Do not ship.				
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on field screening measurements of alpha and beta activity.				

TEST - Location			YES	NO
Prior analytical measurements of radioactive isotopes are available?			✓	
Sample Activity (pCi/g)	Shipment Activity (pCi)		YES	NO
• Am-241 ≥ 27 pCi/g	AND	Am-241 ≥ 270,000 pCi Total		✓
• Cs-137 ≥ 270 pCi/g	AND	Cs-137 ≥ 270,000 pCi Total		
• Pu-238 ≥ 27 pCi/g	AND	Pu-238 ≥ 270,000 pCi Total		
• Pu-239/240 ≥ 27 pCi/g	AND	Pu-239/240 ≥ 270,000 pCi Total		
• Th-228 ≥ 27 pCi/g	AND	Th-228 ≥ 270,000 pCi Total		
• U-234 ≥ 270 pCi/g	AND	U-234 ≥ 1,600,000,000 pCi Total		
• U-238 ≥ 270 pCi/g	AND	U-238 ≥ unlimited		
• H-3 ≥ 27,000,000 pCi/g	AND	H-3 ≥ 27,000,000,000 pCi Total		
Am-241, Pu-238, Pu-239/240, or Th-228 ≥ 27,000,000 pCi; or Cs-137 ≥ 270,000,000 pCi or U-234 ≥ 160,000,000 pCi; or H-3 ≥ 1 Ci. If YES - Do not ship.				
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on prior analytical measurements of radioactive isotopes.				

TEST - AK		YES	NO
The shippers documented knowledge of the sample positively identifies appropriate labeling.			✓
Documented Field Team Member Statement		YES	NO
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, and the sample is submitted to ARS or RP for hazard classification analysis.			✓

These samples do not meet the criteria for classification in any hazard class according to regulation OSHA 29 CFR 1910.1200. The sample(s) contained in this shipment have been assigned a tentative proper DOT shipping name, hazard class, identification number, and packing group, based on the shipper's knowledge of the sample:

Hazard Assessment Completed By:	Date/Time
(Printed Name) <u>Allizyn Stanfield</u>	<u>12/6/17</u>
(Signature) <u>[Signature]</u>	<u>1515</u>

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) <u>John Wilcox</u>	<u>12/6/17</u>
(Signature) <u>[Signature]</u>	<u>1515</u>

## DATA VALIDATION REPORT

Chain Of Custody No. 2018-1201

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
439737	EPA:120.1	1				
439737	EPA:150.1	1				
439737	EPA:160.1	1				
439737	EPA:170.0	4	1	1	1	
439737	EPA:245.2	2				
439737	EPA:300.0	1				
439737	EPA:310.1	1				
439737	EPA:335.4	1				
439737	EPA:350.1	1				
439737	EPA:351.2					
439737	EPA:353.2	1				
439737	EPA:365.4	1				
439737	EPA:900					
439737	EPA:901.1					
439737	EPA:905.0					
439737	HASL-300:AM-241					
439737	HASL-300:ISOPU					
439737	HASL-300:ISOU					
439737	SM:A2340B	1				
439737	SW-846:6010C	1				
439737	SW-846:6020	1				
439737	SW-846:6850	1				
439737	SW-846:8260B	1		1	1	
439737	SW-846:8270D					
439737	SW-846:8330B	3	1			
439737	SW-846:9060					

Only results shown in Section 13 'Display Flagged Data' are current as of this report generation. All other sections are valid for the date the COC data was inserted into EIM, and may have changed due to data updates in the intervening time.

## DATA VALIDATION REPORT

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
439737	EPA:120.1	1725585	1725585	1										1			1				
439737	EPA:150.1	1725084	1725084	1										1			1				
439737	EPA:160.1	1725263	1725263	1					1					1			1				
439737	EPA:170.0	NA	NA	4	1	1	1														
439737	EPA:245.2	1728992	1728991	2					1	1				1			1				
439737	EPA:300.0	1726418	1726418	1					1					1			1				
439737	EPA:310.1	1725083	1725083	1						1				1			1				
439737	EPA:335.4	1725125	1725124	1					1	1				1			1				
439737	EPA:350.1	1724782	1724781	1					1	1				1			1				
439737	EPA:351.2	1725130	1725129						1	2				1			2				
439737	EPA:353.2	1725128	1725128	1					1					1			1				
439737	EPA:365.4	1725512	1725511	1					1	1				1			1				
439737	EPA:900	1726298	1726298						1	1	1			1			1				
439737	EPA:901.1	1725107	1725107						1					1			1				
439737	EPA:905.0	1726106	1726106						1	1				1			1				
439737	HASL-300:AM-241	1725235	1725235						1					1			1				
439737	HASL-300:ISOPU	1725240	1725240						1					1			1				
439737	HASL-300:ISOU	1725243	1725243						1					1			1				
439737	SM:A2340B	1729029	1729029	1																	
439737	SW-846:6010C	1725086	1725085	1					1	1				1			1				
439737	SW-846:6020	1725094	1725093	1					1	1				1			1				
439737	SW-846:6850	1725618	1725614	1					1	1	1			1							
439737	SW-846:8260B	1726412	1726412	1		1	1		2					4							
439737	SW-846:8270D	1725325	1725321						1	1	1			1							
439737	SW-846:8330B	1725853	1725851	3	1				1	1	1			1							
439737	SW-846:9060	1725569	1725569						1					1			1				

### 2. Distribution Of Analytes In EDD.

Only results shown in Section 13 'Display Flagged Data' are current as of this report generation. All other sections are valid for the date the COC data was inserted into EIM, and may have changed due to data updates in the intervening time.

## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAWA-18-148916	439737007	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAWA-18-148944	1203936938	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAWA-18-148944	439737004	PEB	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203936936	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CALA-18-150113	1203935512	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-18-148916	439737007	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-18-148944	439737004	PEB	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203935510	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-18-148916	439737007	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-18-148944	439737004	PEB	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203936156	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203936155	MB	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	WST33-18-147906	1203936159	DUP	1	0	0	0
EPA:170.0	VOC	CAWA-18-148901	439737001	REG	1	0	0	0
EPA:170.0	VOC	CAWA-18-148912	439737003	REG	1	0	0	0
EPA:170.0	VOC	CAWA-18-148915	439737006	REG	1	0	0	0
EPA:170.0	VOC	CAWA-18-148916	439737007	REG	1	0	0	0
EPA:170.0	VOC	CAWA-18-148939	439737008	FTB	1	0	0	0
EPA:170.0	VOC	CAWA-18-148942	439737009	FB	1	0	0	0
EPA:170.0	VOC	CAWA-18-148944	439737004	PEB	1	0	0	0
EPA:170.0	VOC	CAWA-18-148945	439737002	FD	1	0	0	0
EPA:245.2	INORGANIC	CALA-18-150113	1203945551	DUP	1	0	0	0
EPA:245.2	INORGANIC	CALA-18-150113	1203945553	MS	0	0	1	0
EPA:245.2	INORGANIC	CAWA-18-148915	439737006	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-148916	439737007	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-148944	439737004	PEB	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203945550	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203945549	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CALA-18-150113	1203939074	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-18-148916	439737007	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-18-148944	439737004	PEB	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203939073	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203939072	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CALA-18-150113	1203935507	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CALA-18-150113	1203935509	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-148916	439737007	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-148944	439737004	PEB	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203935504	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAWA-18-148915	439737006	REG	1	0	0	0

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## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:335.4	INORGANIC	CAWA-18-148944	1203935627	DUP	1	0	0	0
EPA:335.4	INORGANIC	CAWA-18-148944	1203935629	MS	0	0	1	0
EPA:335.4	INORGANIC	CAWA-18-148944	439737004	PEB	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203935626	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203935625	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CALA-18-150113	1203935631	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CALA-18-150113	1203935632	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-18-148916	439737007	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-18-148944	439737004	PEB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203934795	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203934794	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-148944	1203935648	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-148944	1203935650	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-148944	439737004	PEB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203935646	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203935645	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	WST33-18-147841	1203935647	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	WST33-18-147841	1203935649	MS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	CALA-18-150113	1203935641	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-18-148916	439737007	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-18-148944	439737004	PEB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203935640	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203935639	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-18-148916	439737007	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-18-148944	1203936760	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-18-148944	1203936761	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-18-148944	439737004	PEB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203936759	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203936758	MB	1	0	0	0
EPA:900	RAD	BDW01-18-150415	1203938767	DUP	2	0	0	0
EPA:900	RAD	BDW01-18-150415	1203938768	MS	0	0	2	0
EPA:900	RAD	BDW01-18-150415	1203938769	MSD	0	0	2	0
EPA:900	RAD	CAWA-18-148944	439737004	PEB	2	0	0	0
EPA:900	RAD	LCS	1203938770	LCS	0	0	2	0
EPA:900	RAD	MB	1203938766	MB	2	0	0	0
EPA:901.1	RAD	BDW01-18-150415	1203935581	DUP	5	0	0	0
EPA:901.1	RAD	CAWA-18-148944	439737004	PEB	5	0	0	0
EPA:901.1	RAD	LCS	1203935582	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203935580	MB	5	0	0	0

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## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:905.0	RAD	BDW01-18-150415	1203938212	DUP	1	0	0	0
EPA:905.0	RAD	BDW01-18-150415	1203938213	MS	0	0	1	0
EPA:905.0	RAD	CAWA-18-148944	439737004	PEB	1	0	0	0
EPA:905.0	RAD	LCS	1203938214	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203938211	MB	1	0	0	0
HASL-300:AM-241	RAD	BDW01-18-150415	1203936058	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAWA-18-148944	439737004	PEB	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203936059	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203936057	MB	1	0	0	0
HASL-300:ISOPU	RAD	BDW01-18-150415	1203936068	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAWA-18-148944	439737004	PEB	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203936069	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203936067	MB	2	0	0	0
HASL-300:ISOU	RAD	BDW01-18-150415	1203936074	DUP	3	0	0	0
HASL-300:ISOU	RAD	CAWA-18-148944	439737004	PEB	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203936075	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203936073	MB	3	0	0	0
SM:A2340B	INORGANIC	CAWA-18-148916	439737007	REG	1	0	0	0
SM:A2340B	INORGANIC	CAWA-18-148944	439737004	PEB	1	0	0	0
SW-846:6010C	INORGANIC	CALA-18-150113	1203935515	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CALA-18-150113	1203935516	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAWA-18-148916	439737007	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAWA-18-148944	439737004	PEB	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203935514	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203935513	MB	17	0	0	0
SW-846:6020	INORGANIC	CALA-18-150113	1203935535	DUP	11	0	0	0
SW-846:6020	INORGANIC	CALA-18-150113	1203935536	MS	0	0	11	0
SW-846:6020	INORGANIC	CAWA-18-148916	439737007	REG	11	0	0	0
SW-846:6020	INORGANIC	CAWA-18-148944	439737004	PEB	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203935534	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203935533	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CALA-18-150111	1203937015	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CALA-18-150111	1203937016	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-18-148916	439737007	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-18-148944	439737004	PEB	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203937014	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203937013	MB	1	0	0	0
SW-846:8260B	VOC	CAWA-18-148915	439737006	REG	80	3	0	0
SW-846:8260B	VOC	CAWA-18-148939	439737008	FTB	80	3	0	0

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## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:8260B	VOC	CAWA-18-148942	439737009	FB	80	3	0	0
SW-846:8260B	VOC	CAWA-18-148944	439737004	PEB	80	3	0	0
SW-846:8260B	VOC	LCS	1203939062	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203939063	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203941693	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203941731	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203939061	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203941692	MB	80	3	0	0
SW-846:8270D	SVOC	BDW06-18-150416	1203936312	MS	0	6	76	0
SW-846:8270D	SVOC	BDW06-18-150416	1203936313	MSD	0	6	76	0
SW-846:8270D	SVOC	CAWA-18-148944	439737004	PEB	80	6	0	0
SW-846:8270D	SVOC	LCS	1203936311	LCS	0	6	74	0
SW-846:8270D	SVOC	MB	1203936310	MB	80	6	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-18-148901	1203937560	MS	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	CAWA-18-148901	1203937561	MSD	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	CAWA-18-148901	439737001	REG	23	1	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-18-148912	439737003	REG	23	1	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-18-148915	439737006	REG	23	1	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-18-148944	439737005	PEB	23	1	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-18-148945	439737002	FD	23	1	0	0
SW-846:8330B	LCMS/MS HIGH	LCS	1203937559	LCS	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	MB	1203937558	MB	23	1	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-18-148944	1203939350	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-18-148944	439737004	PEB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203939349	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203939348	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

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## DATA VALIDATION REPORT

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203935513	METHOD BLANK	SW-846:6010C	W	Potassium	70.8	J	ug/L	150
MB	1203936758	METHOD BLANK	EPA:365.4	W	Total Phosphate as Phosphorus	0.0201	J	mg/L	0.050
CAWA-18-148939	439737008	TRIP BLANK	EPA:170.0	W	Temperature	4		Deg C	
CAWA-18-148942	439737009	FIELD BLANK	EPA:170.0	W	Temperature	4		Deg C	

Field Sample ID	Blank Lab	Blank Type	Analytical Method	Parameter Name	Blank Lab Result	Blank Lab Units	Lab Result	Lab Qualifier	Lab Detection Limit	Detect Flag	Detect to Nondetect Factor	Detect to Estimated Factor	Use Factors
CAWA-18-148944	1203936758	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0201	mg/L	0.0666		0.050	Y	5	100	Y
CAWA-18-148916	1203936758	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0201	mg/L	0.0559		0.050	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

7. Any MS/MSD recoveries or RPDs outside the control limits?

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CAWA-18-148944	1203935629		EPA:335.4	Cyanide (Total)	1725124	12-13-2017	W	112		110	90	10		
CAWA-18-148944	1203935629		EPA:335.4	Cyanide (Total)	1725124	12-13-2017	W	112		110	90	10		
WST33-18-147841	1203935649		EPA:351.2	Total Kjeldahl Nitrogen	1725129	12-12-2017	W	-420		110	90	10		

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## DATA VALIDATION REPORT

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CAWA-18-148901	1203937560	1203937561	SW-846:8330B	2,4-Diamino-6-nitrotoluene	1725851	12-14-2017	W	146	112	121	50		26	30
CAWA-18-148901	1203937560	1203937561	SW-846:8330B	2,6-Diamino-4-nitrotoluene	1725851	12-14-2017	W	133	94	127	53		34	30

8. Any LCS/LCSD or BS/BSD recoveries or RPDs outside the control limits?

LCS Lab Sample	LCSD Lab	Analytical Method	Parameter Name	Lab Lot ID	Analysis	Sample Matrix	LCS Spike Recovery	LCSD Spike Recovery	Upper Limit	Lower Limit	Upper Rejection Limit	Lower Rejection Limit	RPD	RPD Limit
1203939062		SW-846:8260B	Chloroethane	1726412	12-14-2017	W	141		129	69		10		
1203939063		SW-846:8260B	Acrylonitrile	1726412	12-14-2017	W	140		122	65		10		
1203939063		SW-846:8260B	Chloro-1-propene[3-]	1726412	12-14-2017	W	131		125	59		10		

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

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## DATA VALIDATION REPORT

### 13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
16-26644	2018-1201	CAWA-18-148901	REG	INIT	LCMS/MS HIGH EXPLOSIVES	SW-846:8330B	2,6-Diamino-4-nitrotoluene	U	UJ	HE12g	N	0.538	ug/L	0.538	ug/L			W	12/06/2017		1725853	VAL	Y
R-58	2018-1201	CAWA-18-148916	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.0559	mg/L	0.0559	mg/L			W	12/06/2017		1725512	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.0000000032	pCi/L	0.0000000032	pCi/L	0.0393	0.0102	W	12/06/2017		1725235	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	-1.46	pCi/L	-1.46	pCi/L	3.58	1.08	W	12/06/2017		1725107	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	1.22	pCi/L	1.22	pCi/L	5.28	1.17	W	12/06/2017		1725107	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	INORGANIC	EPA:335.4	Cyanide (Total)	U	UJ	I6b	N	1.67	ug/L	0.00167	mg/L			W	12/06/2017		1725125	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.333	pCi/L	0.333	pCi/L	2.83	0.744	W	12/06/2017		1726298	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	-0.293	pCi/L	-0.293	pCi/L	1.37	0.401	W	12/06/2017		1726298	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-3	pCi/L	-3	pCi/L	7.09	2.31	W	12/06/2017		1725107	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.00865	pCi/L	-0.00865	pCi/L	0.0436	0.00684	W	12/06/2017		1725240	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0108	pCi/L	-0.0108	pCi/L	0.0469	0.00838	W	12/06/2017		1725240	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	23.3	pCi/L	23.3	pCi/L	50.8	16.3	W	12/06/2017		1725107	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	1.21	pCi/L	1.21	pCi/L	5.21	1.13	W	12/06/2017		1725107	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.144	pCi/L	-0.144	pCi/L	0.478	0.124	W	12/06/2017		1726106	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.0666	mg/L	0.0666	mg/L			W	12/06/2017		1725512	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	HASL-300:ISOU	Uranium-234	U	U	R5	N	0.0683	pCi/L	0.0683	pCi/L	0.126	0.015	W	12/06/2017		1725243	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0271	pCi/L	0.0271	pCi/L	0.0589	0.010	W	12/06/2017		1725243	VAL	Y
R-48	2018-1201	CAWA-18-148944	PEB	INIT	RAD	HASL-300:ISOU	Uranium-238	U	U	R5	N	0.0171	pCi/L	0.0171	pCi/L	0.0623	0.0127	W	12/06/2017		1725243	VAL	Y

#### Reason Code

#### Description

HE12g

The MS/MSD relative percent difference was >30%.

I4

the sample result is =<5x the concentration of related analyte in the method blank.

I6b

The associated matrix spike recovery was above the Upper Acceptance Limit (UAL). Follow the external laboratory limits located within the associated data package.

J\_LAB

The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL

NQ

The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualifire. The analyte is detected in the sample.

R5

Analyte is not detected because the amount reported is less than the MDC.

Only results shown in Section 13 'Display Flagged Data' are current as of this report generation. All other sections are valid for the date the COC data was inserted into EIM, and may have changed due to data updates in the intervening time.

## DATA VALIDATION REPORT

### Reason Code

### Description

U\_LAB

The analytical laboratory qualified the analyte as not detected.

### 14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-18-148901	16-26644	REG	EPA:170.0	0	1
CAWA-18-148901	16-26644	REG	SW-846:8330B	0	23
CAWA-18-148912	R-48	REG	EPA:170.0	0	1
CAWA-18-148912	R-48	REG	SW-846:8330B	0	23
CAWA-18-148915	R-58	REG	EPA:170.0	0	1
CAWA-18-148915	R-58	REG	EPA:245.2	0	1
CAWA-18-148915	R-58	REG	EPA:335.4	0	1
CAWA-18-148915	R-58	REG	SW-846:8260B	0	80
CAWA-18-148915	R-58	REG	SW-846:8330B	0	23
CAWA-18-148916	R-58	REG	EPA:120.1	0	1
CAWA-18-148916	R-58	REG	EPA:150.1	0	1
CAWA-18-148916	R-58	REG	EPA:160.1	0	1
CAWA-18-148916	R-58	REG	EPA:170.0	0	1
CAWA-18-148916	R-58	REG	EPA:245.2	0	1
CAWA-18-148916	R-58	REG	EPA:300.0	0	4
CAWA-18-148916	R-58	REG	EPA:310.1	0	2
CAWA-18-148916	R-58	REG	EPA:350.1	0	1
CAWA-18-148916	R-58	REG	EPA:353.2	0	1
CAWA-18-148916	R-58	REG	EPA:365.4	0	1
CAWA-18-148916	R-58	REG	SM:A2340B	0	1
CAWA-18-148916	R-58	REG	SW-846:6010C	0	17
CAWA-18-148916	R-58	REG	SW-846:6020	0	11
CAWA-18-148916	R-58	REG	SW-846:6850	0	1
CAWA-18-148939	R-58	FTB	EPA:170.0	0	1
CAWA-18-148939	R-58	FTB	SW-846:8260B	0	80
CAWA-18-148942	R-58	FB	EPA:170.0	0	1
CAWA-18-148942	R-58	FB	SW-846:8260B	0	80
CAWA-18-148944	R-48	PEB	EPA:120.1	0	1
CAWA-18-148944	R-48	PEB	EPA:150.1	0	1
CAWA-18-148944	R-48	PEB	EPA:160.1	0	1
CAWA-18-148944	R-48	PEB	EPA:170.0	0	1

Only results shown in Section 13 'Display Flagged Data' are current as of this report generation. All other sections are valid for the date the COC data was inserted into EIM, and may have changed due to data updates in the intervening time.

## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-18-148944	R-48	PEB	EPA:245.2	0	1
CAWA-18-148944	R-48	PEB	EPA:300.0	0	4
CAWA-18-148944	R-48	PEB	EPA:310.1	0	2
CAWA-18-148944	R-48	PEB	EPA:335.4	0	1
CAWA-18-148944	R-48	PEB	EPA:350.1	0	1
CAWA-18-148944	R-48	PEB	EPA:351.2	0	1
CAWA-18-148944	R-48	PEB	EPA:353.2	0	1
CAWA-18-148944	R-48	PEB	EPA:365.4	0	1
CAWA-18-148944	R-48	PEB	EPA:900	0	2
CAWA-18-148944	R-48	PEB	EPA:901.1	0	5
CAWA-18-148944	R-48	PEB	EPA:905.0	0	1
CAWA-18-148944	R-48	PEB	HASL-300:AM-241	0	1
CAWA-18-148944	R-48	PEB	HASL-300:ISOPU	0	2
CAWA-18-148944	R-48	PEB	HASL-300:ISOU	0	3
CAWA-18-148944	R-48	PEB	SM:A2340B	0	1
CAWA-18-148944	R-48	PEB	SW-846:6010C	0	17
CAWA-18-148944	R-48	PEB	SW-846:6020	0	11
CAWA-18-148944	R-48	PEB	SW-846:6850	0	1
CAWA-18-148944	R-48	PEB	SW-846:8260B	0	80
CAWA-18-148944	R-48	PEB	SW-846:8270D	0	80
CAWA-18-148944	R-48	PEB	SW-846:8330B	0	23
CAWA-18-148944	R-48	PEB	SW-846:9060	0	1
CAWA-18-148945	16-26644	FD	EPA:170.0	0	1
CAWA-18-148945	16-26644	FD	SW-846:8330B	0	23



December 18, 2017

Ms. Nita Patel  
Los Alamos National Laboratory  
TA-00, SM1237, Rm104C  
Los Alamos, New Mexico 87545

Re: LANL- WQH Water Samples  
Work Order: 439737  
SDG: 2018-1201

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on December 09, 2017, and analyzed for Explosives by LCMSMS, GC/MS Semivolatile, GC/MS Volatile, General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4485.

Sincerely,



Valerie Davis  
Project Manager

Chain of Custody: 2018-1201  
Enclosures



**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 439737**  
**SDG: 2018-1201**

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# Case Narrative

**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 439737  
SDG # : 2018-1201**

**December 18, 2017**

**Laboratory Identification:**

GEL Laboratories LLC  
2040 Savage Road  
Charleston, South Carolina 29407  
(843) 556-8171

**Summary**

**Sample receipt** The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on December 09, 2017 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperatures were checked, documented, and within specifications. Shipping container temperature was within specification (0 - 6C). The WSP-TKN+TOC container for sample CAWA-18-148915 was broken during handling. The lab did not receive additional preserved volume to perform the analysis. The client was notified.

**Sample Identification** The laboratory received the following samples:

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
439737001	CAWA-18-148901
439737002	CAWA-18-148945
439737003	CAWA-18-148912
439737004	CAWA-18-148944
439737005	CAWA-18-148944
439737006	CAWA-18-148915
439737007	CAWA-18-148916
439737008	CAWA-18-148939
439737009	CAWA-18-148942

**Case Narrative**

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

**Data Package**

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Explosives by LCMSMS, GC/MS Semivolatile, GC/MS Volatile, General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry.

I certify that this data report is in compliance with the terms and conditions of the subcontract and task order, both technically and for completeness, for other than the conditions detailed in the attached case narrative.

A handwritten signature in black ink that reads "Valerie Davis". The script is cursive and fluid.

Valerie Davis  
Project Manager

**List of current GEL Certifications as of 18 December 2017**

<b>State</b>	<b>Certification</b>
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-25
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404



# **Chain of Custody and Supporting Documentation**

General Engineering  
Charleston SC

# Chain of Custody/Analysis Request

COC/Lab Request #:  
2018-1201  
Page 1 of 1

439737

Client Contact:

Lab Agreement #:

Site Name: Los Alamos National Laboratory

Project Number: ADEP

Analysis Turnaround Time:

24 Hour - ☐ Other - ☐

7 Days - ☐

14 Days - ☐

21 Days - ☐

28 Days - ☒

Field Sample ID	Sample Date	Sample Time	Sample Matrix
-----------------	-------------	-------------	---------------

CAWA-18-148901	Dec 6 2017	14:05	W
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CAWA-18-148945	Dec 6 2017	14:05	W
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CAWA-18-148912	Dec 6 2017	11:47	W
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CAWA-18-148944	Dec 6 2017	07:56	W
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CAWA-18-148915	Dec 6 2017	13:04	W
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CAWA-18-148916	Dec 6 2017	13:04	W
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CAWA-18-148939	Dec 6 2017	13:04	W
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CAWA-18-148942	Dec 6 2017	13:04	W
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Rad Screening Info:

LOCATION:

NO

Lab Reporting Limit Type:  
Method Detection Limit

MSGP-Hg	WSP-8260B-VOA	WSP-8270C-SVOA	WSP-8330B-NMED HEXMOD	WSP-All Metals	WSP-CN(T)	WSP-GENINORG+PerChlorate	WSP-GrossA/B	WSP-NH3+NO3/NO2+PO4	WSP-RAD	WSP-TKN+TOC
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			3							
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			3							
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	2		3	1	1					1
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				1	1	1		1		
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	2	ME								
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	2									
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Special Instructions:

Relinquished by: M-Eger

Print Name: MAT ENGELERT

Date/Time: 12-8-17 15:00

Received by: [Signature]

Print Name: Taylor

Date/Time: 12/01/18

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:



Laboratories LLC

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <u>ARSL</u>		SDG/AR/COC/Work Order: <u>439737</u>	
Received By: <u>H. Taylor</u>		Date Received: <u>120917</u>	
Carrier and Tracking Number		Circle Applicable: FedEx Express <u>5908 1783 2990-4</u> FedEx Ground <u>5908 1783 3025-4</u> UPS <u>5908 1783 3117-3</u> <u>2989-4</u> <u>3003-3</u> <u>2945-4</u> <u>2967-3</u> <u>3030-4</u> <u>3128-6</u> <u>2976-4</u> <u>3014-4</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet Ice Ice Packs Dry ice None Other: _____ *all temperatures are recorded in Celsius TEMP: _____
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: _____ Secondary Temperature Device Serial # (If Applicable): _____
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken <u>Damaged container</u> Leaking container Other (describe) <u>HEXP</u> <u>BDW001-18-150415/SIDA</u> <u>CAWA-18-148903</u>
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7	Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A (If unknown, select No) VOA vials free of headspace? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Sample ID's and containers affected: _____
8	Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: _____
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
12	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials BL Date 12/12/17 Page 1 of 1

GL-CHL-SR-001 Rev 5

ORIGIN ID:SAFA (505) 665-9966  
KEITH GREENE  
LOS ALAMOS NATL LAB.  
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

SH1 08DEC17  
ACTWGT: 46.0 LB MAN  
CAD: 0014176/CAFE2916

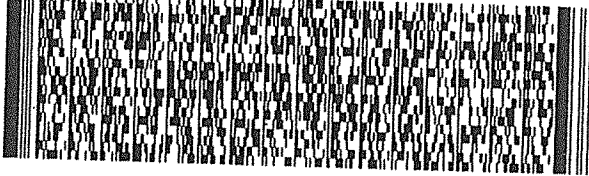
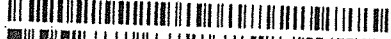
BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PDOASRGW04BAGWS0



FedEx  
Express



1 of 2  
TRK# 5908 1783 3117  
0201  
## MASTER ##

SATURDAY 12:00P  
PRIORITY OVERNIGHT

XO RBWA

29407  
SC-US CHS



FZ B92

12.09

ORIGIN ID:SAFA (505) 665-9966  
KEITH GREENE  
LOS ALAMOS NATL LAB.  
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 08DEC17  
ACTWGT: 48.0 LB MAN  
CAD: 0014176/CAFE2916

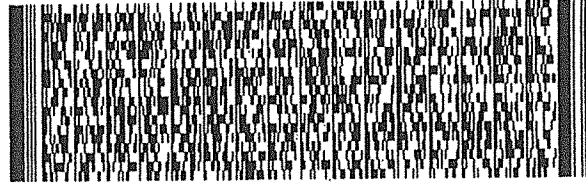
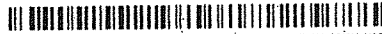
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TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PDOASRD06BDBD00



FedEx  
Express



2 of 3  
MPS# 5908 1783 3003  
0263  
Mstr# 5908 1783 2990

SATURDAY 12:00P  
PRIORITY OVERNIGHT

XO RBWA

29407  
SC-US CHS



SHIP DATE: 08DEC17  
ACTWGT: 51.0 LB MAN  
CAD: 0014176/CAFE2916

BILL SENDER

B  
1 12:00 2967  
12.09

707  
RT

FZ B92

3

ORIGIN ID:SAFA (505) 665-9966  
KEITH GREENE  
LOS ALAMOS NATL LAB.  
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

VALERIE DAVIS  
GENERAL ENGINEERING  
2040 SAVAGE RD

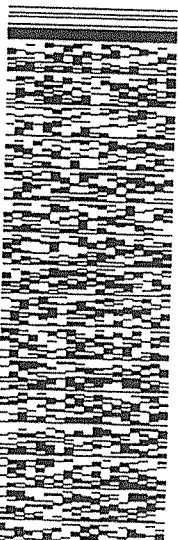
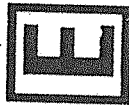
CHARLESTON SC 29407

(843) 556-8171

REF: 3N030ATT47100TMANT



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Express

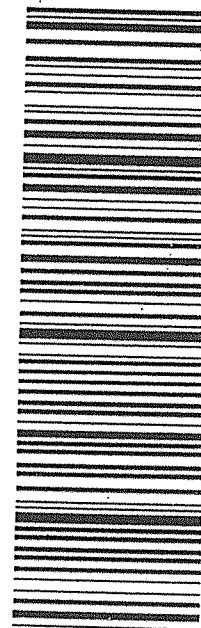


SATURDAY 12:00P  
PRIORITY OVERNIGHT

1 of 3  
5908 1783 2967  
MASTER ##

XO RBWA

294  
SC-US C



ORIGIN ID:SAFA (505) 665-9966  
KEITH GREENE  
LOS ALAMOS NATL LAB.  
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 08DEC17  
ACTWGT: 54.0 LB MAN  
CAD: 0014176/CAFE2916

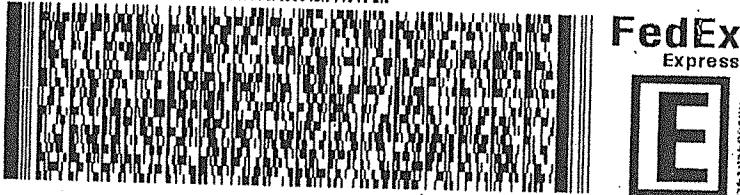
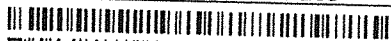
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TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PDOASRGW06BDBD00



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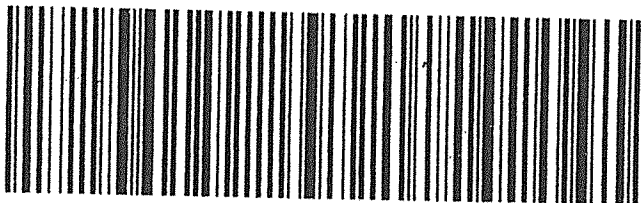
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SATURDAY 12:00P  
PRIORITY OVERNIGHT

29407  
SC-US CHS



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TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

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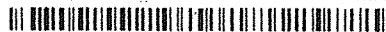
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CHARLESTON SC 29407

(843) 566-8171

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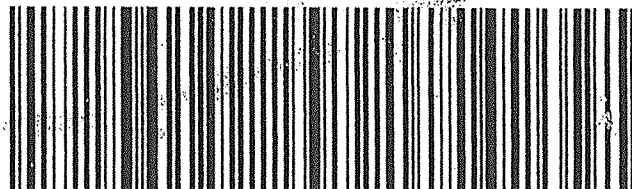
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XO RBWA

SATURDAY 12:00P  
PRIORITY OVERNIGHT

29407  
SC-US CHS



Part # 156148V-434 RIT2 06/15 83

SHIP DATE: 08DEC17  
ACTWGT: 52.0 LB MAN  
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KEITH GREENE  
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UNITED STATES US

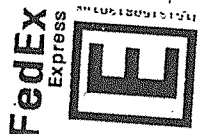
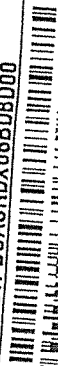
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GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

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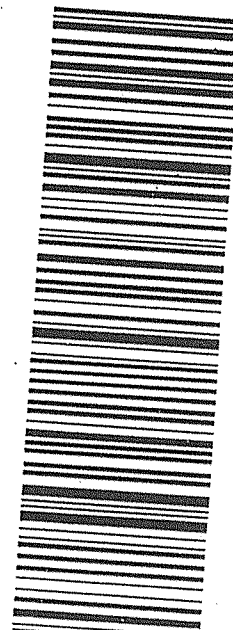
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SC-US CHS



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TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 08DEC17  
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BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(043) 656-8171

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2 of 3

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Part # 156148V-434 RIT2 06/15 33

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CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545  
UNITED STATES US

BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(043) 656-8171

REF: 21PDOACSWSE0SWS00

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1 of 3

TRK# 5908 1783 3025

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## MASTER ##

SATURDAY 12:00  
PRIORITY OVERNIGHT

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Part # 156148V-434 RIT2 06/15 33

FedEx  
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RT 707  
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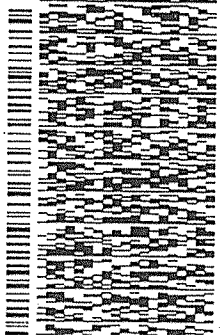
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2040 SAVAGE RD

CHARLESTON SC 29407

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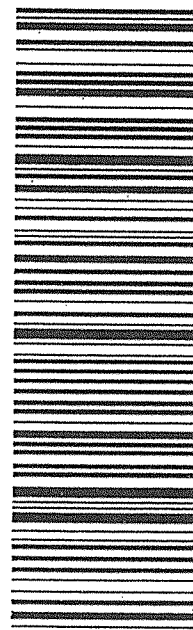
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KEITH GREENE  
LOS ALAMOS NATL LAB.  
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LOS ALAMOS, NM 87545  
UNITED STATES US

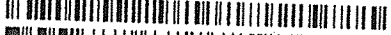
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2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PDOASRD06BDBD00

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FedEx  
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1 of 3

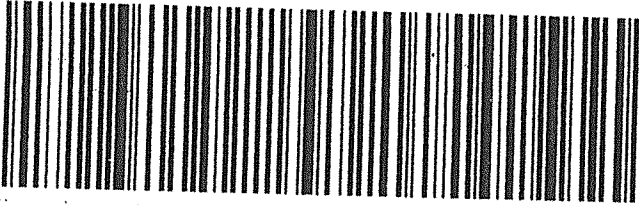
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SC-US CHS



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LOS ALAMOS NATL LAB.  
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 06/15/98

RT 707  
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12:00

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 3N030ATT47100TMANT

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3 of 3

SATURDAY 12:01  
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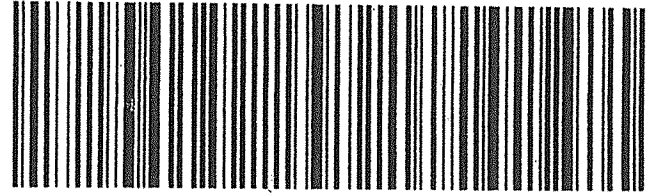
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Part # 156148V-434 RIT2 06/15/98

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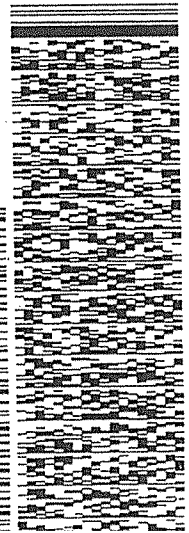
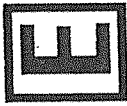
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SATURDAY 12:00P  
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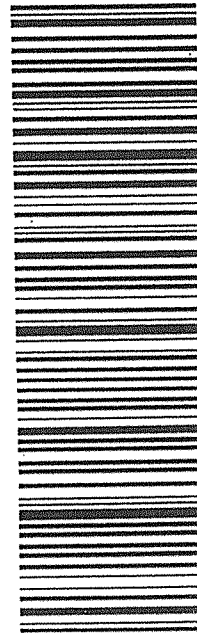
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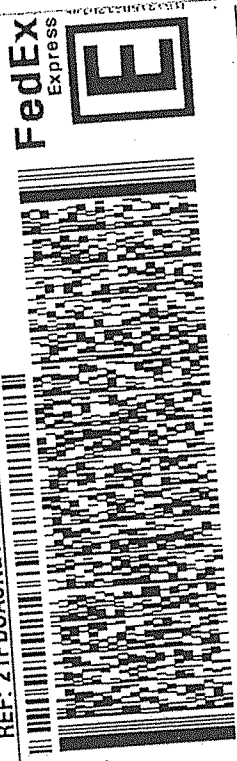


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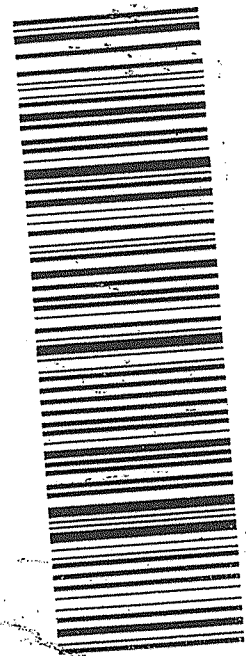
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TO VALERIE DAVIS  
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CHARLESTON SC 29407  
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(843) 666-8171  
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2 of 2  
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SATURDAY 12:00P  
PRIORITY OVERNIGHT  
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SC-US



Part # 156148V-A31



# **Data Review Qualifier Flag Definition Sheet**

## Data Review Qualifier Definitions

Qualifier	Explanation
-----------	-------------

*	A quality control analyte recovery is outside of specified acceptance criteria
**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL
A	The TIC is a suspected aldol-condensation product
B	Target analyte was detected in the associated blank
B	Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
d	5-day BOD-The 2:1 depletion requirement was not met for this sample
E	Organics-Concentration of the target analyte exceeds the instrument calibration range
E	Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
H	Analytical holding time was exceeded
h	Preparation or preservation holding time was exceeded
J	Value is estimated
N	Metals-The Matrix spike sample recovery is not within specified control limits
N	Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
ND	Analyte concentration is not detected above the reporting limit
UI	Gamma Spectroscopy-Uncertain identification
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.  
For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

# **Volatile Analysis**

# Case Narrative

**GC/MS Volatile  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1201  
Work Order #: 439737**

**Method/Analysis Information**

**Procedure:** Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer

Analytical Method: SW-846:8260B

Analytical Batch Number: 1726412

**Sample Analysis**

The following client and quality control samples were analyzed to complete this SDG using the methods referenced in the Analysis Information section:

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
439737006	CAWA-18-148915
439737008	CAWA-18-148939
439737009	CAWA-18-148942
1203939061	Method Blank (MB)
1203939062	Laboratory Control Sample (LCS)
1203939063	Laboratory Control Sample (LCS)
1203939064	439735003(WST33-18-147906) Post Spike (PS)
1203939065	439735003(WST33-18-147906) Post Spike (PS)
1203939066	439735003(WST33-18-147906) Post Spike Duplicate (PSD)
1203939067	439735003(WST33-18-147906) Post Spike Duplicate (PSD)
1203941692	Method Blank (MB)
1203941693	Laboratory Control Sample (LCS)
1203941731	Laboratory Control Sample (LCS)

NOTE: For volatile organic analyses the matrix spike designations may be indicated as "PS" or "PSD". The "PS" designation (post spike) indicates that the matrix was fortified prior to analysis but after applying any prep factors, such as a dilution. The laboratory considers the MS/MSD and PS/PSD designations interchangeable.

The data results reported met all SOP and method criteria, unless otherwise discussed below.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-038 REV# 26.

**Calibration Information**

A complete list of the initial calibration data files with the correct dates and times of analysis are shown in the Calibration History report located in the Standard Data section of the data package. The surrogate compounds were calibrated using a minimum five-point calibration curve. The surrogates were added by the auto sampler at

a concentration of 50 ug/L or 20 ug/L for low level analyses. GEL Laboratories LLC will not have surrogate recoveries reported for Dibromofluoromethane. This is due to increased regulations for this analyte and an industry shortage.

#### **Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

#### **Continuing Calibration Verification Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

#### **Quality Control (QC) Information**

##### **Blank (MB) Statement**

The blanks analyzed with this SDG met the acceptance criteria.

##### **Surrogate Recoveries**

Surrogate recoveries in all client and quality control samples were within the acceptance limits.

##### **Laboratory Control Sample (LCS) Recovery**

The LCS/and or LCSD (See Below) recoveries were not within the acceptance limits for all analytes. The unacceptable analytes were not detected in the samples associated with the laboratory control samples. Therefore, the data were reported.

Sample	Analyte	Value
1203939062 (LCS)	Chloroethane	141* (69%-129%)
1203939063 (LCS)	Acrylonitrile	140* (65%-122%)
	Allyl chloride	131* (59%-125%)

##### **QC Sample Designation**

Sample 439735003 (WST33-18-147906) was designated for spike analysis.

##### **Matrix Spike/Matrix Spike Duplicate Recovery Statement**

The spike and/or spike duplicate (See Below) recoveries were not all within the acceptance limits. The associated spike and/or spike duplicate passed recoveries near the lower/upper end of the limits.

Sample	Analyte	Value
1203939064 (WST33-18-147906PS)	Several	See applicable report
1203939065 (WST33-18-147906PS)	Several	See applicable report
1203939066 (WST33-18-147906PSD)	Several	See applicable report
1203939067 (WST33-18-147906PSD)	Several	See applicable report

##### **Relative Percent Difference (RPD) Statement**

The RPD between the matrix spike pair (See Below) were not all within the acceptance limits. The unacceptable RPD may be attributed to matrix interference and/or sample non-homogeneity.

Sample	Analyte	Value
1203939064PS and 1203939066PSD (WST33-18-147906)	Chloroethane	RPD 40* (0%-20%)
	Dichlorodifluoromethane	RPD 25* (0%-20%)

**Internal Standard (ISTD) Acceptance**

The internal standard responses in all client and quality control samples met the required acceptance criteria.

**Technical Information****Holding Time Specifications**

All samples in this SDG met the specified holding time. GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the ALPHALIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

**Sample Preservation and Integrity**

All samples met the sample preservation and integrity requirements.

**Sample Dilutions/Methanol Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-extraction/Re-analysis**

Re-analyses were not required for samples in this SDG.

**Miscellaneous Information****Manual Integrations**

Data files associated with the initial calibration, continuing calibration check, and samples did not require manual integrations.

**TIC Comment**

Tentatively identified compounds (TIC) may be requested for samples in this delivery group/work order. Please note that non-requested calibrated analytes detected in a client sample may be reported on the Form 1/Certificate of Analysis as TICs. TIC data, if requested, were included on the Sample Data Summary (Form 1) and included with the sample raw data.

**Additional Comments**

Additional comments were not required for this SDG.

**Residual Chlorine**

Residual Chlorine was not detected in any of the samples in this SDG.

**Electronic Package Comment**

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the reviewer name associated with the generation of the data and package. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

**System Configuration**

The Volatile-GC/MS analysis was performed on the following instrument configuration:



<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>	<b>P &amp; T Trap</b>
VOA4.I	Hewlett Packard 6890/5973 GC/MS w/ OI 4560/Archon Autosampler	HP6890/HP5973	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

#### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

### Qualifier Definition Report for

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2018-1201 GEL Work Order: 439737

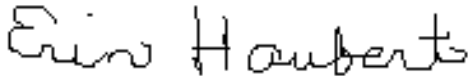
#### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- E Concentration of the target analyte exceeds the instrument calibration range
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

#### Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Erin Haubert

Date: 06 JAN 2018

Title: Data Validator

# **Sample Data Summary**

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 3

SDG Number: 2018-1201

Lab Sample ID: 439737004

Date Collected: 12/06/2017 07:56

Date Received: 12/09/2017 10:20

Matrix: W

Client ID: CAWA-18-148944

Batch ID: 1726412

Run Date: 12/14/2017 16:48

Prep Date: 12/14/2017 16:48

Data File: 121417V4\4M416.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: PXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

**SDG Number:** 2018-1201  
**Lab Sample ID:** 439737004  
  
**Client ID:** CAWA-18-148944  
**Batch ID:** 1726412  
**Run Date:** 12/14/2017 16:48  
**Prep Date:** 12/14/2017 16:48  
**Data File:** 121417V4\4M416.D

**Date Collected:** 12/06/2017 07:56  
**Date Received:** 12/09/2017 10:20  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** W  
  
**Project:** ESHL00114  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

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SDG Number: 2018-1201

Lab Sample ID: 439737004

Date Collected: 12/06/2017 07:56

Date Received: 12/09/2017 10:20

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1726412

Inst: VOA4.I

Dilution: 1

Run Date: 12/14/2017 16:48

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 12/14/2017 16:48

Data File: 121417V4\4M416.D

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	0.300	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	0.300	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	49.7	50.0	ug/L 99	(71%-134%)
Bromofluorobenzene	48.9	50.0	ug/L 98	(70%-131%)
Toluene-d8	47.0	50.0	ug/L 94	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	4.262	18.1	ug/L	0	J
	unknown siloxane	12.107	22.4	ug/L	0	J
	unknown siloxane	14.497	42.3	ug/L	0	J
	unknown	16.448	15.6	ug/L	0	J

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 3

SDG Number: 2018-1201

Lab Sample ID: 439737006

Date Collected: 12/06/2017 13:04

Date Received: 12/09/2017 10:20

Matrix: W

Client ID: CAWA-18-148915

Batch ID: 1726412

Run Date: 12/14/2017 17:17

Prep Date: 12/14/2017 17:17

Data File: 121417V4\4M417.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: PXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

**SDG Number:** 2018-1201  
**Lab Sample ID:** 439737006  
  
**Client ID:** CAWA-18-148915  
**Batch ID:** 1726412  
**Run Date:** 12/14/2017 17:17  
**Prep Date:** 12/14/2017 17:17  
**Data File:** 121417V4\4M417.D

**Date Collected:** 12/06/2017 13:04  
**Date Received:** 12/09/2017 10:20  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** W  
  
**Project:** ESHL00114  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00



**Volatile  
Certificate of Analysis  
Sample Summary**

SDG Number: 2018-1201

Lab Sample ID: 439737006

Date Collected: 12/06/2017 13:04

Date Received: 12/09/2017 10:20

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1726412

Inst: VOA4.I

Dilution: 1

Run Date: 12/14/2017 17:17

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 12/14/2017 17:17

Column: DB-624

Data File: 121417V4\4M417.D

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	0.300	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	0.300	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.8	50.0	ug/L 102	(71%-134%)
Bromofluorobenzene	50.0	50.0	ug/L 100	(70%-131%)
Toluene-d8	46.5	50.0	ug/L 93	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	4.254	44.4	ug/L	0	J
	unknown siloxane	12.107	14.2	ug/L	0	J
	unknown siloxane	14.491	27.7	ug/L	0	J
	unknown	16.448	12.4	ug/L	0	J

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 3

SDG Number: 2018-1201

Lab Sample ID: 439737008

Date Collected: 12/06/2017 13:04

Date Received: 12/09/2017 10:20

Matrix: W

Client ID: CAWA-18-148939

Batch ID: 1726412

Run Date: 12/14/2017 17:46

Prep Date: 12/14/2017 17:46

Data File: 121417V4\4M418.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: PXY1

Column: DB-624

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

Page 2 of 3

SDG Number: 2018-1201

Lab Sample ID: 439737008

Date Collected: 12/06/2017 13:04

Date Received: 12/09/2017 10:20

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1726412

Inst: VOA4.I

Dilution: 1

Run Date: 12/14/2017 17:46

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 12/14/2017 17:46

Data File: 121417V4\4M418.D

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

SDG Number: 2018-1201

Lab Sample ID: 439737008

Date Collected: 12/06/2017 13:04

Date Received: 12/09/2017 10:20

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1726412

Inst: VOA4.I

Dilution: 1

Run Date: 12/14/2017 17:46

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 12/14/2017 17:46

Data File: 121417V4\4M418.D

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	0.300	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	0.300	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	40.9	50.0	ug/L 82	(71%-134%)
Bromofluorobenzene	48.7	50.0	ug/L 97	(70%-131%)
Toluene-d8	46.7	50.0	ug/L 93	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	4.27	22.3	ug/L	0	J
	unknown siloxane	12.107	17.8	ug/L	0	J
	unknown siloxane	14.491	41.3	ug/L	0	J
	unknown	16.448	24.7	ug/L	0	J

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 3

SDG Number: 2018-1201

Lab Sample ID: 439737009

Date Collected: 12/06/2017 13:04

Date Received: 12/09/2017 10:20

Matrix: W

Client: ARSL004

Project: ESHL00114

Batch ID: 1726412

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 12/14/2017 18:16

Inst: VOA4.I

Dilution: 1

Prep Date: 12/14/2017 18:16

Analyst: PXY1

Purge Vol: 5 mL

Data File: 121417V4\4M419.D

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

**SDG Number:** 2018-1201  
**Lab Sample ID:** 439737009  
  
**Client ID:** CAWA-18-148942  
**Batch ID:** 1726412  
**Run Date:** 12/14/2017 18:16  
**Prep Date:** 12/14/2017 18:16  
**Data File:** 121417V4\4M419.D

**Date Collected:** 12/06/2017 13:04  
**Date Received:** 12/09/2017 10:20  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** W  
  
**Project:** ESHL00114  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

SDG Number: 2018-1201

Lab Sample ID: 439737009

Date Collected: 12/06/2017 13:04

Date Received: 12/09/2017 10:20

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1726412

Inst: VOA4.I

Dilution: 1

Run Date: 12/14/2017 18:16

Analyst: PXY1

Purge Vol: 5 mL

Prep Date: 12/14/2017 18:16

Data File: 121417V4\4M419.D

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	0.300	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	0.300	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.4	50.0	ug/L 107	(71%-134%)
Bromofluorobenzene	50.4	50.0	ug/L 101	(70%-131%)
Toluene-d8	46.6	50.0	ug/L 93	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	4.191	8.72	ug/L	0	J
	unknown siloxane	12.107	11.7	ug/L	0	J
	unknown siloxane	14.491	31.1	ug/L	0	J
	unknown	16.442	17.7	ug/L	0	J

# **Quality Control Summary**



**Volatile**  
**Surrogate Recovery Report**

Page 1 of 1

**SDG Number: 2018-1201****Matrix Type: LIQUID**

<b>Sample ID</b>	<b>Client ID</b>	<b>DCED4 %REC</b>	<b>TOL %REC</b>	<b>BFB %REC</b>
1203939062	LCS for batch 1726412	89	96	100
1203939063	LCS for batch 1726412	90	96	97
1203939061	MB for batch 1726412	92	96	97
439737004	CAWA-18-148944	99	94	98
439737006	CAWA-18-148915	102	93	100
439737008	CAWA-18-148939	82	93	97
439737009	CAWA-18-148942	107	93	101
1203941693	LCS for batch 1726412	101	89	100
1203941731	LCS for batch 1726412	100	89	98
1203941692	MB for batch 1726412	105	87	97
1203939064	WST33-18-147906PS	112	89	99
1203939066	WST33-18-147906PSD	106	90	99
1203939065	WST33-18-147906PS	103	90	99
1203939067	WST33-18-147906PSD	83	91	99

**Surrogate****Acceptance Limits**

DCED4	= 1,2-Dichloroethane-d4	(71%-134%)
TOL	= Toluene-d8	(74%-124%)
BFB	= Bromofluorobenzene	(70%-131%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1726412

Matrix: WATER

Lab Sample ID 1203939062

Instrument: VOA4.I

Analysis Date: 12/14/2017 11:17

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	LCS m,p-Xylenes	100	0.0	96.2	96	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1180	94	61-125
67-64-1	LCS Acetone	250	0.0	218	87	48-157
74-88-4	LCS Iodomethane	250	0.0	249	100	72-128
75-15-0	LCS Carbon disulfide	250	0.0	253	101	69-138
108-05-4	LCS Vinyl acetate	250	0.0	265	106	67-125
78-93-3	LCS 2-Butanone	250	0.0	252	101	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	234	93	66-124
591-78-6	LCS 2-Hexanone	250	0.0	232	93	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	58.1	116	40-160
74-87-3	LCS Chloromethane	50.0	0.0	66.4	133	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	59.1	118	65-137
74-83-9	LCS Bromomethane	50.0	0.0	68.7	137	63-137
75-00-3	LCS Chloroethane	50.0	0.0	70.7	141 *	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	54.0	108	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	56.1	112	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	50.2	100	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	48.6	97	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	53.6	107	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	51.9	104	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	50.5	101	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	55.1	110	75-123

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1726412

Matrix: WATER

Lab Sample ID 1203939062

Instrument: VOA4.I

Analysis Date: 12/14/2017 11:17

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	LCS 2,2-Dichloropropane	50.0	0.0	50.2	100	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	52.5	105	76-125
67-66-3	LCS Chloroform	50.0	0.0	49.3	99	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	49.2	98	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	52.1	104	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	49.8	100	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	46.7	93	74-122
71-43-2	LCS Benzene	50.0	0.0	52.1	104	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	52.4	105	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	51.8	104	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	50.7	101	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	50.8	102	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	54.1	108	78-131
108-88-3	LCS Toluene	50.0	0.0	46.6	93	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	47.4	95	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	47.2	94	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	44.4	89	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	46.0	92	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	49.2	98	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	48.8	98	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	47.6	95	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	48.3	97	73-125

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1726412

Matrix: WATER

Lab Sample ID 1203939062

Instrument: VOA4.I

Analysis Date: 12/14/2017 11:17

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS o-Xylene	50.0	0.0	47.0	94	74-126
100-42-5	LCS Styrene	50.0	0.0	51.1	102	72-130
75-25-2	LCS Bromoform	50.0	0.0	45.0	90	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	51.1	102	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	47.4	95	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	46.5	93	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	47.1	94	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	48.5	97	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	49.2	98	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	47.9	96	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	46.7	93	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	51.6	103	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	49.2	98	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	51.2	102	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	51.6	103	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	44.0	88	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	45.2	90	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	49.7	99	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	46.6	93	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	49.9	100	72-136
91-20-3	LCS Naphthalene	50.0	0.0	54.7	109	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	50.5	101	70-130

## Volatile

Page 4 of 4

Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1726412

Matrix: WATER

Lab Sample ID 1203939062

Instrument: VOA4.I

Analysis Date: 12/14/2017 11:17

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	51.0	102	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	47.3	95	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	46.6	93	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5280	106	63-138

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1726412

Matrix: WATER

Lab Sample ID 1203939063

Instrument: VOA4.I

Analysis Date: 12/14/2017 12:16

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	LCS	Acrolein	250	0.0	350	140	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	303	121	61-148
107-05-1	LCS	Allyl chloride	250	0.0	327	131 *	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	349	140 *	65-122
107-12-0	LCS	Propionitrile	250	0.0	252	101	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	253	101	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	266	107	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	234	93	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2450	98	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	61.7	123	66-147

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Post Spike

Client ID: WST33-18-147906PS

Matrix: W

Lab Sample ID 1203939064

Instrument: VOA4.I

Analysis Date: 12/18/2017 19:10

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	PS m,p-Xylenes	100	0.00 U	107	107	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1710	137 *	56-131
67-64-1	PS Acetone	250	5.62 J	161	62	25-155
75-15-0	PS Carbon disulfide	250	2.04 J	337	134	61-141
78-93-3	PS 2-Butanone	250	2.44 J	224	89	25-143
74-88-4	PS Iodomethane	250	0.00 U	326	131	66-133
108-05-4	PS Vinyl acetate	250	0.00 U	363	145 *	48-133
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	269	107	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	206	83	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	104	208 *	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	104	209 *	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	79.4	159 *	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	96.0	192 *	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	103	206 *	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	72.1	144 *	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	71.0	142 *	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	71.4	143 *	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	63.5	127 *	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	69.4	139 *	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	70.3	141 *	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	67.6	135 *	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	70.3	141 *	69-127

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Post Spike

Client ID: WST33-18-147906PS

Matrix: W

Lab Sample ID 1203939064

Instrument: VOA4.I

Analysis Date: 12/18/2017 19:10

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	PS 2,2-Dichloropropane	50.0	0.00 U	71.1	142 *	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	66.7	133 *	71-130
67-66-3	PS Chloroform	50.0	0.00 U	68.2	136 *	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	70.1	140 *	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	67.8	136 *	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	72.2	144 *	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	70.3	141 *	69-130
71-43-2	PS Benzene	50.0	0.00 U	65.2	130 *	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	68.3	137 *	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	65.4	131 *	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	68.5	137 *	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	70.8	142 *	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	68.5	137 *	70-134
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	56.3	113	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	52.9	106	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	51.5	103	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	51.6	103	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	59.2	118	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	55.6	111	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	52.3	105	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	54.7	109	61-130
95-47-6	PS o-Xylene	50.0	0.00 U	54.6	109	62-131



Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Post Spike

Client ID: WST33-18-147906PS

Matrix: W

Lab Sample ID 1203939064

Instrument: VOA4.I

Analysis Date: 12/18/2017 19:10

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
100-42-5	PS Styrene	50.0	0.00 U	55.9	112	59-135
75-25-2	PS Bromoform	50.0	0.00 U	50.4	101	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	52.2	104	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	51.1	102	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	53.2	106	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	49.3	99	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	50.3	101	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	52.1	104	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	49.1	98	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	49.7	99	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	52.9	106	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	52.2	104	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	53.0	106	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	53.7	107	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	48.0	96	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	47.4	95	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	52.4	105	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	52.8	106	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	54.0	108	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	58.8	118	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	53.1	106	52-135
120-82-1	PS 1,2,4-Trichlorobenzene	50.0	0.00 U	53.4	107	50-133

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Post Spike

Client ID: WST33-18-147906PS

Matrix: W

Lab Sample ID 1203939064

Instrument: VOA4.I

Analysis Date: 12/18/2017 19:10

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
630-20-6	PS 1,1,1,2-Tetrachloroethane	50.0	0.00 U	56.0	112	71-133
95-50-1	PS 1,2-Dichlorobenzene	50.0	0.00 U	49.4	99	60-125
108-88-3	PS Toluene	50.0	48.9	93.5	89	60-126
71-36-3	PS n-Butyl alcohol	5000	0.00 U	7290	146 *	60-140

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Post Spike Duplicate

Client ID: WST33-18-147906PSD

Matrix: W

Lab Sample ID 1203939066

Instrument: VOA4.I

Analysis Date: 12/18/2017 19:40

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
179601-23-1	PSD m,p-Xylenes	100	0.00 U	109	109	59-132	2	0-20
75-05-8	PSD Acetonitrile	1250	0.00 U	1680	134 *	56-131	2	0-20
67-64-1	PSD Acetone	250	5.62 J	156	60	25-155	3	0-20
75-15-0	PSD Carbon disulfide	250	2.04 J	352	140	61-141	4	0-20
78-93-3	PSD 2-Butanone	250	2.44 J	223	88	25-143	1	0-20
74-88-4	PSD Iodomethane	250	0.00 U	333	133	66-133	2	0-20
108-05-4	PSD Vinyl acetate	250	0.00 U	354	142 *	48-133	2	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00 U	270	108	61-127	0	0-20
591-78-6	PSD 2-Hexanone	250	0.00 U	204	82	33-138	1	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00 U	81.0	162	33-164	25 *	0-20
74-87-3	PSD Chloromethane	50.0	0.00 U	93.6	187 *	53-139	11	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00 U	70.3	141 *	58-140	12	0-20
74-83-9	PSD Bromomethane	50.0	0.00 U	87.5	175 *	59-146	9	0-20
75-00-3	PSD Chloroethane	50.0	0.00 U	68.8	138 *	65-129	40 *	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00 U	68.5	137	65-141	5	0-20
60-29-7	PSD Ethyl ether	50.0	0.00 U	70.9	142 *	69-127	0	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00 U	72.7	145 *	59-130	2	0-20
75-09-2	PSD Methylene chloride	50.0	0.00 U	64.8	130 *	62-123	2	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00 U	70.0	140 *	69-132	1	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00 U	70.7	141 *	65-127	1	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00 U	67.7	135 *	67-127	0	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00 U	70.3	141 *	69-127	0	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Post Spike Duplicate

Client ID: WST33-18-147906PSD

Matrix: W

Lab Sample ID 1203939066

Instrument: VOA4.I

Analysis Date: 12/18/2017 19:40

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
594-20-7	PSD 2,2-Dichloropropane	50.0	0.00 U	69.8	140 *	66-137	2	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00 U	67.9	136 *	71-130	2	0-20
67-66-3	PSD Chloroform	50.0	0.00 U	67.9	136 *	71-129	0	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00 U	69.2	138	69-139	1	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00 U	69.9	140 *	67-130	3	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00 U	70.3	141	66-143	3	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00 U	67.2	134 *	69-130	5	0-20
71-43-2	PSD Benzene	50.0	0.00 U	66.9	134 *	66-125	3	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00 U	70.1	140 *	65-131	3	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00 U	66.1	132 *	67-127	1	0-20
74-95-3	PSD Dibromomethane	50.0	0.00 U	67.2	134 *	72-129	2	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00 U	70.2	140 *	70-138	1	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00 U	69.9	140 *	70-134	2	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00 U	56.4	113	69-135	0	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00 U	53.3	107	66-125	1	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00 U	51.4	103	67-124	0	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00 U	53.3	107	60-130	3	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00 U	59.5	119	68-143	1	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00 U	57.3	115	71-127	3	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00 U	53.7	107	64-124	3	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00 U	55.2	110	61-130	1	0-20
95-47-6	PSD o-Xylene	50.0	0.00 U	54.2	108	62-131	1	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Post Spike Duplicate

Client ID: WST33-18-147906PSD

Matrix: W

Lab Sample ID 1203939066

Instrument: VOA4.I

Analysis Date: 12/18/2017 19:40

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
100-42-5	PSD Styrene	50.0	0.00	U 56.5	113	59-135	1	0-20
75-25-2	PSD Bromoform	50.0	0.00	U 51.6	103	64-138	2	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00	U 54.8	110	55-133	5	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00	U 52.6	105	62-129	3	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00	U 52.9	106	70-124	0	0-20
108-86-1	PSD Bromobenzene	50.0	0.00	U 51.3	103	62-124	4	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00	U 52.7	105	50-133	5	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00	U 54.1	108	53-135	4	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00	U 50.5	101	56-128	3	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00	U 51.6	103	53-130	4	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00	U 55.6	111	55-135	5	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00	U 54.1	108	53-132	4	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00	U 54.8	110	50-138	3	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00	U 55.3	111	49-138	3	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00	U 49.7	99	56-126	3	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00	U 49.5	99	55-125	4	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00	U 53.4	107	43-142	2	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00	U 53.6	107	62-141	2	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00	U 54.8	110	40-147	1	0-20
91-20-3	PSD Naphthalene	50.0	0.00	U 59.1	118	62-134	1	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00	U 53.2	106	52-135	0	0-20
120-82-1	PSD 1,2,4-Trichlorobenzene	50.0	0.00	U 53.8	108	50-133	1	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Post Spike Duplicate

Client ID: WST33-18-147906PSD

Matrix: W

Lab Sample ID 1203939066

Instrument: VOA4.I

Analysis Date: 12/18/2017 19:40

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00	U	55.1	110	71-133	2	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00	U	50.7	101	60-125	3	0-20
108-88-3	PSD Toluene	50.0	48.9		95.1	92	60-126	2	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00	U	7220	144 *	60-140	1	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 2

SDG Number: 2018-1201

Sample Type: Post Spike

Client ID: WST33-18-147906PS

Matrix: W

Lab Sample ID 1203939065

Instrument: VOA4.I

Analysis Date: 12/18/2017 20:09

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No			Parmname		Amount Added ug/L	Sample Conc. ug/L	U	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	PS	Acrolein			250	0.00	U	274	110	49-141
76-13-1	PS	Trichlorotrifluoroethane			250	0.00	U	325	130	57-149
107-05-1	PS	Allyl chloride			250	0.00	U	329	132 *	54-128
107-13-1	PS	Acrylonitrile			250	0.00	U	341	136 *	59-129
107-12-0	PS	Propionitrile			250	0.00	U	330	132 *	58-131
126-98-7	PS	Methacrylonitrile			250	0.00	U	332	133	59-134
80-62-6	PS	Methyl methacrylate			250	0.00	U	328	131	62-135
97-63-2	PS	Ethyl methacrylate			250	0.00	U	248	99	60-136
78-83-1	PS	Isobutyl alcohol			2500	0.00	U	3400	136	60-143
126-99-8	PS	2-Chloro-1,3-butadiene			50.0	0.00	U	68.7	137	63-146

## Volatile

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# Quality Control Summary Spike Recovery Report

SDG Number: 2018-1201

Sample Type: Post Spike Duplicate

Client ID: WST33-18-147906PSD

Matrix: W

Lab Sample ID 1203939067

Instrument: VOA4.I

Analysis Date: 12/18/2017 20:38

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	U	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
107-02-8	PSD Acrolein	250	0.00	U	264	105	49-141	4	0-20
76-13-1	PSD Trichlorotrifluoroethane	250	0.00	U	278	111	57-149	16	0-20
107-05-1	PSD Allyl chloride	250	0.00	U	309	124	54-128	6	0-20
107-13-1	PSD Acrylonitrile	250	0.00	U	336	135 *	59-129	1	0-20
107-12-0	PSD Propionitrile	250	0.00	U	314	126	58-131	5	0-20
126-98-7	PSD Methacrylonitrile	250	0.00	U	306	122	59-134	8	0-20
80-62-6	PSD Methyl methacrylate	250	0.00	U	309	123	62-135	6	0-20
97-63-2	PSD Ethyl methacrylate	250	0.00	U	243	97	60-136	2	0-20
78-83-1	PSD Isobutyl alcohol	2500	0.00	U	3050	122	60-143	11	0-20
126-99-8	PSD 2-Chloro-1,3-butadiene	50.0	0.00	U	57.3	115	63-146	18	0-20



Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1726412

Matrix: WATER

Lab Sample ID 1203941693

Instrument: VOA4.I

Analysis Date: 12/18/2017 13:21

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	LCS m,p-Xylenes	100	0.0	83.5	83	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1160	93	61-125
67-64-1	LCS Acetone	250	0.0	252	101	48-157
74-88-4	LCS Iodomethane	250	0.0	235	94	72-128
75-15-0	LCS Carbon disulfide	250	0.0	230	92	69-138
108-05-4	LCS Vinyl acetate	250	0.0	267	107	67-125
78-93-3	LCS 2-Butanone	250	0.0	271	108	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	213	85	66-124
591-78-6	LCS 2-Hexanone	250	0.0	242	97	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	42.4	85	40-160
74-87-3	LCS Chloromethane	50.0	0.0	63.7	127	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	57.7	115	65-137
74-83-9	LCS Bromomethane	50.0	0.0	51.8	104	63-137
75-00-3	LCS Chloroethane	50.0	0.0	53.0	106	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	50.5	101	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	56.5	113	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	48.2	96	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	48.6	97	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	52.0	104	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	50.2	100	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	49.4	99	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	51.6	103	75-123

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1726412

Matrix: WATER

Lab Sample ID 1203941693

Instrument: VOA4.I

Analysis Date: 12/18/2017 13:21

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	LCS 2,2-Dichloropropane	50.0	0.0	49.8	100	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	49.7	99	76-125
67-66-3	LCS Chloroform	50.0	0.0	49.1	98	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	48.4	97	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	50.6	101	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	49.7	99	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	48.8	98	74-122
71-43-2	LCS Benzene	50.0	0.0	49.4	99	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	51.4	103	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	50.3	101	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	49.0	98	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	50.7	101	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	52.1	104	78-131
108-88-3	LCS Toluene	50.0	0.0	40.3	81	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	42.6	85	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	40.9	82	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	39.2	78	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	39.4	79	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	44.6	89	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	42.7	85	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	40.9	82	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	41.7	83	73-125

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1726412

Matrix: WATER

Lab Sample ID 1203941693

Instrument: VOA4.I

Analysis Date: 12/18/2017 13:21

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS o-Xylene	50.0	0.0	41.4	83	74-126
100-42-5	LCS Styrene	50.0	0.0	43.8	88	72-130
75-25-2	LCS Bromoform	50.0	0.0	39.0	78	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	43.4	87	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	41.4	83	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	40.9	82	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	40.8	82	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	41.4	83	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	42.5	85	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	40.2	80	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	41.4	83	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	44.1	88	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	42.6	85	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	42.8	86	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	43.9	88	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	39.3	79	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	38.4	77	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	42.1	84	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	37.8	76	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	41.7	83	72-136
91-20-3	LCS Naphthalene	50.0	0.0	45.3	91	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	42.1	84	70-130

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1726412

Matrix: WATER

Lab Sample ID 1203941693

Instrument: VOA4.I

Analysis Date: 12/18/2017 13:21

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	42.7	85	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	41.8	84	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	39.7	79	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	4890	98	63-138

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1726412

Matrix: WATER

Lab Sample ID 1203941731

Instrument: VOA4.I

Analysis Date: 12/18/2017 14:48

Dilution: 1

Analyst: PXY1

Purge Vol: 5 mL

Batch ID: 1726412

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	LCS	Acrolein	250	0.0	348	139	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	294	118	61-148
107-05-1	LCS	Allyl chloride	250	0.0	291	117	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	299	120	65-122
107-12-0	LCS	Propionitrile	250	0.0	281	112	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	295	118	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	305	122	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	235	94	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2890	116	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	62.5	125	66-147

## Method Blank Summary

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SDG Number:	2018-1201	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1726412	Instrument ID:	VOA4.I	Data File:	121417V4\4M408AR.D
Lab Sample ID:	1203939061	Prep Date:	12/14/2017 12:46	Analyzed:	12/14/17 12:46
Column:	DB-624				

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 1726412	1203939062	121417V4\4M405AR.D	12/14/17	1117
02 LCS for batch 1726412	1203939063	121417V4\4M407AR.D	12/14/17	1216
03 CAWA-18-148944	439737004	121417V4\4M416.D	12/14/17	1648
04 CAWA-18-148915	439737006	121417V4\4M417.D	12/14/17	1717
05 CAWA-18-148939	439737008	121417V4\4M418.D	12/14/17	1746
06 CAWA-18-148942	439737009	121417V4\4M419.D	12/14/17	1816

## Method Blank Summary

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SDG Number:	2018-1201	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1726412	Instrument ID:	VOA4.I	Data File:	121817V4\4N114A.D
Lab Sample ID:	1203941692	Prep Date:	12/18/2017 15:47	Analyzed:	12/18/17 15:47
Column:	DB-624				

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
08 LCS for batch 1726412	1203941693	121817V4\4N109A.D	12/18/17	1321
09 LCS for batch 1726412	1203941731	121817V4\4N112A.D	12/18/17	1448
10 WST33-18-147906PS	1203939064	121817V4\4N121.D	12/18/17	1910
11 WST33-18-147906PSD	1203939066	121817V4\4N122.D	12/18/17	1940
12 WST33-18-147906PS	1203939065	121817V4\4N123.D	12/18/17	2009
13 WST33-18-147906PSD	1203939067	121817V4\4N124.D	12/18/17	2038

# Quality Control Data



**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203939061  
**Client Sample:** QC for batch 1726412  
**Client ID:** MB for batch 1726412  
**Batch ID:** 1726412  
**Run Date:** 12/14/2017 12:46  
**Prep Date:** 12/14/2017 12:46  
**Data File:** 121417V4\4M408AR.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** WATER  
  
**Project:** QC  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203939061  
**Client Sample:** QC for batch 1726412  
**Client ID:** MB for batch 1726412  
**Batch ID:** 1726412  
**Run Date:** 12/14/2017 12:46  
**Prep Date:** 12/14/2017 12:46  
**Data File:** 121417V4\4M408AR.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** WATER  
  
**Project:** QC  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile  
Certificate of Analysis  
Sample Summary

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SDG Number: 2018-1201  
Lab Sample ID: 1203939061  
Client Sample: QC for batch 1726412  
Client ID: MB for batch 1726412  
Batch ID: 1726412  
Run Date: 12/14/2017 12:46  
Prep Date: 12/14/2017 12:46  
Data File: 121417V4\4M408AR.D

Client: ARSL004  
Method: SW-846:8260B  
Inst: VOA4.I  
Analyst: PXY1  
  
Column: DB-624

Matrix: WATER  
  
Project: QC  
SOP Ref: GL-OA-E-038  
Dilution: 1  
Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	0.300	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	0.300	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	46.0	50.0	ug/L 92	(71%-134%)
Bromofluorobenzene	48.4	50.0	ug/L 97	(70%-131%)
Toluene-d8	48.1	50.0	ug/L 96	(74%-124%)

## Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	4.293	14.9	ug/L	0	J
	unknown	16.448	13.1	ug/L	0	J
	unknown	18.734	5.91	ug/L	0	J

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203939062  
**Client Sample:** QC for batch 1726412  
**Client ID:** LCS for batch 1726412  
**Batch ID:** 1726412  
**Run Date:** 12/14/2017 11:17  
**Prep Date:** 12/14/2017 11:17  
**Data File:** 121417V4\4M405AR.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** WATER  
  
**Project:** QC  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		47.3	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		49.2	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		47.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		47.2	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		50.5	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		50.2	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		52.1	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		50.5	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		46.5	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		51.0	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		49.2	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		46.6	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		48.8	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		46.6	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		46.7	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		51.8	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		49.2	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		44.0	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		44.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		45.2	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		50.2	ug/L	0.300	1.00
78-93-3	2-Butanone		252	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		47.9	ug/L	0.300	1.00
591-78-6	2-Hexanone		232	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		46.7	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		51.6	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		234	ug/L	1.50	5.00
67-64-1	Acetone		218	ug/L	1.50	10.0
75-05-8	Acetonitrile		1180	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		52.1	ug/L	0.300	1.00
108-86-1	Bromobenzene		47.1	ug/L	0.300	1.00
74-97-5	Bromochloromethane		52.5	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		50.8	ug/L	0.300	1.00
75-25-2	Bromoform		45.0	ug/L	0.300	1.00

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203939062  
**Client Sample:** QC for batch 1726412  
**Client ID:** LCS for batch 1726412  
**Batch ID:** 1726412  
**Run Date:** 12/14/2017 11:17  
**Prep Date:** 12/14/2017 11:17  
**Data File:** 121417V4\4M405AR.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** WATER  
  
**Project:** QC  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		68.7	ug/L	0.300	1.00
75-15-0	Carbon disulfide		253	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		49.8	ug/L	0.300	1.00
108-90-7	Chlorobenzene		47.6	ug/L	0.300	1.00
75-00-3	Chloroethane		70.7	ug/L	0.300	1.00
67-66-3	Chloroform		49.3	ug/L	0.300	1.00
74-87-3	Chloromethane		66.4	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		49.2	ug/L	0.300	1.00
74-95-3	Dibromomethane		50.7	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		58.1	ug/L	0.300	1.00
60-29-7	Ethyl ether		56.1	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		48.3	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		49.9	ug/L	0.300	1.00
74-88-4	Iodomethane		249	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		51.1	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		48.6	ug/L	1.00	10.0
91-20-3	Naphthalene		54.7	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		51.1	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		46.0	ug/L	0.300	1.00
108-88-3	Toluene		46.6	ug/L	0.300	1.00
79-01-6	Trichloroethylene		52.4	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		54.0	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		265	ug/L	1.50	5.00
75-01-4	Vinyl chloride		59.1	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		55.1	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		54.1	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		96.2	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5280	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		49.7	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		48.5	ug/L	0.300	1.00
95-47-6	o-Xylene		47.0	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		51.2	ug/L	0.300	1.00

**Volatile  
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Sample Summary**

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<b>SDG Number:</b>	2018-1201	<b>Matrix:</b>	WATER
<b>Lab Sample ID:</b>	1203939062		
<b>Client Sample:</b>	QC for batch 1726412	<b>Client:</b>	ARSL004
<b>Client ID:</b>	LCS for batch 1726412	<b>Method:</b>	SW-846:8260B
<b>Batch ID:</b>	1726412	<b>Inst:</b>	VOA4.I
<b>Run Date:</b>	12/14/2017 11:17	<b>Analyst:</b>	PXY1
<b>Prep Date:</b>	12/14/2017 11:17		
<b>Data File:</b>	121417V4\4M405AR.D	<b>Column:</b>	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		53.6	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		51.6	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		51.9	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		47.4	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	44.4	50.0	ug/L	89	(71%-134%)
Bromofluorobenzene	49.9	50.0	ug/L	100	(70%-131%)
Toluene-d8	47.9	50.0	ug/L	96	(74%-124%)

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203939063  
**Client Sample:** QC for batch 1726412  
**Client ID:** LCS for batch 1726412  
**Batch ID:** 1726412  
**Run Date:** 12/14/2017 12:16  
**Prep Date:** 12/14/2017 12:16  
**Data File:** 121417V4\4M407AR.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** WATER  
  
**Project:** QC  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		61.7	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		350	ug/L	1.50	5.00
107-13-1	Acrylonitrile		349	ug/L	1.50	5.00
107-05-1	Allyl chloride		327	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile**  
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**Sample Summary**

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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203939063  
**Client Sample:** QC for batch 1726412  
**Client ID:** LCS for batch 1726412  
**Batch ID:** 1726412  
**Run Date:** 12/14/2017 12:16  
**Prep Date:** 12/14/2017 12:16  
**Data File:** 121417V4\4M407AR.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** WATER  
  
**Project:** QC  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		234	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2450	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		253	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		266	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		252	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		303	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00



**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203939063  
**Client Sample:** QC for batch 1726412  
**Client ID:** LCS for batch 1726412  
**Batch ID:** 1726412  
**Run Date:** 12/14/2017 12:16  
**Prep Date:** 12/14/2017 12:16  
**Data File:** 121417V4\4M407AR.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** WATER  
  
**Project:** QC  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	0.300	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	0.300	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	44.8	50.0	ug/L	90	(71%-134%)
Bromofluorobenzene	48.5	50.0	ug/L	97	(70%-131%)
Toluene-d8	48.0	50.0	ug/L	96	(74%-124%)

**Volatile**  
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**Sample Summary**

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<b>SDG Number:</b> 2018-1201	<b>Date Collected:</b> 12/05/2017 13:23	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203939064	<b>Date Received:</b> 12/09/2017 10:20	
<b>Client Sample:</b> QC for batch 1726412	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> WST33-18-147906PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1726412	<b>Inst:</b> VOA4.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/18/2017 19:10	<b>Analyst:</b> PXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 12/18/2017 19:10		
<b>Data File:</b> 121817V4\4N121.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		56.0	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		70.1	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		51.1	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		52.9	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		67.6	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		71.4	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		67.8	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		53.1	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		53.2	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		53.4	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		52.2	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		52.8	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		55.6	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		49.4	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		70.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		65.4	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		52.1	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		48.0	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		51.5	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		47.4	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		71.1	ug/L	0.300	1.00
78-93-3	2-Butanone		224	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		49.1	ug/L	0.300	1.00
591-78-6	2-Hexanone		206	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		49.7	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		53.7	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		269	ug/L	1.50	5.00
67-64-1	Acetone		161	ug/L	1.50	10.0
75-05-8	Acetonitrile		1710	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		65.2	ug/L	0.300	1.00
108-86-1	Bromobenzene		49.3	ug/L	0.300	1.00
74-97-5	Bromochloromethane		66.7	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		70.8	ug/L	0.300	1.00
75-25-2	Bromoform		50.4	ug/L	0.300	1.00

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b> 2018-1201	<b>Date Collected:</b> 12/05/2017 13:23	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203939064	<b>Date Received:</b> 12/09/2017 10:20	
<b>Client Sample:</b> QC for batch 1726412	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> WST33-18-147906PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1726412	<b>Inst:</b> VOA4.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/18/2017 19:10	<b>Analyst:</b> PXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 12/18/2017 19:10		
<b>Data File:</b> 121817V4\4N121.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		96.0	ug/L	0.300	1.00
75-15-0	Carbon disulfide		337	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		72.2	ug/L	0.300	1.00
108-90-7	Chlorobenzene		52.3	ug/L	0.300	1.00
75-00-3	Chloroethane	E	103	ug/L	0.300	1.00
67-66-3	Chloroform		68.2	ug/L	0.300	1.00
74-87-3	Chloromethane	E	104	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		59.2	ug/L	0.300	1.00
74-95-3	Dibromomethane		68.5	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	E	104	ug/L	0.300	1.00
60-29-7	Ethyl ether		71.0	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		54.7	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		54.0	ug/L	0.300	1.00
74-88-4	Iodomethane		326	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		52.2	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		63.5	ug/L	1.00	10.0
91-20-3	Naphthalene		58.8	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		55.9	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		51.6	ug/L	0.300	1.00
108-88-3	Toluene		93.5	ug/L	0.300	1.00
79-01-6	Trichloroethylene		68.3	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		72.1	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		363	ug/L	1.50	5.00
75-01-4	Vinyl chloride		79.4	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		70.3	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		68.5	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		107	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		7290	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		52.4	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		50.3	ug/L	0.300	1.00
95-47-6	o-Xylene		54.6	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		53.0	ug/L	0.300	1.00

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b>	<b>2018-1201</b>	<b>Date Collected:</b>	<b>12/05/2017 13:23</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203939064</b>	<b>Date Received:</b>	<b>12/09/2017 10:20</b>		
<b>Client Sample:</b>	<b>QC for batch 1726412</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>WST33-18-147906PS</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1726412</b>	<b>Inst:</b>	<b>VOA4.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>12/18/2017 19:10</b>	<b>Analyst:</b>	<b>PXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>12/18/2017 19:10</b>				
<b>Data File:</b>	<b>121817V4\4N121.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		69.4	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		52.9	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		70.3	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		56.3	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	56.2	50.0	ug/L	112	(71%-134%)
Bromofluorobenzene	49.3	50.0	ug/L	99	(70%-131%)
Toluene-d8	44.7	50.0	ug/L	89	(74%-124%)

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

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<b>SDG Number:</b> 2018-1201	<b>Date Collected:</b> 12/05/2017 13:23	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203939065	<b>Date Received:</b> 12/09/2017 10:20	
<b>Client Sample:</b> QC for batch 1726412	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> WST33-18-147906PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1726412	<b>Inst:</b> VOA4.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/18/2017 20:09	<b>Analyst:</b> PXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 12/18/2017 20:09		
<b>Data File:</b> 121817V4\4N123.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		68.7	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		274	ug/L	1.50	5.00
107-13-1	Acrylonitrile		341	ug/L	1.50	5.00
107-05-1	Allyl chloride		329	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b>	<b>2018-1201</b>	<b>Date Collected:</b>	<b>12/05/2017 13:23</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203939065</b>	<b>Date Received:</b>	<b>12/09/2017 10:20</b>		
<b>Client Sample:</b>	<b>QC for batch 1726412</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>WST33-18-147906PS</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1726412</b>	<b>Inst:</b>	<b>VOA4.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>12/18/2017 20:09</b>	<b>Analyst:</b>	<b>PXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>12/18/2017 20:09</b>				
<b>Data File:</b>	<b>121817V4\4N123.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		248	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		3400	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		332	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		328	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		330	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		325	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

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<b>SDG Number:</b>	<b>2018-1201</b>	<b>Date Collected:</b>	<b>12/05/2017 13:23</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203939065</b>	<b>Date Received:</b>	<b>12/09/2017 10:20</b>		
<b>Client Sample:</b>	<b>QC for batch 1726412</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>WST33-18-147906PS</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1726412</b>	<b>Inst:</b>	<b>VOA4.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>12/18/2017 20:09</b>	<b>Analyst:</b>	<b>PXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>12/18/2017 20:09</b>				
<b>Data File:</b>	<b>121817V4\4N123.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	0.300	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	0.300	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.4	50.0	ug/L 103	(71%-134%)
Bromofluorobenzene	49.5	50.0	ug/L 99	(70%-131%)
Toluene-d8	45.2	50.0	ug/L 90	(74%-124%)

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203939066  
**Client Sample:** QC for batch 1726412  
**Client ID:** WST33-18-147906PSD  
**Batch ID:** 1726412  
**Run Date:** 12/18/2017 19:40  
**Prep Date:** 12/18/2017 19:40  
**Data File:** 121817V4\4N122.D

**Date Collected:** 12/05/2017 13:23  
**Date Received:** 12/09/2017 10:20  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** W  
  
**Project:** QC  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		55.1	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		69.2	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		52.6	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		53.3	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		67.7	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		72.7	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		69.9	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		53.2	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		52.9	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		53.8	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		54.1	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		53.6	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		57.3	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		50.7	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		67.2	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		66.1	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		54.1	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		49.7	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		51.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		49.5	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		69.8	ug/L	0.300	1.00
78-93-3	2-Butanone		223	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		50.5	ug/L	0.300	1.00
591-78-6	2-Hexanone		204	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		51.6	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		55.3	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		270	ug/L	1.50	5.00
67-64-1	Acetone		156	ug/L	1.50	10.0
75-05-8	Acetonitrile		1680	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		66.9	ug/L	0.300	1.00
108-86-1	Bromobenzene		51.3	ug/L	0.300	1.00
74-97-5	Bromochloromethane		67.9	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		70.2	ug/L	0.300	1.00
75-25-2	Bromoform		51.6	ug/L	0.300	1.00



**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b> 2018-1201	<b>Date Collected:</b> 12/05/2017 13:23	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203939066	<b>Date Received:</b> 12/09/2017 10:20	
<b>Client Sample:</b> QC for batch 1726412	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> WST33-18-147906PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1726412	<b>Inst:</b> VOA4.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/18/2017 19:40	<b>Analyst:</b> PXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 12/18/2017 19:40		
<b>Data File:</b> 121817V4\4N122.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		87.5	ug/L	0.300	1.00
75-15-0	Carbon disulfide		352	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		70.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		53.7	ug/L	0.300	1.00
75-00-3	Chloroethane		68.8	ug/L	0.300	1.00
67-66-3	Chloroform		67.9	ug/L	0.300	1.00
74-87-3	Chloromethane		93.6	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		59.5	ug/L	0.300	1.00
74-95-3	Dibromomethane		67.2	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		81.0	ug/L	0.300	1.00
60-29-7	Ethyl ether		70.9	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		55.2	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		54.8	ug/L	0.300	1.00
74-88-4	Iodomethane		333	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		54.8	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		64.8	ug/L	1.00	10.0
91-20-3	Naphthalene		59.1	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		56.5	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		53.3	ug/L	0.300	1.00
108-88-3	Toluene		95.1	ug/L	0.300	1.00
79-01-6	Trichloroethylene		70.1	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		68.5	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		354	ug/L	1.50	5.00
75-01-4	Vinyl chloride		70.3	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		70.3	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		69.9	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		109	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		7220	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		53.4	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		52.7	ug/L	0.300	1.00
95-47-6	o-Xylene		54.2	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		54.8	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b>	<b>2018-1201</b>	<b>Date Collected:</b>	<b>12/05/2017 13:23</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203939066</b>	<b>Date Received:</b>	<b>12/09/2017 10:20</b>		
<b>Client Sample:</b>	<b>QC for batch 1726412</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>WST33-18-147906PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1726412</b>	<b>Inst:</b>	<b>VOA4.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>12/18/2017 19:40</b>	<b>Analyst:</b>	<b>PXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>12/18/2017 19:40</b>				
<b>Data File:</b>	<b>121817V4\4N122.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		70.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		55.6	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		70.7	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		56.4	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.1	50.0	ug/L	106	(71%-134%)
Bromofluorobenzene	49.3	50.0	ug/L	99	(70%-131%)
Toluene-d8	45.0	50.0	ug/L	90	(74%-124%)

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b> 2018-1201	<b>Date Collected:</b> 12/05/2017 13:23	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203939067	<b>Date Received:</b> 12/09/2017 10:20	
<b>Client Sample:</b> QC for batch 1726412	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> WST33-18-147906PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1726412	<b>Inst:</b> VOA4.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/18/2017 20:38	<b>Analyst:</b> PXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 12/18/2017 20:38		
<b>Data File:</b> 121817V4\4N124.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		57.3	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		264	ug/L	1.50	5.00
107-13-1	Acrylonitrile		336	ug/L	1.50	5.00
107-05-1	Allyl chloride		309	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

<b>SDG Number:</b> 2018-1201	<b>Date Collected:</b> 12/05/2017 13:23	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203939067	<b>Date Received:</b> 12/09/2017 10:20	
<b>Client Sample:</b> QC for batch 1726412	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> WST33-18-147906PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1726412	<b>Inst:</b> VOA4.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/18/2017 20:38	<b>Analyst:</b> PXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 12/18/2017 20:38		
<b>Data File:</b> 121817V4\4N124.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		243	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		3050	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		306	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		309	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		314	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		278	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

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<b>SDG Number:</b>	<b>2018-1201</b>	<b>Date Collected:</b>	<b>12/05/2017 13:23</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203939067</b>	<b>Date Received:</b>	<b>12/09/2017 10:20</b>		
<b>Client Sample:</b>	<b>QC for batch 1726412</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>WST33-18-147906PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1726412</b>	<b>Inst:</b>	<b>VOA4.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>12/18/2017 20:38</b>	<b>Analyst:</b>	<b>PXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>12/18/2017 20:38</b>				
<b>Data File:</b>	<b>121817V4\4N124.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	0.300	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	0.300	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	41.5	50.0	ug/L 83	(71%-134%)
Bromofluorobenzene	49.4	50.0	ug/L 99	(70%-131%)
Toluene-d8	45.4	50.0	ug/L 91	(74%-124%)

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 3

SDG Number: 2018-1201

Lab Sample ID: 1203941692

Client Sample: QC for batch 1726412

Client ID: MB for batch 1726412

Batch ID: 1726412

Run Date: 12/18/2017 15:47

Prep Date: 12/18/2017 15:47

Data File: 121817V4\4N114A.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: PXY1

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203941692  
**Client Sample:** QC for batch 1726412  
**Client ID:** MB for batch 1726412  
**Batch ID:** 1726412  
**Run Date:** 12/18/2017 15:47  
**Prep Date:** 12/18/2017 15:47  
**Data File:** 121817V4\4N114A.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** WATER  
  
**Project:** QC  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203941692  
**Client Sample:** QC for batch 1726412  
**Client ID:** MB for batch 1726412  
**Batch ID:** 1726412  
**Run Date:** 12/18/2017 15:47  
**Prep Date:** 12/18/2017 15:47  
**Data File:** 121817V4\4N114A.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
**Column:** DB-624

**Matrix:** WATER  
**Project:** QC  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	0.300	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	0.300	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.7	50.0	ug/L 105	(71%-134%)
Bromofluorobenzene	48.4	50.0	ug/L 97	(70%-131%)
Toluene-d8	43.6	50.0	ug/L 87	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	4.254	23	ug/L	0	J



**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 3

**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203941693  
**Client Sample:** QC for batch 1726412  
**Client ID:** LCS for batch 1726412  
**Batch ID:** 1726412  
**Run Date:** 12/18/2017 13:21  
**Prep Date:** 12/18/2017 13:21  
**Data File:** 121817V4\4N109A.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** WATER  
  
**Project:** QC  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		41.8	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		48.4	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		41.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		40.9	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		49.4	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		48.2	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		50.6	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		42.1	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		40.9	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		42.7	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		42.6	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		37.8	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		42.7	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		39.7	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		48.8	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		50.3	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		42.5	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		39.3	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		39.2	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		38.4	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		49.8	ug/L	0.300	1.00
78-93-3	2-Butanone		271	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		40.2	ug/L	0.300	1.00
591-78-6	2-Hexanone		242	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		41.4	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		43.9	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		213	ug/L	1.50	5.00
67-64-1	Acetone		252	ug/L	1.50	10.0
75-05-8	Acetonitrile		1160	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		49.4	ug/L	0.300	1.00
108-86-1	Bromobenzene		40.8	ug/L	0.300	1.00
74-97-5	Bromochloromethane		49.7	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		50.7	ug/L	0.300	1.00
75-25-2	Bromoform		39.0	ug/L	0.300	1.00

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203941693  
**Client Sample:** QC for batch 1726412  
**Client ID:** LCS for batch 1726412  
**Batch ID:** 1726412  
**Run Date:** 12/18/2017 13:21  
**Prep Date:** 12/18/2017 13:21  
**Data File:** 121817V4\4N109A.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** WATER  
  
**Project:** QC  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		51.8	ug/L	0.300	1.00
75-15-0	Carbon disulfide		230	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		49.7	ug/L	0.300	1.00
108-90-7	Chlorobenzene		40.9	ug/L	0.300	1.00
75-00-3	Chloroethane		53.0	ug/L	0.300	1.00
67-66-3	Chloroform		49.1	ug/L	0.300	1.00
74-87-3	Chloromethane		63.7	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		44.6	ug/L	0.300	1.00
74-95-3	Dibromomethane		49.0	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		42.4	ug/L	0.300	1.00
60-29-7	Ethyl ether		56.5	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		41.7	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		41.7	ug/L	0.300	1.00
74-88-4	Iodomethane		235	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		43.4	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		48.6	ug/L	1.00	10.0
91-20-3	Naphthalene		45.3	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		43.8	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		39.4	ug/L	0.300	1.00
108-88-3	Toluene		40.3	ug/L	0.300	1.00
79-01-6	Trichloroethylene		51.4	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		50.5	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		267	ug/L	1.50	5.00
75-01-4	Vinyl chloride		57.7	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		51.6	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		52.1	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		83.5	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4890	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		42.1	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		41.4	ug/L	0.300	1.00
95-47-6	o-Xylene		41.4	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		42.8	ug/L	0.300	1.00

Volatil  
Certificate of Analysis  
Sample Summary

SDG Number: 2018-1201

Lab Sample ID: 1203941693

Client Sample: QC for batch 1726412

Client ID: LCS for batch 1726412

Batch ID: 1726412

Run Date: 12/18/2017 13:21

Prep Date: 12/18/2017 13:21

Data File: 121817V4\4N109A.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: PXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		52.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		44.1	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		50.2	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		42.6	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.3	50.0	ug/L	101	(71%-134%)
Bromofluorobenzene	49.8	50.0	ug/L	100	(70%-131%)
Toluene-d8	44.7	50.0	ug/L	89	(74%-124%)

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 3

SDG Number: 2018-1201

Lab Sample ID: 1203941731

Client Sample: QC for batch 1726412

Client ID: LCS for batch 1726412

Batch ID: 1726412

Run Date: 12/18/2017 14:48

Prep Date: 12/18/2017 14:48

Data File: 121817V4\4N112A.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: PXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		62.5	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		348	ug/L	1.50	5.00
107-13-1	Acrylonitrile		299	ug/L	1.50	5.00
107-05-1	Allyl chloride		291	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203941731  
**Client Sample:** QC for batch 1726412  
**Client ID:** LCS for batch 1726412  
**Batch ID:** 1726412  
**Run Date:** 12/18/2017 14:48  
**Prep Date:** 12/18/2017 14:48  
**Data File:** 121817V4\4N112A.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** PXY1  
  
**Column:** DB-624

**Matrix:** WATER  
  
**Project:** QC  
**SOP Ref:** GL-OA-E-038  
**Dilution:** 1  
**Purge Vol:** 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		235	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2890	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		295	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		305	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		281	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		294	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile  
Certificate of Analysis  
Sample Summary

SDG Number:	2018-1201	Matrix:	WATER
Lab Sample ID:	1203941731		
Client Sample:	QC for batch 1726412	Client:	ARSL004
Client ID:	LCS for batch 1726412	Method:	SW-846:8260B
Batch ID:	1726412	Inst:	VOA4.I
Run Date:	12/18/2017 14:48	Analyst:	PXY1
Prep Date:	12/18/2017 14:48		
Data File:	121817V4\4N112A.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	U	0.300	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene	U	0.300	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.1	50.0	ug/L 100	(71%-134%)
Bromofluorobenzene	48.8	50.0	ug/L 98	(70%-131%)
Toluene-d8	44.5	50.0	ug/L 89	(74%-124%)

# **Semi-Volatile Analysis**

# Case Narrative



**GC/MS Semivolatile  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1201  
Work Order #: 439737**

**Method/Analysis Information**

<b>Procedure:</b>	<b>Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry</b>
Analytical Method:	SW846 3510C/8270D
Prep Method:	SW846 3510C
Analytical Batch Number:	1725325
Prep Batch Number:	1725321

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW846 3510C/8270D:

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
1203936310	Method Blank (MB)
1203936311	Laboratory Control Sample (LCS)
1203936312	439739008(BDW06-18-150416) Matrix Spike (MS)
1203936313	439739008(BDW06-18-150416) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

**Preparation/Analytical Method Verification**

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-009 REV# 39.

Raw data reports are processed and reviewed by the analyst using the data analysis software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

**Calibration Information**

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package. The various calibration mixes may not be calibrated using all of the calibration levels. In addition, not all of the mixes are calibrated using the same levels.

Diphenylamine has now superseded N-Nitroso-diphenylamine on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Methodologies referenced N-Nitroso-diphenylamine. However, as stated in EPA Methodology, "N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine." Studies of these two compounds at GEL, both independent of each other and together, showed that they not only co-elute, but also have similar mass spectra. N-Nitroso-diphenylamine and Diphenylamine will be reported as Diphenylamine on all reports and forms.

#### **Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG) in this batch. A second source initial calibration verification (ICV) was included in the standard section directly behind the initial calibration.

#### **CCV Requirements**

All Calibration Verification Standards (CCV) did not meet the acceptance criteria as outlined in Method 8270D for sample 439737004 (CAWA-18-148944) and the associated QC. However, the method allows for a designated number of outliers dependent on the requested analyte list. This SDG satisfied the 8270D outlier acceptance criteria. If required, a CRDL was analyzed after the CCVs to demonstrate that there is adequate sensitivity to detect the failed compounds at the applicable lower quantitation limit.

#### **Quality Control (QC) Information**

##### **Method Blank (MB) Statement**

The MB analyzed with this SDG in this batch met the acceptance criteria.

##### **Surrogate Recoveries**

All the surrogate recoveries were within the established acceptance criteria for this SDG in this batch.

##### **Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

##### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

##### **QC Sample Designation**

Sample 439739008 (BDW06-18-150416) was selected for analysis as the matrix spike and matrix spike duplicate.

##### **Spike Recovery Statement**

The MS and MSD recoveries were within the established acceptance limits.

##### **MS/MSD Relative Percent Difference (RPD) Statement**

The relative percent difference (RPD) between the MS and MSD (See Below) did not meet acceptance limits. As the individual MS and MSD recoveries were within the acceptance limits, the failures had no adverse impact on the reported sample data.

Sample	Analyte	Value
1203936312MS and 1203936313MSD (BDW06-18-150416)	Benzidine	39* (0%-30%)

##### **Internal Standard (ISTD) Acceptance**

The internal standard responses used to quantitate the requested target analytes were within the required acceptance criteria for the SDG associated samples in this batch.

### **Technical Information:**

#### **Holding Time Specifications**

All samples in this SDG in this batch met the specified holding time. GEL assigns holding times based on the associated methodology that assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the ALPHALIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

#### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP. All reported compound mass spectra met the detection specifications in the method.

#### **Sample Dilutions**

The samples in this SDG in this batch did not require dilutions.

#### **Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG in this analytical batch unless confirmations or dilutions were required.

### **Miscellaneous Information:**

#### **Manual Integrations**

Manual integrations were not required on samples in this batch in this SDG for detected target analytes or surrogates.

#### **TIC Comment**

Tentatively identified compounds (TIC) were requested for sample 439737004 (CAWA-18-148944) in this SDG in this batch.

#### **Additional Comments**

Additional comments were not required for the SDG associated samples in this batch.

#### **Electronic Package Comment**

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the reviewer name associated with the generation of the data and package. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **System Configuration**

The Semi-Volatile-GC/MS analysis was performed on the following instrument configuration:

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>
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MSDA.I	Agilent 7890B/5977A GC/MSD with 7693A Autoinjector	Agilent7890B/5977	DB-5MS	25m x 0.2mm x 0.33um (5% Polysilarylene-95% Polydimethylsiloxane)
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**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

### Qualifier Definition Report for

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2018-1201 GEL Work Order: 439737


#### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

#### Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Barbara Bailey

Date: 20 DEC 2017

Title: Data Validator

# **Sample Data Summary**

**Semi-Volatile  
Certificate of Analysis  
Sample Summary**

Page 1 of 3

SDG Number: 2018-1201

Lab Sample ID: 439737004

Date Collected: 12/06/2017 07:56

Date Received: 12/09/2017 10:20

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSDA.I

Dilution: 1

Batch ID: 1725325

Run Date: 12/13/2017 15:46

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 12/12/2017 05:25

Aliquot: 940 mL

Final Volume: 1 mL

Data File: 121317a.s\AL1317.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.19	ug/L	3.19	10.6
120-82-1	1,2,4-Trichlorobenzene	U	3.19	ug/L	3.19	10.6
95-50-1	1,2-Dichlorobenzene	U	3.19	ug/L	3.19	10.6
122-66-7	Azobenzene	U	3.19	ug/L	3.19	10.6
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.19	ug/L	3.19	10.6
106-46-7	1,4-Dichlorobenzene	U	3.19	ug/L	3.19	10.6
123-91-1	1,4-Dioxane	U	3.19	ug/L	3.19	10.6
90-12-0	1-Methylnaphthalene	U	0.319	ug/L	0.319	1.06
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.19	ug/L	3.19	10.6
95-95-4	2,4,5-Trichlorophenol	U	3.19	ug/L	3.19	10.6
88-06-2	2,4,6-Trichlorophenol	U	3.19	ug/L	3.19	10.6
120-83-2	2,4-Dichlorophenol	U	3.19	ug/L	3.19	10.6
105-67-9	2,4-Dimethylphenol	U	3.19	ug/L	3.19	10.6
51-28-5	2,4-Dinitrophenol	U	5.32	ug/L	5.32	21.3
121-14-2	2,4-Dinitrotoluene	U	3.19	ug/L	3.19	10.6
606-20-2	2,6-Dinitrotoluene	U	3.19	ug/L	3.19	10.6
91-58-7	2-Chloronaphthalene	U	0.436	ug/L	0.436	1.06
95-57-8	2-Chlorophenol	U	3.19	ug/L	3.19	10.6
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.19	ug/L	3.19	10.6
91-57-6	2-Methylnaphthalene	U	0.319	ug/L	0.319	1.06
88-75-5	2-Nitrophenol	U	3.19	ug/L	3.19	10.6
91-94-1	3,3'-Dichlorobenzidine	U	3.19	ug/L	3.19	10.6
101-55-3	4-Bromophenylphenylether	U	3.19	ug/L	3.19	10.6
59-50-7	Parachlorometa cresol	U	3.19	ug/L	3.19	10.6
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.51	ug/L	3.51	10.6
7005-72-3	4-Chlorophenylphenylether	U	3.19	ug/L	3.19	10.6
100-02-7	4-Nitrophenol	U	3.19	ug/L	3.19	10.6
83-32-9	Acenaphthene	U	0.319	ug/L	0.319	1.06
208-96-8	Acenaphthylene	U	0.319	ug/L	0.319	1.06
62-53-3	Aniline	U	4.47	ug/L	4.47	10.6
120-12-7	Anthracene	U	0.319	ug/L	0.319	1.06
1912-24-9	Atrazine	U	3.19	ug/L	3.19	10.6
92-87-5	Benzidine	U	4.15	ug/L	4.15	10.6
56-55-3	Benzo(a)anthracene	U	0.319	ug/L	0.319	1.06
50-32-8	Benzo(a)pyrene	U	0.319	ug/L	0.319	1.06
205-99-2	Benzo(b)fluoranthene	U	0.319	ug/L	0.319	1.06
191-24-2	Benzo(ghi)perylene	U	0.319	ug/L	0.319	1.06

**Semi-Volatile  
Certificate of Analysis  
Sample Summary**

Page 2 of 3

SDG Number: 2018-1201

Lab Sample ID: 439737004

Date Collected: 12/06/2017 07:56

Date Received: 12/09/2017 10:20

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSDA.I

Dilution: 1

Batch ID: 1725325

Analyst: JMB3

Inj. Vol: 1 uL

Run Date: 12/13/2017 15:46

Aliquot: 940 mL

Final Volume: 1 mL

Prep Date: 12/12/2017 05:25

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.319	ug/L	0.319	1.06
65-85-0	Benzoic acid	U	6.38	ug/L	6.38	21.3
100-51-6	Benzyl alcohol	U	3.19	ug/L	3.19	10.6
85-68-7	Butylbenzylphthalate	U	3.19	ug/L	3.19	10.6
218-01-9	Chrysene	U	0.319	ug/L	0.319	1.06
84-74-2	Di-n-butylphthalate	U	3.19	ug/L	3.19	10.6
117-84-0	Di-n-octylphthalate	U	3.19	ug/L	3.19	10.6
53-70-3	Dibenzo(a,h)anthracene	U	0.319	ug/L	0.319	1.06
132-64-9	Dibenzofuran	U	3.19	ug/L	3.19	10.6
84-66-2	Diethylphthalate	U	3.19	ug/L	3.19	10.6
131-11-3	Dimethylphthalate	U	3.19	ug/L	3.19	10.6
88-85-7	Dinoseb	U	3.19	ug/L	3.19	10.6
122-39-4	Diphenylamine	U	3.19	ug/L	3.19	10.6
206-44-0	Fluoranthene	U	0.319	ug/L	0.319	1.06
86-73-7	Fluorene	U	0.319	ug/L	0.319	1.06
118-74-1	Hexachlorobenzene	U	3.19	ug/L	3.19	10.6
87-68-3	Hexachlorobutadiene	U	3.19	ug/L	3.19	10.6
77-47-4	Hexachlorocyclopentadiene	U	3.19	ug/L	3.19	10.6
67-72-1	Hexachloroethane	U	3.19	ug/L	3.19	10.6
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.319	ug/L	0.319	1.06
78-59-1	Isophorone	U	3.72	ug/L	3.72	10.6
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.19	ug/L	3.19	10.6
924-16-3	N-Nitrosodi-n-butylamine	U	3.19	ug/L	3.19	10.6
55-18-5	N-Nitrosodiethylamine	U	3.19	ug/L	3.19	10.6
621-64-7	N-Nitrosodi-n-propylamine	U	3.19	ug/L	3.19	10.6
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.19	ug/L	3.19	10.6
91-20-3	Naphthalene	U	0.319	ug/L	0.319	1.06
98-95-3	Nitrobenzene	U	3.19	ug/L	3.19	10.6
608-93-5	Pentachlorobenzene	U	3.19	ug/L	3.19	10.6
87-86-5	Pentachlorophenol	U	3.19	ug/L	3.19	10.6
85-01-8	Phenanthrene	U	0.319	ug/L	0.319	1.06
108-95-2	Phenol	U	3.19	ug/L	3.19	10.6
129-00-0	Pyrene	U	0.319	ug/L	0.319	1.06
110-86-1	Pyridine	U	3.19	ug/L	3.19	10.6
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.19	ug/L	3.19	10.6
111-91-1	bis(2-Chloroethoxy)methane	U	3.19	ug/L	3.19	10.6
111-44-4	bis(2-Chloroethyl) ether	U	3.19	ug/L	3.19	10.6
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.19	ug/L	3.19	10.6



**Semi-Volatile  
Certificate of Analysis  
Sample Summary**

Page 3 of 3

SDG Number: 2018-1201

Lab Sample ID: 439737004

Date Collected: 12/06/2017 07:56

Date Received: 12/09/2017 10:20

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1725325

Inst: MSDA.I

Dilution: 1

Run Date: 12/13/2017 15:46

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 12/12/2017 05:25

Aliquot: 940 mL

Final Volume: 1 mL

Data File: 121317a.s\AL1317.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	3.94	ug/L	3.94	10.6
99-09-2	3-Nitroaniline	U	3.19	ug/L	3.19	10.6
	<i>m</i> -Nitroaniline					
95-48-7	o-Cresol	U	3.19	ug/L	3.19	10.6
88-74-4	2-Nitroaniline	U	3.19	ug/L	3.19	10.6
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline	U	3.19	ug/L	3.19	10.6
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	82.3	106	ug/L	77	(32%-124%)
2-Fluorobiphenyl	32.6	53.2	ug/L	61	(32%-112%)
2-Fluorophenol	35.1	106	ug/L	33	(15%-88%)
Nitrobenzene-d5	37.7	53.2	ug/L	71	(36%-115%)
Phenol-d5	20.0	106	ug/L	19	(15%-91%)
p-Terphenyl-d14	43.0	53.2	ug/L	81	(36%-121%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
No Tentatively Identified Compounds Found				ug/L		

# **Quality Control Summary**

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**Semi-Volatile**  
**Surrogate Recovery Report**

Page 1 of 1

**SDG Number: 2018-1201****Matrix Type: LIQUID**

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203936310	MB for batch 1725321	35	20	72	69	82	77
1203936311	LCS for batch 1725321	38	22	81	79	93	95
1203936312	BDW06-18-150416MS	52	37	79	78	89	102
1203936313	BDW06-18-150416MSD	47	32	70	69	76	86
439737004	CAWA-18-148944	33	19	71	61	77	81

**Surrogate****Acceptance Limits**

2FP	= 2-Fluorophenol	(15%-88%)
PHL	= Phenol-d5	(15%-91%)
NBZ	= Nitrobenzene-d5	(36%-115%)
FBP	= 2-Fluorobiphenyl	(32%-112%)
TBP	= 2,4,6-Tribromophenol	(32%-124%)
TPH	= p-Terphenyl-d14	(36%-121%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1725321

Matrix: WATER

Lab Sample ID 1203936311

Instrument: MSDA.I

Analysis Date: 12/12/2017 17:00

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1725321

Inj. Vol: 1 uL

Batch ID: 1725325

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
62-75-9	LCS N-Methyl-N-nitrosomethylamine	50.0	0.0	20.2	40	30-88
110-86-1	LCS Pyridine	50.0	0.0	20.3	41	27-89
62-53-3	LCS Aniline	50.0	0.0	36.2	72	49-112
108-95-2	LCS Phenol	50.0	0.0	11.4	23	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	40.2	80	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	36.3	73	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	32.3	65	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	32.6	65	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	34.3	69	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)ether	50.0	0.0	38.9	78	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	34.8	70	44-102
95-48-7	LCS o-Cresol	50.0	0.0	29.6	59	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	30.4	61	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	41.2	82	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	29.8	60	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	39.1	78	53-115
78-59-1	LCS Isophorone	50.0	0.0	38.3	77	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	42.1	84	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	32.9	66	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	39.8	80	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	41.3	83	53-109
65-85-0	LCS Benzoic acid	100	0.0	29.0	29	21-74

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1725321

Matrix: WATER

Lab Sample ID 1203936311

Instrument: MSDA.I

Analysis Date: 12/12/2017 17:00

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1725321

Inj. Vol: 1 uL

Batch ID: 1725325

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	LCS 4-Chloroaniline	50.0	0.0	49.9	100	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	31.9	64	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	40.8	82	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	37.3	75	42-103
91-20-3	LCS Naphthalene	50.0	0.0	37.2	74	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	38.6	77	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	22.9	46	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	41.8	84	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	43.0	86	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	39.0	78	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	42.9	86	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	53.6	107	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	44.0	88	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	43.1	86	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	45.0	90	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	41.1	82	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	43.4	87	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	36.5	73	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	42.4	85	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	44.8	90	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	44.7	89	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	11.3	23	15-137

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1725321

Matrix: WATER

Lab Sample ID 1203936311

Instrument: MSDA.I

Analysis Date: 12/12/2017 17:00

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1725321

Inj. Vol: 1 uL

Batch ID: 1725325

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	LCS Fluorene	50.0	0.0	42.2	84	52-114
7005-72-3	LCS 4-Chlorophenylphenylether	50.0	0.0	44.9	90	52-121
100-01-6	LCS 4-Nitroaniline	50.0	0.0	51.4	103	44-137
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	41.6	83	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	42.5	85	55-113
122-66-7	LCS Azobenzene	50.0	0.0	40.4	81	53-115
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	43.5	87	54-116
118-74-1	LCS Hexachlorobenzene	50.0	0.0	42.5	85	54-115
87-86-5	LCS Pentachlorophenol	50.0	0.0	49.6	99	41-116
85-01-8	LCS Phenanthrene	50.0	0.0	42.4	85	55-110
120-12-7	LCS Anthracene	50.0	0.0	43.1	86	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	44.7	89	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	43.3	87	54-118
129-00-0	LCS Pyrene	50.0	0.0	41.8	84	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	45.6	91	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	44.3	89	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	43.8	88	57-112
218-01-9	LCS Chrysene	50.0	0.0	44.7	89	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	43.8	88	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	42.4	85	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	43.5	87	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	43.6	87	40-118

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-1201

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1725321

Matrix: WATER

Lab Sample ID 1203936311

Instrument: MSDA.I

Analysis Date: 12/12/2017 17:00

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1725321

Inj. Vol: 1 uL

Batch ID: 1725325

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
193-39-5	LCS Indeno(1,2,3-cd)pyrene	50.0	0.0	50.7	101	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	51.9	104	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	47.5	95	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	22.4	45	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	40.1	80	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	36.8	74	44-102
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	43.0	86	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	35.9	72	39-99

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-1201

Sample Type: Matrix Spike

Client ID: BDW06-18-150416MS

Matrix: W

Lab Sample ID 1203936312

Instrument: MSDA.I

Analysis Date: 12/12/2017 18:21

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1725321

Inj. Vol: 1 uL

Batch ID: 1725325

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
62-75-9	MS N-Methyl-N-nitrosomethylamine	106	0.00 U	63.8	60	25-106
110-86-1	MS Pyridine	106	0.00 U	35.0	33	24-93
62-53-3	MS Aniline	106	0.00 U	72.8	68	37-113
108-95-2	MS Phenol	106	0.00 U	42.3	40	23-82
111-44-4	MS bis(2-Chloroethyl) ether	106	0.00 U	84.8	80	39-114
95-57-8	MS 2-Chlorophenol	106	0.00 U	81.0	76	37-108
541-73-1	MS 1,3-Dichlorobenzene	106	0.00 U	73.5	69	27-97
106-46-7	MS 1,4-Dichlorobenzene	106	0.00 U	74.2	70	28-97
95-50-1	MS 1,2-Dichlorobenzene	106	0.00 U	77.0	72	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)ether	106	0.00 U	83.2	78	32-127
100-51-6	MS Benzyl alcohol	106	0.00 U	85.8	81	37-116
95-48-7	MS o-Cresol	106	0.00 U	76.4	72	34-109
65794-96-9	MS m,p-Cresols	106	0.00 U	84.1	79	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	106	0.00 U	88.3	83	42-118
67-72-1	MS Hexachloroethane	106	0.00 U	71.4	67	29-94
98-95-3	MS Nitrobenzene	106	0.00 U	85.0	80	38-123
78-59-1	MS Isophorone	106	0.00 U	82.6	78	43-120
88-75-5	MS 2-Nitrophenol	106	0.00 U	88.6	83	39-115
105-67-9	MS 2,4-Dimethylphenol	106	0.00 U	73.9	69	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	106	0.00 U	85.9	81	42-118
120-83-2	MS 2,4-Dichlorophenol	106	0.00 U	89.7	84	40-111
65-85-0	MS Benzoic acid	213	0.00 U	110	52	17-95



Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Matrix Spike

Client ID: BDW06-18-150416MS

Matrix: W

Lab Sample ID 1203936312

Instrument: MSDA.I

Analysis Date: 12/12/2017 18:21

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1725321

Inj. Vol: 1 uL

Batch ID: 1725325

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS 4-Chloroaniline	106	0.00 U	104	98	44-138
87-68-3	MS Hexachlorobutadiene	106	0.00 U	78.6	74	26-98
59-50-7	MS Parachlorometa cresol 4-Chloro-3-methylphenol	106	0.00 U	90.6	85	41-122
91-57-6	MS 2-Methylnaphthalene	106	0.00 U	82.3	77	29-109
91-20-3	MS Naphthalene	106	0.00 U	81.8	77	31-108
90-12-0	MS 1-Methylnaphthalene	106	0.00 U	84.7	80	33-112
77-47-4	MS Hexachlorocyclopentadiene	106	0.00 U	54.7	51	26-79
88-06-2	MS 2,4,6-Trichlorophenol	106	0.00 U	88.5	83	39-124
95-95-4	MS 2,4,5-Trichlorophenol	106	0.00 U	90.6	85	42-120
91-58-7	MS 2-Chloronaphthalene	106	0.00 U	86.2	81	29-113
88-74-4	MS 2-Nitroaniline o-Nitroaniline	106	0.00 U	89.3	84	41-121
99-09-2	MS 3-Nitroaniline m-Nitroaniline	106	0.00 U	110	103	42-144
131-11-3	MS Dimethylphthalate	106	0.00 U	94.1	88	45-128
606-20-2	MS 2,6-Dinitrotoluene	106	0.00 U	91.0	86	46-124
121-14-2	MS 2,4-Dinitrotoluene	106	0.00 U	94.6	89	45-125
208-96-8	MS Acenaphthylene	106	0.00 U	88.8	83	35-120
83-32-9	MS Acenaphthene	106	0.00 U	94.2	89	35-117
51-28-5	MS 2,4-Dinitrophenol	106	0.00 U	67.7	64	27-122
132-64-9	MS Dibenzofuran	106	0.00 U	92.4	87	38-113
58-90-2	MS 2,3,4,6-Tetrachlorophenol	106	0.00 U	91.4	86	40-128
84-66-2	MS Diethylphthalate	106	0.00 U	94.5	89	43-127
100-02-7	MS 4-Nitrophenol	106	0.00 U	36.0	34	17-85

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Matrix Spike

Client ID: BDW06-18-150416MS

Matrix: W

Lab Sample ID 1203936312

Instrument: MSDA.I

Analysis Date: 12/12/2017 18:21

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1725321

Inj. Vol: 1 uL

Batch ID: 1725325

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS Fluorene	106	0.00 U	91.3	86	39-117
7005-72-3	MS 4-Chlorophenylphenylether	106	0.00 U	97.4	92	39-121
100-01-6	MS 4-Nitroaniline	106	0.00 U	102	96	30-133
534-52-1	MS 2-Methyl-4,6-dinitrophenol	106	0.00 U	79.9	75	32-126
122-39-4	MS Diphenylamine	106	0.00 U	91.7	86	37-118
122-66-7	MS Azobenzene	106	0.00 U	88.5	83	38-120
101-55-3	MS 4-Bromophenylphenylether	106	0.00 U	95.4	90	39-121
118-74-1	MS Hexachlorobenzene	106	0.00 U	92.8	87	40-118
87-86-5	MS Pentachlorophenol	106	0.00 U	100	94	35-121
85-01-8	MS Phenanthrene	106	0.00 U	90.3	85	40-115
120-12-7	MS Anthracene	106	0.00 U	91.0	86	38-120
84-74-2	MS Di-n-butylphthalate	106	0.00 U	93.5	88	41-128
206-44-0	MS Fluoranthene	106	0.00 U	88.9	84	41-119
129-00-0	MS Pyrene	106	0.00 U	99.0	93	35-128
85-68-7	MS Butylbenzylphthalate	106	0.00 U	103	96	40-129
117-81-7	MS bis(2-Ethylhexyl)phthalate	106	0.00 U	99.3	93	38-131
56-55-3	MS Benzo(a)anthracene	106	0.00 U	92.7	87	39-120
218-01-9	MS Chrysene	106	0.00 U	96.0	90	41-124
117-84-0	MS Di-n-octylphthalate	106	0.00 U	90.4	85	37-134
205-99-2	MS Benzo(b)fluoranthene	106	0.00 U	93.7	88	31-122
207-08-9	MS Benzo(k)fluoranthene	106	0.00 U	98.1	92	33-123
50-32-8	MS Benzo(a)pyrene	106	0.00 U	94.2	89	32-118

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Matrix Spike

Client ID: BDW06-18-150416MS

Matrix: W

Lab Sample ID 1203936312

Instrument: MSDA.I

Analysis Date: 12/12/2017 18:21

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1725321

Inj. Vol: 1 uL

Batch ID: 1725325

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
193-39-5	MS Indeno(1,2,3-cd)pyrene	106	0.00 U	97.4	92	27-121
53-70-3	MS Dibenzo(a,h)anthracene	106	0.00 U	96.0	90	30-125
191-24-2	MS Benzo(ghi)perylene	106	0.00 U	88.1	83	24-126
123-91-1	MS 1,4-Dioxane	106	0.00 U	63.7	60	24-110
930-55-2	MS N-Nitrosopyrrolidine	106	0.00 U	91.5	86	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	106	0.00 U	84.1	79	32-101
1912-24-9	MS Atrazine	106	0.00 U	102	96	42-129
92-87-5	MS Benzidine	213	0.00 U	50.7	24	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	106	0.00 U	81.1	76	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	106	0.00 U	81.2	76	26-102

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Matrix Spike Duplicate

Client ID: BDW06-18-150416MSD

Matrix: W

Lab Sample ID 1203936313

Instrument: MSDA.I

Analysis Date: 12/12/2017 18:48

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1725321

Inj. Vol: 1 uL

Batch ID: 1725325

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
62-75-9	MSD N-Methyl-N-nitrosomethylamine	106	0.00	U 47.8	45	25-106	29	0-30
110-86-1	MSD Pyridine	106	0.00	U 45.4	43	24-93	26	0-30
62-53-3	MSD Aniline	106	0.00	U 70.0	66	37-113	4	0-30
108-95-2	MSD Phenol	106	0.00	U 35.6	33	23-82	17	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	106	0.00	U 76.3	72	39-114	11	0-30
95-57-8	MSD 2-Chlorophenol	106	0.00	U 72.3	68	37-108	11	0-30
541-73-1	MSD 1,3-Dichlorobenzene	106	0.00	U 67.0	63	27-97	9	0-30
106-46-7	MSD 1,4-Dichlorobenzene	106	0.00	U 68.3	64	28-97	8	0-30
95-50-1	MSD 1,2-Dichlorobenzene	106	0.00	U 70.3	66	28-99	9	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)ether	106	0.00	U 74.1	70	32-127	12	0-30
100-51-6	MSD Benzyl alcohol	106	0.00	U 73.0	69	37-116	16	0-30
95-48-7	MSD o-Cresol	106	0.00	U 66.3	62	34-109	14	0-30
65794-96-9	MSD m,p-Cresols	106	0.00	U 72.9	69	36-120	14	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	106	0.00	U 76.9	72	42-118	14	0-30
67-72-1	MSD Hexachloroethane	106	0.00	U 63.7	60	29-94	11	0-30
98-95-3	MSD Nitrobenzene	106	0.00	U 74.2	70	38-123	14	0-30
78-59-1	MSD Isophorone	106	0.00	U 70.6	66	43-120	16	0-30
88-75-5	MSD 2-Nitrophenol	106	0.00	U 77.3	73	39-115	14	0-30
105-67-9	MSD 2,4-Dimethylphenol	106	0.00	U 62.5	59	39-107	17	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	106	0.00	U 74.9	70	42-118	14	0-30
120-83-2	MSD 2,4-Dichlorophenol	106	0.00	U 77.6	73	40-111	15	0-30
65-85-0	MSD Benzoic acid	213	0.00	U 89.0	42	17-95	21	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Matrix Spike Duplicate

Client ID: BDW06-18-150416MSD

Matrix: W

Lab Sample ID 1203936313

Instrument: MSDA.I

Analysis Date: 12/12/2017 18:48

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1725321

Inj. Vol: 1 uL

Batch ID: 1725325

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
106-47-8	MSD 4-Chloroaniline	106	0.00 U	93.2	88	44-138	11	0-30
87-68-3	MSD Hexachlorobutadiene	106	0.00 U	70.5	66	26-98	11	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	106	0.00 U	77.1	73	41-122	16	0-30
91-57-6	MSD 2-Methylnaphthalene	106	0.00 U	71.2	67	29-109	14	0-30
91-20-3	MSD Naphthalene	106	0.00 U	71.6	67	31-108	13	0-30
90-12-0	MSD 1-Methylnaphthalene	106	0.00 U	73.7	69	33-112	14	0-30
77-47-4	MSD Hexachlorocyclopentadiene	106	0.00 U	46.9	44	26-79	15	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	106	0.00 U	75.5	71	39-124	16	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	106	0.00 U	78.3	74	42-120	15	0-30
91-58-7	MSD 2-Chloronaphthalene	106	0.00 U	75.2	71	29-113	14	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	106	0.00 U	76.4	72	41-121	15	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	106	0.00 U	94.2	89	42-144	15	0-30
131-11-3	MSD Dimethylphthalate	106	0.00 U	79.4	75	45-128	17	0-30
606-20-2	MSD 2,6-Dinitrotoluene	106	0.00 U	76.5	72	46-124	17	0-30
121-14-2	MSD 2,4-Dinitrotoluene	106	0.00 U	79.3	75	45-125	18	0-30
208-96-8	MSD Acenaphthylene	106	0.00 U	76.9	72	35-120	14	0-30
83-32-9	MSD Acenaphthene	106	0.00 U	81.6	77	35-117	14	0-30
51-28-5	MSD 2,4-Dinitrophenol	106	0.00 U	59.2	56	27-122	13	0-30
132-64-9	MSD Dibenzofuran	106	0.00 U	78.7	74	38-113	16	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	106	0.00 U	77.4	73	40-128	17	0-30
84-66-2	MSD Diethylphthalate	106	0.00 U	79.6	75	43-127	17	0-30
100-02-7	MSD 4-Nitrophenol	106	0.00 U	30.1	28	17-85	18	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Matrix Spike Duplicate

Client ID: BDW06-18-150416MSD

Matrix: W

Lab Sample ID 1203936313

Instrument: MSDA.I

Analysis Date: 12/12/2017 18:48

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1725321

Inj. Vol: 1 uL

Batch ID: 1725325

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
86-73-7	MSD Fluorene	106	0.00 U	77.9	73	39-117	16	0-30
7005-72-3	MSD 4-Chlorophenylphenylether	106	0.00 U	83.6	79	39-121	15	0-30
100-01-6	MSD 4-Nitroaniline <i>p</i> -Nitroaniline	106	0.00 U	85.9	81	30-133	17	0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	106	0.00 U	68.3	64	32-126	16	0-30
122-39-4	MSD Diphenylamine	106	0.00 U	79.4	75	37-118	14	0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	106	0.00 U	76.5	72	38-120	15	0-30
101-55-3	MSD 4-Bromophenylphenylether	106	0.00 U	83.2	78	39-121	14	0-30
118-74-1	MSD Hexachlorobenzene	106	0.00 U	79.5	75	40-118	15	0-30
87-86-5	MSD Pentachlorophenol	106	0.00 U	82.0	77	35-121	20	0-30
85-01-8	MSD Phenanthrene	106	0.00 U	77.4	73	40-115	15	0-30
120-12-7	MSD Anthracene	106	0.00 U	77.9	73	38-120	16	0-30
84-74-2	MSD Di-n-butylphthalate	106	0.00 U	79.6	75	41-128	16	0-30
206-44-0	MSD Fluoranthene	106	0.00 U	76.8	72	41-119	15	0-30
129-00-0	MSD Pyrene	106	0.00 U	82.4	77	35-128	18	0-30
85-68-7	MSD Butylbenzylphthalate	106	0.00 U	86.7	81	40-129	17	0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	106	0.00 U	85.2	80	38-131	15	0-30
56-55-3	MSD Benzo(a)anthracene	106	0.00 U	78.1	73	39-120	17	0-30
218-01-9	MSD Chrysene	106	0.00 U	79.6	75	41-124	19	0-30
117-84-0	MSD Di-n-octylphthalate	106	0.00 U	76.1	72	37-134	17	0-30
205-99-2	MSD Benzo(b)fluoranthene	106	0.00 U	79.6	75	31-122	16	0-30
207-08-9	MSD Benzo(k)fluoranthene	106	0.00 U	81.4	77	33-123	19	0-30
50-32-8	MSD Benzo(a)pyrene	106	0.00 U	80.0	75	32-118	16	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-1201

Sample Type: Matrix Spike Duplicate

Client ID: BDW06-18-150416MSD

Matrix: W

Lab Sample ID 1203936313

Instrument: MSDA.I

Analysis Date: 12/12/2017 18:48

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1725321

Inj. Vol: 1 uL

Batch ID: 1725325

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	Acceptance RPD %	Acceptance Limits	
193-39-5	MSD	Indeno(1,2,3-cd)pyrene	106	0.00	U	85.3	80	27-121	13	0-30
53-70-3	MSD	Dibenzo(a,h)anthracene	106	0.00	U	85.3	80	30-125	12	0-30
191-24-2	MSD	Benzo(ghi)perylene	106	0.00	U	78.7	74	24-126	11	0-30
123-91-1	MSD	1,4-Dioxane	106	0.00	U	55.4	52	24-110	14	0-30
930-55-2	MSD	N-Nitrosopyrrolidine	106	0.00	U	78.3	74	47-119	16	0-30
95-94-3	MSD	1,2,4,5-Tetrachlorobenzene	106	0.00	U	73.9	69	32-101	13	0-30
1912-24-9	MSD	Atrazine	106	0.00	U	87.4	82	42-129	15	0-30
92-87-5	MSD	Benzidine	213	0.00	U	75.6	36	15-130	39 *	0-30
91-94-1	MSD	3,3'-Dichlorobenzidine	106	0.00	U	67.9	64	34-124	18	0-30
120-82-1	MSD	1,2,4-Trichlorobenzene	106	0.00	U	71.6	67	26-102	13	0-30

## Method Blank Summary

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SDG Number:	2018-1201	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1725321	Instrument ID:	MSDA.I	Data File:	121217.s\AL1217.D
Lab Sample ID:	1203936310	Prep Date:	12/12/2017 05:25	Analyzed:	12/12/17 16:33
Column:	DB-5ms				

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 1725321	1203936311	121217.s\AL1218.D	12/12/17	1700
02 BDW06-18-150416MS	1203936312	121217.s\AL1221.D	12/12/17	1821
03 BDW06-18-150416MSD	1203936313	121217.s\AL1222.D	12/12/17	1848
04 CAWA-18-148944	439737004	121317a.s\AL1317.D	12/13/17	1546



# Quality Control Data

**Semi-Volatile  
Certificate of Analysis  
Sample Summary**

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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203936310  
**Client Sample:** QC for batch 1725321  
**Client ID:** MB for batch 1725321  
**Batch ID:** 1725325  
**Run Date:** 12/12/2017 16:33  
**Prep Date:** 12/12/2017 05:25  
**Data File:** 121217.s\AL1217.D

**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 1000 mL  
**Column:** DB-5ms

**Matrix:** WATER  
**Project:** QC  
**SOP Ref:** GL-OA-E-009  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.00	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene	U	3.00	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
122-66-7	Azobenzene	U	3.00	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
123-91-1	1,4-Dioxane	U	3.00	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene	U	0.300	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.00	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol	U	3.00	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol	U	3.00	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol	U	3.00	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol	U	3.00	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol	U	5.00	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene	U	3.00	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene	U	3.00	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene	U	0.410	ug/L	0.410	1.00
95-57-8	2-Chlorophenol	U	3.00	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.00	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene	U	0.300	ug/L	0.300	1.00
88-75-5	2-Nitrophenol	U	3.00	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine	U	3.00	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether	U	3.00	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol	U	3.00	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.30	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether	U	3.00	ug/L	3.00	10.0
100-02-7	4-Nitrophenol	U	3.00	ug/L	3.00	10.0
83-32-9	Acenaphthene	U	0.300	ug/L	0.300	1.00
208-96-8	Acenaphthylene	U	0.300	ug/L	0.300	1.00
62-53-3	Aniline	U	4.20	ug/L	4.20	10.0
120-12-7	Anthracene	U	0.300	ug/L	0.300	1.00
1912-24-9	Atrazine	U	3.00	ug/L	3.00	10.0
92-87-5	Benzidine	U	3.90	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene	U	0.300	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene	U	0.300	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene	U	0.300	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene	U	0.300	ug/L	0.300	1.00

**Semi-Volatile  
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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203936310  
**Client Sample:** QC for batch 1725321  
**Client ID:** MB for batch 1725321  
**Batch ID:** 1725325  
**Run Date:** 12/12/2017 16:33  
**Prep Date:** 12/12/2017 05:25  
**Data File:** 121217.s\AL1217.D

**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 1000 mL  
**Column:** DB-5ms

**Matrix:** WATER  
**Project:** QC  
**SOP Ref:** GL-OA-E-009  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.300	ug/L	0.300	1.00
65-85-0	Benzoic acid	U	6.00	ug/L	6.00	20.0
100-51-6	Benzyl alcohol	U	3.00	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate	U	3.00	ug/L	3.00	10.0
218-01-9	Chrysene	U	0.300	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate	U	3.00	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate	U	3.00	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene	U	0.300	ug/L	0.300	1.00
132-64-9	Dibenzofuran	U	3.00	ug/L	3.00	10.0
84-66-2	Diethylphthalate	U	3.00	ug/L	3.00	10.0
131-11-3	Dimethylphthalate	U	3.00	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine	U	3.00	ug/L	3.00	10.0
206-44-0	Fluoranthene	U	0.300	ug/L	0.300	1.00
86-73-7	Fluorene	U	0.300	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene	U	3.00	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene	U	3.00	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene	U	3.00	ug/L	3.00	10.0
67-72-1	Hexachloroethane	U	3.00	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.300	ug/L	0.300	1.00
78-59-1	Isophorone	U	3.50	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.00	ug/L	3.00	10.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.00	ug/L	3.00	10.0
55-18-5	N-Nitrosodiethylamine	U	3.00	ug/L	3.00	10.0
621-64-7	N-Nitrosodi-n-propylamine	U	3.00	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.00	ug/L	3.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
98-95-3	Nitrobenzene	U	3.00	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol	U	3.00	ug/L	3.00	10.0
85-01-8	Phenanthrene	U	0.300	ug/L	0.300	1.00
108-95-2	Phenol	U	3.00	ug/L	3.00	10.0
129-00-0	Pyrene	U	0.300	ug/L	0.300	1.00
110-86-1	Pyridine	U	3.00	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.00	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane	U	3.00	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether	U	3.00	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.00	ug/L	3.00	10.0

**Semi-Volatile  
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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203936310  
**Client Sample:** QC for batch 1725321  
**Client ID:** MB for batch 1725321  
**Batch ID:** 1725325  
**Run Date:** 12/12/2017 16:33  
**Prep Date:** 12/12/2017 05:25  
**Data File:** 121217.s\AL1217.D

**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 1000 mL  
**Column:** DB-5ms

**Matrix:** WATER  
**Project:** QC  
**SOP Ref:** GL-OA-E-009  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	3.70	ug/L	3.70	10.0
99-09-2	3-Nitroaniline	U	3.00	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol	U	3.00	ug/L	3.00	10.0
88-74-4	2-Nitroaniline	U	3.00	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline	U	3.00	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	82.3	100	ug/L	82	(32%-124%)
2-Fluorobiphenyl	34.7	50.0	ug/L	69	(32%-112%)
2-Fluorophenol	34.9	100	ug/L	35	(15%-88%)
Nitrobenzene-d5	36.2	50.0	ug/L	72	(36%-115%)
Phenol-d5	20.1	100	ug/L	20	(15%-91%)
p-Terphenyl-d14	38.3	50.0	ug/L	77	(36%-121%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
No Tentatively Identified Compounds Found				ug/L		

**Semi-Volatile  
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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203936311  
**Client Sample:** QC for batch 1725321  
**Client ID:** LCS for batch 1725321  
**Batch ID:** 1725325  
**Run Date:** 12/12/2017 17:00  
**Prep Date:** 12/12/2017 05:25  
**Data File:** 121217.s\AL1218.D

**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 1000 mL  
**Column:** DB-5ms

**Matrix:** WATER  
**Project:** QC  
**SOP Ref:** GL-OA-E-009  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		36.8	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		35.9	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		34.3	ug/L	3.00	10.0
122-66-7	Azobenzene		40.4	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		32.3	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		32.6	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		22.4	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		38.6	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		44.8	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		43.0	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		41.8	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		41.3	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		32.9	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		36.5	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		45.0	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		43.1	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		39.0	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		36.3	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		41.6	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		37.3	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		42.1	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		43.0	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		43.5	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		40.8	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		49.9	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		44.9	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		11.3	ug/L	3.00	10.0
83-32-9	Acenaphthene		43.4	ug/L	0.300	1.00
208-96-8	Acenaphthylene		41.1	ug/L	0.300	1.00
62-53-3	Aniline		36.2	ug/L	4.20	10.0
120-12-7	Anthracene		43.1	ug/L	0.300	1.00
1912-24-9	Atrazine		46.0	ug/L	3.00	10.0
92-87-5	Benzidine		50.2	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		43.8	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		43.6	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		42.4	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		47.5	ug/L	0.300	1.00

**Semi-Volatile  
Certificate of Analysis  
Sample Summary**

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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203936311  
**Client Sample:** QC for batch 1725321  
**Client ID:** LCS for batch 1725321  
**Batch ID:** 1725325  
**Run Date:** 12/12/2017 17:00  
**Prep Date:** 12/12/2017 05:25  
**Data File:** 121217.s\AL1218.D

**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 1000 mL  
**Column:** DB-5ms

**Matrix:** WATER  
**Project:** QC  
**SOP Ref:** GL-OA-E-009  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		43.5	ug/L	0.300	1.00
65-85-0	Benzoic acid		29.0	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		34.8	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		45.6	ug/L	3.00	10.0
218-01-9	Chrysene		44.7	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		44.7	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		43.8	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		51.9	ug/L	0.300	1.00
132-64-9	Dibenzofuran		42.4	ug/L	3.00	10.0
84-66-2	Diethylphthalate		44.7	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		44.0	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		42.5	ug/L	3.00	10.0
206-44-0	Fluoranthene		43.3	ug/L	0.300	1.00
86-73-7	Fluorene		42.2	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		42.5	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		31.9	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		22.9	ug/L	3.00	10.0
67-72-1	Hexachloroethane		29.8	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		50.7	ug/L	0.300	1.00
78-59-1	Isophorone		38.3	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		20.2	ug/L	3.00	10.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.00	ug/L	3.00	10.0
55-18-5	N-Nitrosodiethylamine	U	3.00	ug/L	3.00	10.0
621-64-7	N-Nitrosodi-n-propylamine		41.2	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		40.1	ug/L	3.00	10.0
91-20-3	Naphthalene		37.2	ug/L	0.300	1.00
98-95-3	Nitrobenzene		39.1	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		49.6	ug/L	3.00	10.0
85-01-8	Phenanthrene		42.4	ug/L	0.300	1.00
108-95-2	Phenol		11.4	ug/L	3.00	10.0
129-00-0	Pyrene		41.8	ug/L	0.300	1.00
110-86-1	Pyridine		20.3	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		38.9	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		39.8	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		40.2	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		44.3	ug/L	3.00	10.0

**Semi-Volatile  
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Sample Summary**

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<b>SDG Number:</b> 2018-1201	<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 1203936311	
<b>Client Sample:</b> QC for batch 1725321	<b>Client:</b> ARSL004
<b>Client ID:</b> LCS for batch 1725321	<b>Method:</b> SW846 3510C/8270D
<b>Batch ID:</b> 1725325	<b>Inst:</b> MSDA.I
<b>Run Date:</b> 12/12/2017 17:00	<b>Analyst:</b> JMB3
<b>Prep Date:</b> 12/12/2017 05:25	<b>Aliquot:</b> 1000 mL
<b>Data File:</b> 121217.s\AL1218.D	<b>Column:</b> DB-5ms
	<b>Project:</b> QC
	<b>SOP Ref:</b> GL-OA-E-009
	<b>Dilution:</b> 1
	<b>Inj. Vol:</b> 1 uL
	<b>Final Volume:</b> 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		30.4	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		53.6	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		29.6	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		42.9	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		51.4	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	93.4	100	ug/L	93	(32%-124%)
2-Fluorobiphenyl	39.7	50.0	ug/L	79	(32%-112%)
2-Fluorophenol	37.6	100	ug/L	38	(15%-88%)
Nitrobenzene-d5	40.4	50.0	ug/L	81	(36%-115%)
Phenol-d5	21.9	100	ug/L	22	(15%-91%)
p-Terphenyl-d14	47.3	50.0	ug/L	95	(36%-121%)

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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203936312  
**Client Sample:** QC for batch 1725321  
**Client ID:** BDW06-18-150416MS  
**Batch ID:** 1725325  
**Run Date:** 12/12/2017 18:21  
**Prep Date:** 12/12/2017 05:25  
**Data File:** 121217.s\AL1221.D

**Date Collected:** 12/07/2017 09:45  
**Date Received:** 12/09/2017 09:00  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 470 mL  
**Column:** DB-5ms

**Matrix:** W  
**Project:** QC  
**SOP Ref:** GL-OA-E-009  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		84.1	ug/L	6.38	21.3
120-82-1	1,2,4-Trichlorobenzene		81.2	ug/L	6.38	21.3
95-50-1	1,2-Dichlorobenzene		77.0	ug/L	6.38	21.3
122-66-7	Azobenzene		88.5	ug/L	6.38	21.3
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		73.5	ug/L	6.38	21.3
106-46-7	1,4-Dichlorobenzene		74.2	ug/L	6.38	21.3
123-91-1	1,4-Dioxane		63.7	ug/L	6.38	21.3
90-12-0	1-Methylnaphthalene		84.7	ug/L	0.638	2.13
58-90-2	2,3,4,6-Tetrachlorophenol		91.4	ug/L	6.38	21.3
95-95-4	2,4,5-Trichlorophenol		90.6	ug/L	6.38	21.3
88-06-2	2,4,6-Trichlorophenol		88.5	ug/L	6.38	21.3
120-83-2	2,4-Dichlorophenol		89.7	ug/L	6.38	21.3
105-67-9	2,4-Dimethylphenol		73.9	ug/L	6.38	21.3
51-28-5	2,4-Dinitrophenol		67.7	ug/L	10.6	42.6
121-14-2	2,4-Dinitrotoluene		94.6	ug/L	6.38	21.3
606-20-2	2,6-Dinitrotoluene		91.0	ug/L	6.38	21.3
91-58-7	2-Chloronaphthalene		86.2	ug/L	0.872	2.13
95-57-8	2-Chlorophenol		81.0	ug/L	6.38	21.3
534-52-1	2-Methyl-4,6-dinitrophenol		79.9	ug/L	6.38	21.3
91-57-6	2-Methylnaphthalene		82.3	ug/L	0.638	2.13
88-75-5	2-Nitrophenol		88.6	ug/L	6.38	21.3
91-94-1	3,3'-Dichlorobenzidine		81.1	ug/L	6.38	21.3
101-55-3	4-Bromophenylphenylether		95.4	ug/L	6.38	21.3
59-50-7	Parachlorometa cresol		90.6	ug/L	6.38	21.3
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		104	ug/L	7.02	21.3
7005-72-3	4-Chlorophenylphenylether		97.4	ug/L	6.38	21.3
100-02-7	4-Nitrophenol		36.0	ug/L	6.38	21.3
83-32-9	Acenaphthene		94.2	ug/L	0.638	2.13
208-96-8	Acenaphthylene		88.8	ug/L	0.638	2.13
62-53-3	Aniline		72.8	ug/L	8.94	21.3
120-12-7	Anthracene		91.0	ug/L	0.638	2.13
1912-24-9	Atrazine		102	ug/L	6.38	21.3
92-87-5	Benzidine		50.7	ug/L	8.30	21.3
56-55-3	Benzo(a)anthracene		92.7	ug/L	0.638	2.13
50-32-8	Benzo(a)pyrene		94.2	ug/L	0.638	2.13
205-99-2	Benzo(b)fluoranthene		93.7	ug/L	0.638	2.13
191-24-2	Benzo(ghi)perylene		88.1	ug/L	0.638	2.13



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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203936312  
**Client Sample:** QC for batch 1725321  
**Client ID:** BDW06-18-150416MS  
**Batch ID:** 1725325  
**Run Date:** 12/12/2017 18:21  
**Prep Date:** 12/12/2017 05:25  
**Data File:** 121217.s\AL1221.D

**Date Collected:** 12/07/2017 09:45  
**Date Received:** 12/09/2017 09:00  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 470 mL  
**Column:** DB-5ms

**Matrix:** W  
**Project:** QC  
**SOP Ref:** GL-OA-E-009  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		98.1	ug/L	0.638	2.13
65-85-0	Benzoic acid		110	ug/L	12.8	42.6
100-51-6	Benzyl alcohol		85.8	ug/L	6.38	21.3
85-68-7	Butylbenzylphthalate		103	ug/L	6.38	21.3
218-01-9	Chrysene		96.0	ug/L	0.638	2.13
84-74-2	Di-n-butylphthalate		93.5	ug/L	6.38	21.3
117-84-0	Di-n-octylphthalate		90.4	ug/L	6.38	21.3
53-70-3	Dibenzo(a,h)anthracene		96.0	ug/L	0.638	2.13
132-64-9	Dibenzofuran		92.4	ug/L	6.38	21.3
84-66-2	Diethylphthalate		94.5	ug/L	6.38	21.3
131-11-3	Dimethylphthalate		94.1	ug/L	6.38	21.3
88-85-7	Dinoseb	U	6.38	ug/L	6.38	21.3
122-39-4	Diphenylamine		91.7	ug/L	6.38	21.3
206-44-0	Fluoranthene		88.9	ug/L	0.638	2.13
86-73-7	Fluorene		91.3	ug/L	0.638	2.13
118-74-1	Hexachlorobenzene		92.8	ug/L	6.38	21.3
87-68-3	Hexachlorobutadiene		78.6	ug/L	6.38	21.3
77-47-4	Hexachlorocyclopentadiene		54.7	ug/L	6.38	21.3
67-72-1	Hexachloroethane		71.4	ug/L	6.38	21.3
193-39-5	Indeno(1,2,3-cd)pyrene		97.4	ug/L	0.638	2.13
78-59-1	Isophorone		82.6	ug/L	7.45	21.3
62-75-9	N-Methyl-N-nitrosomethylamine		63.8	ug/L	6.38	21.3
924-16-3	N-Nitrosodi-n-butylamine	U	6.38	ug/L	6.38	21.3
55-18-5	N-Nitrosodiethylamine	U	6.38	ug/L	6.38	21.3
621-64-7	N-Nitrosodi-n-propylamine		88.3	ug/L	6.38	21.3
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		91.5	ug/L	6.38	21.3
91-20-3	Naphthalene		81.8	ug/L	0.638	2.13
98-95-3	Nitrobenzene		85.0	ug/L	6.38	21.3
608-93-5	Pentachlorobenzene	U	6.38	ug/L	6.38	21.3
87-86-5	Pentachlorophenol		100	ug/L	6.38	21.3
85-01-8	Phenanthrene		90.3	ug/L	0.638	2.13
108-95-2	Phenol		42.3	ug/L	6.38	21.3
129-00-0	Pyrene		99.0	ug/L	0.638	2.13
110-86-1	Pyridine		35.0	ug/L	6.38	21.3
108-60-1	bis(2-Chloro-1-methylethyl)ether		83.2	ug/L	6.38	21.3
111-91-1	bis(2-Chloroethoxy)methane		85.9	ug/L	6.38	21.3
111-44-4	bis(2-Chloroethyl) ether		84.8	ug/L	6.38	21.3
117-81-7	bis(2-Ethylhexyl)phthalate		99.3	ug/L	6.38	21.3

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<b>SDG Number:</b> 2018-1201	<b>Date Collected:</b> 12/07/2017 09:45	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203936312	<b>Date Received:</b> 12/09/2017 09:00	
<b>Client Sample:</b> QC for batch 1725321	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> BDW06-18-150416MS	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Batch ID:</b> 1725325	<b>Inst:</b> MSDA.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/12/2017 18:21	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 12/12/2017 05:25	<b>Aliquot:</b> 470 mL	<b>Final Volume:</b> 1 mL
<b>Data File:</b> 121217.s\AL1221.D	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		84.1	ug/L	7.87	21.3
99-09-2	3-Nitroaniline		110	ug/L	6.38	21.3
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		76.4	ug/L	6.38	21.3
88-74-4	2-Nitroaniline		89.3	ug/L	6.38	21.3
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		102	ug/L	6.38	21.3
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	189	213	ug/L	89	(32%-124%)
2-Fluorobiphenyl	82.6	106	ug/L	78	(32%-112%)
2-Fluorophenol	111	213	ug/L	52	(15%-88%)
Nitrobenzene-d5	83.8	106	ug/L	79	(36%-115%)
Phenol-d5	79.3	213	ug/L	37	(15%-91%)
p-Terphenyl-d14	108	106	ug/L	102	(36%-121%)

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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203936313  
**Client Sample:** QC for batch 1725321  
**Client ID:** BDW06-18-150416MSD  
**Batch ID:** 1725325  
**Run Date:** 12/12/2017 18:48  
**Prep Date:** 12/12/2017 05:25  
**Data File:** 121217.s\AL1222.D

**Date Collected:** 12/07/2017 09:45  
**Date Received:** 12/09/2017 09:00  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 470 mL  
**Column:** DB-5ms

**Matrix:** W  
**Project:** QC  
**SOP Ref:** GL-OA-E-009  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		73.9	ug/L	6.38	21.3
120-82-1	1,2,4-Trichlorobenzene		71.6	ug/L	6.38	21.3
95-50-1	1,2-Dichlorobenzene		70.3	ug/L	6.38	21.3
122-66-7	Azobenzene		76.5	ug/L	6.38	21.3
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		67.0	ug/L	6.38	21.3
106-46-7	1,4-Dichlorobenzene		68.3	ug/L	6.38	21.3
123-91-1	1,4-Dioxane		55.4	ug/L	6.38	21.3
90-12-0	1-Methylnaphthalene		73.7	ug/L	0.638	2.13
58-90-2	2,3,4,6-Tetrachlorophenol		77.4	ug/L	6.38	21.3
95-95-4	2,4,5-Trichlorophenol		78.3	ug/L	6.38	21.3
88-06-2	2,4,6-Trichlorophenol		75.5	ug/L	6.38	21.3
120-83-2	2,4-Dichlorophenol		77.6	ug/L	6.38	21.3
105-67-9	2,4-Dimethylphenol		62.5	ug/L	6.38	21.3
51-28-5	2,4-Dinitrophenol		59.2	ug/L	10.6	42.6
121-14-2	2,4-Dinitrotoluene		79.3	ug/L	6.38	21.3
606-20-2	2,6-Dinitrotoluene		76.5	ug/L	6.38	21.3
91-58-7	2-Chloronaphthalene		75.2	ug/L	0.872	2.13
95-57-8	2-Chlorophenol		72.3	ug/L	6.38	21.3
534-52-1	2-Methyl-4,6-dinitrophenol		68.3	ug/L	6.38	21.3
91-57-6	2-Methylnaphthalene		71.2	ug/L	0.638	2.13
88-75-5	2-Nitrophenol		77.3	ug/L	6.38	21.3
91-94-1	3,3'-Dichlorobenzidine		67.9	ug/L	6.38	21.3
101-55-3	4-Bromophenylphenylether		83.2	ug/L	6.38	21.3
59-50-7	Parachlorometa cresol		77.1	ug/L	6.38	21.3
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		93.2	ug/L	7.02	21.3
7005-72-3	4-Chlorophenylphenylether		83.6	ug/L	6.38	21.3
100-02-7	4-Nitrophenol		30.1	ug/L	6.38	21.3
83-32-9	Acenaphthene		81.6	ug/L	0.638	2.13
208-96-8	Acenaphthylene		76.9	ug/L	0.638	2.13
62-53-3	Aniline		70.0	ug/L	8.94	21.3
120-12-7	Anthracene		77.9	ug/L	0.638	2.13
1912-24-9	Atrazine		87.4	ug/L	6.38	21.3
92-87-5	Benzidine		75.6	ug/L	8.30	21.3
56-55-3	Benzo(a)anthracene		78.1	ug/L	0.638	2.13
50-32-8	Benzo(a)pyrene		80.0	ug/L	0.638	2.13
205-99-2	Benzo(b)fluoranthene		79.6	ug/L	0.638	2.13
191-24-2	Benzo(ghi)perylene		78.7	ug/L	0.638	2.13

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**SDG Number:** 2018-1201  
**Lab Sample ID:** 1203936313  
**Client Sample:** QC for batch 1725321  
**Client ID:** BDW06-18-150416MSD  
**Batch ID:** 1725325  
**Run Date:** 12/12/2017 18:48  
**Prep Date:** 12/12/2017 05:25  
**Data File:** 121217.s\AL1222.D

**Date Collected:** 12/07/2017 09:45  
**Date Received:** 12/09/2017 09:00  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 470 mL  
**Column:** DB-5ms

**Matrix:** W  
**Project:** QC  
**SOP Ref:** GL-OA-E-009  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		81.4	ug/L	0.638	2.13
65-85-0	Benzoic acid		89.0	ug/L	12.8	42.6
100-51-6	Benzyl alcohol		73.0	ug/L	6.38	21.3
85-68-7	Butylbenzylphthalate		86.7	ug/L	6.38	21.3
218-01-9	Chrysene		79.6	ug/L	0.638	2.13
84-74-2	Di-n-butylphthalate		79.6	ug/L	6.38	21.3
117-84-0	Di-n-octylphthalate		76.1	ug/L	6.38	21.3
53-70-3	Dibenzo(a,h)anthracene		85.3	ug/L	0.638	2.13
132-64-9	Dibenzofuran		78.7	ug/L	6.38	21.3
84-66-2	Diethylphthalate		79.6	ug/L	6.38	21.3
131-11-3	Dimethylphthalate		79.4	ug/L	6.38	21.3
88-85-7	Dinoseb	U	6.38	ug/L	6.38	21.3
122-39-4	Diphenylamine		79.4	ug/L	6.38	21.3
206-44-0	Fluoranthene		76.8	ug/L	0.638	2.13
86-73-7	Fluorene		77.9	ug/L	0.638	2.13
118-74-1	Hexachlorobenzene		79.5	ug/L	6.38	21.3
87-68-3	Hexachlorobutadiene		70.5	ug/L	6.38	21.3
77-47-4	Hexachlorocyclopentadiene		46.9	ug/L	6.38	21.3
67-72-1	Hexachloroethane		63.7	ug/L	6.38	21.3
193-39-5	Indeno(1,2,3-cd)pyrene		85.3	ug/L	0.638	2.13
78-59-1	Isophorone		70.6	ug/L	7.45	21.3
62-75-9	N-Methyl-N-nitrosomethylamine		47.8	ug/L	6.38	21.3
924-16-3	N-Nitrosodi-n-butylamine	U	6.38	ug/L	6.38	21.3
55-18-5	N-Nitrosodiethylamine	U	6.38	ug/L	6.38	21.3
621-64-7	N-Nitrosodi-n-propylamine		76.9	ug/L	6.38	21.3
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		78.3	ug/L	6.38	21.3
91-20-3	Naphthalene		71.6	ug/L	0.638	2.13
98-95-3	Nitrobenzene		74.2	ug/L	6.38	21.3
608-93-5	Pentachlorobenzene	U	6.38	ug/L	6.38	21.3
87-86-5	Pentachlorophenol		82.0	ug/L	6.38	21.3
85-01-8	Phenanthrene		77.4	ug/L	0.638	2.13
108-95-2	Phenol		35.6	ug/L	6.38	21.3
129-00-0	Pyrene		82.4	ug/L	0.638	2.13
110-86-1	Pyridine		45.4	ug/L	6.38	21.3
108-60-1	bis(2-Chloro-1-methylethyl)ether		74.1	ug/L	6.38	21.3
111-91-1	bis(2-Chloroethoxy)methane		74.9	ug/L	6.38	21.3
111-44-4	bis(2-Chloroethyl) ether		76.3	ug/L	6.38	21.3
117-81-7	bis(2-Ethylhexyl)phthalate		85.2	ug/L	6.38	21.3

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<b>SDG Number:</b> 2018-1201	<b>Date Collected:</b> 12/07/2017 09:45	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203936313	<b>Date Received:</b> 12/09/2017 09:00	
<b>Client Sample:</b> QC for batch 1725321	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> BDW06-18-150416MSD	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Batch ID:</b> 1725325	<b>Inst:</b> MSDA.I	<b>Dilution:</b> 1
<b>Run Date:</b> 12/12/2017 18:48	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 12/12/2017 05:25	<b>Aliquot:</b> 470 mL	<b>Final Volume:</b> 1 mL
<b>Data File:</b> 121217.s\AL1222.D	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		72.9	ug/L	7.87	21.3
99-09-2	3-Nitroaniline		94.2	ug/L	6.38	21.3
	<i>m</i> -Nitroaniline					
95-48-7	o-Cresol		66.3	ug/L	6.38	21.3
88-74-4	2-Nitroaniline		76.4	ug/L	6.38	21.3
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline		85.9	ug/L	6.38	21.3
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	162	213	ug/L	76	(32%-124%)
2-Fluorobiphenyl	73.3	106	ug/L	69	(32%-112%)
2-Fluorophenol	99.4	213	ug/L	47	(15%-88%)
Nitrobenzene-d5	74.9	106	ug/L	70	(36%-115%)
Phenol-d5	67.2	213	ug/L	32	(15%-91%)
p-Terphenyl-d14	91.6	106	ug/L	86	(36%-121%)

# **Perchlorates by LCMSMS Analysis**

# Case Narrative

**Perchlorates by LCMSMS  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1201  
Work Order #: 439737**

**Method/Analysis Information**

**Procedure:** **Definitive Low Level Perchlorate Analysis Utilizing Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS) by EPA Method 6850 Modified (6850M)**

Analytical Method: SW-846:6850

Prep Method: SW-846:6850

Analytical Batch Number: 1725618

Prep Batch Number: 1725614

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
439737004	439737004 (CAWA-18-148944)
439737007	439737007 (CAWA-18-148916)
1203937027	Interference Check Sample (ICS)
1203937013	Method Blank (MB)
1203937014	Laboratory Control Sample (LCS)
1203937015	439736001(CALA-18-150111) Matrix Spike (MS)
1203937016	439736001(CALA-18-150111) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

**Preparation/Analytical Method Verification**

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-067 REV# 14.



## **Calibration Information**

### **Initial Calibration**

All initial calibration requirements have been met for this SDG. Due to software constraints, all Initial Calibration Blanks must be designated as IPB001.

### **ICV Requirements**

All associated initial calibration verification standard(s) (ICV) met the acceptance criteria.

### **CCB Requirements**

All continuing calibration blanks (CCB) bracketing the analyses associated with this batch were within acceptance criteria.

### **CCV Requirements**

All continuing calibration checks (CCV) requirements were met by all bracketing CCV standards.

### **Low Level Standard (CRI) Requirements**

All low level calibration verification (CRI) requirements were met by all bracketing CRI standards.

## **Quality Control (QC) Information**

### **Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

### **Interference Check Sample (ICS)**

The ICS spike recoveries met the acceptance criteria.

### **QC Sample Designation**

Client sample 439736001 (CALA-18-150111) was chosen for matrix spike and matrix spike duplicate analysis.

### **Matrix Spike (MS) Recovery Statement**

One or more of the required spiking analytes were not within the acceptance limits in the matrix spike (MS). 1203937015 (CALA-18-150111MS) recovered Perchlorate-101 at 74%. The acceptance range is from 75-125%. The non-conforming recovery was attributed to the background concentration in the parent sample, 439736001 (CALA-18-150111). The LCS and MSD were within the acceptance ranges.

### **MS/MSD Relative Percent Difference (RPD) Statement**

The RPDs between the MS and MSD met the acceptance limits.

### **Internal Standard Area Acceptance**

The internal standard areas were within the required acceptance criteria for all samples and QC.

### **Retention Time**

During the analysis of Perchlorate by LC/MS/MS, retention time shifts are commonly observed. These retention time shifts, which are caused by fouling of the column by the sample matrices, are problematic when the retention time is used as one of the criterion for confirmation. To overcome this problem, a known amount of O(18) labeled Perchlorate was added to each sample as a retention time standard. The presence of Perchlorate was confirmed by the relative retention time (RRT) of the Perchlorate peak and the O(18) standard. A RRT window of 0.98 to 1.02, as required by DOD QSM 5.0, has been used. In addition to the isotopic ratio, the presence of Perchlorate in the samples associated with this data package have been confirmed using the relative retention criteria stated above, not the absolute retention time.

## **Technical Information**

### **Holding Time Specifications**

All samples in this SDG in this analytical batch met the specified holding time. GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

### **Sample Dilutions**

The samples in this SDG did not require dilutions.

### **Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG.

## **Miscellaneous Information**

### **Manual Integrations**

Manual integrations were not required for any data file associated with this SDG.

### **Method Comments**

The samples in this SDG were not originally analyzed using EPA Method 314.0.

### **Additional Comments**

The Perchlorate Isotope Ratio on the Form I may differ slightly from the ratio on the corresponding raw data due to rounding rules and/or significant figures or due to software limitations when there are manual integrations, dilutions or other factors. The ratio value of the Form I is the correct value. The retention time marker, Perchlorate-O (18), is added to all samples, instrument blanks, and standards prior to injection. It is used to verify the retention time of Perchlorate and Perchlorate-101 and to insure an accurate injection occurred. Due to various anions affecting the recovery of Perchlorate-O (18) and not Perchlorate and Perchlorate-101, the calibration curves of Perchlorate and Perchlorate-101 are internally corrected for using Perchlorate-O (18).

### **Perchlorate Isotope Ratio**

The Perchlorate isotope ratio met acceptance criteria for all samples and QC samples. Please see the isotope ratio criteria in the Miscellaneous Section.

## **System Configuration**

The laboratory utilizes a Waters LC 2795 liquid chromatography instrument for Perchlorate analysis. It is coupled with a Micromass Quattro Ultima Mass Spectrometer/Mass Spectrometer. It is designated as LCMSMS #2. It is fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis. The laboratory may also utilize an Agilent 1100 liquid chromatography instrument for Perchlorate analysis. It is coupled with an Applied Biosystems 4000 Mass Spectrometer/Mass Spectrometer, designated as LCMSMS #3 or LCMSMS #4. It is also fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis.

### **Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An

electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **Chromatographic Columns**

The LC-MS/MS Perchlorate analysis was performed on a Quatro Ultima LC/MS/MS.

Chromatographic separation of Perchlorate is accomplished through analysis on the following anion column:

Dionex: IonPac AG-16 2 x 50 mm.

### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

### Qualifier Definition Report for

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2018-1201 GEL Work Order: 439737

#### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

#### Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Michael Penny

Date: 15 DEC 2017

Title: Group Leader

# **Sample Data Summary**

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1725614Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-18-148944Date Received: 09-DEC-17GEL Job No (SDG): 2018-1201GEL Sample ID: 439737004Date Filtered: 12-DEC-17Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.050	ug/L	U	1	13-DEC-17 19:15	per1213026a
	Perchlorate Isotope Ratio						1	13-DEC-17 19:15	per1213026a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	13-DEC-17 19:15	per1213026a
	Perchlorate-O(18)			0.466	ug/L		1	13-DEC-17 19:15	per1213026a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1725614Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-18-148916Date Received: 09-DEC-17GEL Job No (SDG): 2018-1201GEL Sample ID: 439737007Date Filtered: 12-DEC-17Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.289	ug/L		1	13-DEC-17 19:24	per1213027a
	Perchlorate Isotope Ratio			2.99			1	13-DEC-17 19:24	per1213027a
14797-73-0	Perchlorate-101	.05	.2	0.283	ug/L		1	13-DEC-17 19:24	per1213027a
	Perchlorate-O(18)			0.475	ug/L		1	13-DEC-17 19:24	per1213027a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

# **Quality Control Summary**



**Perchlorate Laboratory Control Sample**

**Lab Name:** General Engineering Laboratories

**Lab Code:** GEL

**GEL Job No. (SDG):** 2018-1201

**Extract Batch Code:** 1725614

**Date Filtered:** 12-DEC-17

**Matrix:** WATER

**Sample ID:** 1203937014

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.194	ug/L	97		85 - 115
Perchlorate Isotope Ratio		3.14				-
Perchlorate-101	0.200	.181	ug/L	90		85 - 115
Perchlorate-O(18)		.499	ug/L			-

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

### Perchlorate Spike/Spike Duplicate Summary

**Lab Name:** General Engineering Laboratories

**Lab Code:** GEL

**GEL Job No (SDG):** 2018-1201

**Extract Batch Code:** 1725614

**Date Extracted:** 12-DEC-17

**GEL MS/PS ID:** 1203937015

**Client ID:** CALA-18-150111

**GEL MSD/PSD ID:** 1203937016

**QC Type:** MS

Compound^	Spike Added	Sample Conc	Units	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Recovery Limit
Perchlorate	0.200	0.471	ug/L	0.666	98	.675	102	1	30	75 - 125
Perchlorate Isotope Ratio	0	3.07		3.27		3.06		7		-
Perchlorate-101	0.200	0.449	ug/L	0.596	74 *	.645	98	8	30	75 - 125
Perchlorate-O(18)	0	0.510	ug/L	0.514		.485		6		-

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

# Quality Control Data

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1725614Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 12-DEC-17GEL Job No (SDG): 2018-1201GEL Sample ID: 1203937013Date Filtered: 12-DEC-17Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.050	ug/L	U	1	13-DEC-17 17:18	per1213013a
	Perchlorate Isotope Ratio						1	13-DEC-17 17:18	per1213013a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	13-DEC-17 17:18	per1213013a
	Perchlorate-O(18)			0.469	ug/L		1	13-DEC-17 17:18	per1213013a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1725614Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 12-DEC-17GEL Job No (SDG): 2018-1201GEL Sample ID: 1203937014Date Filtered: 12-DEC-17Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.194	ug/L	J	1	13-DEC-17 17:27	per1213014a
	Perchlorate Isotope Ratio			3.14			1	13-DEC-17 17:27	per1213014a
14797-73-0	Perchlorate-101	.05	.2	0.181	ug/L	J	1	13-DEC-17 17:27	per1213014a
	Perchlorate-O(18)			0.499	ug/L		1	13-DEC-17 17:27	per1213014a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1725614Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2018-1201GEL Sample ID: 1203937027Date Filtered: 12-DEC-17Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.228	ug/L		1	13-DEC-17 17:36	per1213015a
	Perchlorate Isotope Ratio			2.78			1	13-DEC-17 17:36	per1213015a
14797-73-0	Perchlorate-101	.05	.2	0.240	ug/L		1	13-DEC-17 17:36	per1213015a
	Perchlorate-O(18)			0.504	ug/L		1	13-DEC-17 17:36	per1213015a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1725614Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CALA-18-150111MSDate Received: 09-DEC-17GEL Job No (SDG): 2018-1201GEL Sample ID: 1203937015Date Filtered: 12-DEC-17Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.666	ug/L		1	13-DEC-17 18:21	per1213020a
	Perchlorate Isotope Ratio			3.27			1	13-DEC-17 18:21	per1213020a
14797-73-0	Perchlorate-101	.05	.2	0.596	ug/L		1	13-DEC-17 18:21	per1213020a
	Perchlorate-O(18)			0.514	ug/L		1	13-DEC-17 18:21	per1213020a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1725614Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CALA-18-150111MSDDate Received: 09-DEC-17GEL Job No (SDG): 2018-1201GEL Sample ID: 1203937016Date Filtered: 12-DEC-17Injection Volume (uL): 20%Solids:     

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.675	ug/L		1	13-DEC-17 18:30	per1213021a
	Perchlorate Isotope Ratio			3.06			1	13-DEC-17 18:30	per1213021a
14797-73-0	Perchlorate-101	.05	.2	0.645	ug/L		1	13-DEC-17 18:30	per1213021a
	Perchlorate-O(18)			0.485	ug/L		1	13-DEC-17 18:30	per1213021a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

\*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$



# **Explosives by LCMSMS Analysis**

# Case Narrative

**Explosives by LCMSMS  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1201  
Work Order #: 439737**

**Method/Analysis Information**

**Procedure:**                   **The Processing, Extraction, and Analysis of Nitroaromatics, Nitroamines, and Nitrate Esters by SW-846 8330B**

Analytical Method:       SW846 3535A/8330B

Prep Method:               SW846 3535A

Analytical Batch  
Number:                   1725853

Prep Batch Number:       1725851

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW846 3535A/8330B:

<b>Sample ID</b>	<b>Client ID</b>
439737001	CAWA-18-148901
439737002	CAWA-18-148945
439737003	CAWA-18-148912
439737005	CAWA-18-148944
439737006	CAWA-18-148915
1203937558	Method Blank (MB)
1203937559	Laboratory Control Sample (LCS)
1203937560	439737001(CAWA-18-148901) Matrix Spike (MS)
1203937561	439737001(CAWA-18-148901) Matrix Spike Duplicate (MSD)

**Preparation/Analytical Method Verification**

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-068 REV# 7.

**Calibration Information**

**Initial Calibration**

All initial calibration requirements for this analysis have been met for this SDG.

**Calibration Verification Standard Requirements**

All calibration verification standards (ICV or CCV) have not met requirements of 80-120% for samples in this SDG. Please refer to Form 7 of the data package for a list of recoveries. Since the recoveries are biased high and target analytes were not detected in the associated samples, the data are considered unaffected. The data are

reported.

#### **Calibration Blank Requirements**

All initial and continuing calibration blanks (ICB and CCB) bracketing the analyses associated with this batch for this analysis were within acceptance criteria. Due to software limitations, the CCBs and/or the ICBs may have a concentration for target analytes in the Found column. These values should be zero.

#### **CRI Requirements**

All low level calibration verification (CRI) requirements for this analysis were met by all bracketing CRI standards.

#### **Quality Control (QC) Information**

##### **Method Blank (MB) Statement**

The MB analyzed with this SDG for this analysis met the acceptance criteria.

##### **Surrogate Recoveries**

All the surrogate recoveries were within the established acceptance criteria in this SDG in this analytical batch for this analysis.

##### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries were within the established acceptance limits.

##### **QC Sample Designation**

Client sample 439737001 (CAWA-18-148901) was chosen for matrix spike and matrix spike duplicate analysis.

##### **Matrix Spike (MS) Recovery Statement**

The MS and/or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. Because the recoveries were biased high and target analytes were not detected in the associated samples, the data were reported.

Sample	Analyte	Value
1203937560 (CAWA-18-148901MS)	2, 4-Diamino-6-nitrotoluene	146* (50%-121%)
	2, 6-Diamino-4-nitrotoluene	133* (53%-127%)

##### **MS/MSD Relative Percent Difference (RPD) Statement**

The RPD values between the MS and MSD (See Below) were not within the acceptance limits. Since all other RPD values met acceptance criteria, the noted exceptions are attributed to vagaries in the extraction process. The data are reported.

Sample	Analyte	Value
1203937560MS and 1203937561MSD (CAWA-18-148901)	2, 6-Diamino-4-nitrotoluene	RPD 34* (0%-30%)

##### **Internal Standard (ISTD) Acceptance**

The internal standard responses were within the required acceptance criteria for all samples and QC in this SDG.

#### **Technical Information**

##### **Holding Time Specifications**

All samples in this SDG in this analytical batch met the specified holding time. GEL assigns holding times based

on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

#### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

#### **Sample Dilutions**

In accordance with GEL SOP GL-OA-056, all sample and QC extracts are diluted 1:1 v/v with LC reagent grade Water. The samples in this SDG in this analytical batch for this analysis did not require any additional dilutions.

#### **Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG in this analytical batch for this analysis.

#### **Miscellaneous Information**

##### **Manual Integrations**

Manual integrations were not required for any data file associated with this SDG.

##### **Additional Comments**

Due to software limitations, all initial calibration blanks must be designated as XIB001 in order for the forms to be correct. Due to software limitations, file extensions such as DL, RE, etc. may not appear on the generated forms and/or raw data. Relative Retention Time (RRT) is used by the laboratory to establish peak identity. The RRT of each target analyte is calculated using the retention time of the corresponding internal standard. The RRT of each analyte in a sample must be within 2.0 of the analyte's calculated RRT in the ICV.

##### **System Configuration**

The laboratory utilizes an Agilent 1100 liquid chromatography instrument for either Primary or Secondary analyte analysis. It is coupled with an Applied Biosystems 4000 Mass Spectrometer/ Mass Spectrometer, designated as either LC/MS/MS #3 or LC/MS/MS #4. The laboratory also utilizes a Shimadzu Nexera XC liquid chromatography instrument for Primary and/or Secondary analyte analysis. It is coupled with an Applied Biosystems 5500 Mass Spectrometer/ Mass Spectrometer, designated as LC/MS/MS #5. All are fitted with an APCI (Atmospheric Pressure Chemical Ionization) probe that is operated in the negative ionization mode for both the Primary and Secondary analyte analysis.

##### **Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

##### **Chromatographic Columns**

The LC-MS/MS Explosives analysis was performed on a ABSciex 5500 LCMSMS.

The detection of the Primary and Secondary Nitroaromatic and Nitramine analytes is accomplished through analysis on the following reversed phase column:

Phenomenex: Ultracarb 5u ODS (20), 250 x 4.60 mm ID.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

### Qualifier Definition Report for

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2018-1201 GEL Work Order: 439737

#### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

#### Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Michael Penny

Date: 20 DEC 2017

Title: Group Leader

# **Sample Data Summary**



1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148901

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 439737001

Sample Amount 930 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1213030.wiff

Date Analyzed: 14-DEC-17 03:29

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.086	U	0.086	0.269
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.086	U	0.086	0.269
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
13980-04-6	TNX	.086	U	0.086	0.269
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.086	U	0.086	0.269
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.086	U	0.086	0.269
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.086	U	0.086	0.269
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.086	U	0.086	0.538
<i>479-45-8</i>	<i>Tetryl</i>				
5755-27-1	MNX	.086	U	0.086	0.269
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.086	U	0.086	0.269
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.086	U	0.086	0.269
<i>80251-29-2</i>	<i>DNX</i>				
98-95-3	Nitrobenzene	.086	U	0.086	0.269
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.086	U	0.086	0.269
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-65-0	m-Dinitrobenzene	.086	U	0.086	0.269
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148901

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 439737001

Sample Amount 930 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
88-72-2	o-Nitrotoluene	.0882	U	0.0882	0.269
88-72-2	<i>o-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.0936	J	0.086	0.269
99-35-4	<i>1,3,5-Trinitrobenzene</i>				
78-11-5	PETN	.108	U	0.108	0.538
78-11-5	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.161	U	0.161	0.538
99-99-0	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	.323	U	0.323	1.08
3058-38-6	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	.323	U	0.323	1.08
618-87-1	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	.323	U	0.323	1.08
78-30-8	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	.538	U	0.538	2.69
59229-75-3	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	.538	U	0.538	2.69
6629-29-4	<i>2,4-Diamino-6-nitrotoluene</i>				
121-82-4	RDX	.939		0.086	0.269
121-82-4	<i>RDX</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148945

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 439737002

Sample Amount 940 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1213033.wiff

Date Analyzed: 14-DEC-17 05:15

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.0851	U	0.0851	0.266
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.0851	U	0.0851	0.266
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
13980-04-6	TNX	.0851	U	0.0851	0.266
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.0851	U	0.0851	0.266
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.0851	U	0.0851	0.266
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.0851	U	0.0851	0.266
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.0851	U	0.0851	0.532
<i>479-45-8</i>	<i>Tetryl</i>				
5755-27-1	MNX	.0851	U	0.0851	0.266
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.0851	U	0.0851	0.266
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.0851	U	0.0851	0.266
<i>80251-29-2</i>	<i>DNX</i>				
98-95-3	Nitrobenzene	.0851	U	0.0851	0.266
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.0851	U	0.0851	0.266
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-65-0	m-Dinitrobenzene	.0851	U	0.0851	0.266
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148945

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 439737002

Sample Amount 940 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
88-72-2	o-Nitrotoluene	.0872	U	0.0872	0.266
88-72-2	<i>o-Nitrotoluene</i>				
78-11-5	PETN	.106	U	0.106	0.532
78-11-5	<i>PETN</i>				
99-35-4	1,3,5-Trinitrobenzene	.111	J	0.0851	0.266
99-35-4	<i>1,3,5-Trinitrobenzene</i>				
99-99-0	p-Nitrotoluene	.16	U	0.160	0.532
99-99-0	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	.319	U	0.319	1.06
3058-38-6	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	.319	U	0.319	1.06
618-87-1	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	.319	U	0.319	1.06
78-30-8	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	.532	U	0.532	2.66
59229-75-3	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	.532	U	0.532	2.66
6629-29-4	<i>2,4-Diamino-6-nitrotoluene</i>				
121-82-4	RDX	1.01		0.0851	0.266
121-82-4	<i>RDX</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148912

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 439737003

Sample Amount 890 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1213034.wiff

Date Analyzed: 14-DEC-17 05:50

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.0899	U	0.0899	0.281
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.0899	U	0.0899	0.281
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.0899	U	0.0899	0.281
<i>121-82-4</i>	<i>RDX</i>				
13980-04-6	TNX	.0899	U	0.0899	0.281
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.0899	U	0.0899	0.281
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.0899	U	0.0899	0.281
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.0899	U	0.0899	0.281
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.0899	U	0.0899	0.562
<i>479-45-8</i>	<i>Tetryl</i>				
5755-27-1	MNX	.0899	U	0.0899	0.281
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.0899	U	0.0899	0.281
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.0899	U	0.0899	0.281
<i>80251-29-2</i>	<i>DNX</i>				
98-95-3	Nitrobenzene	.0899	U	0.0899	0.281
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.0899	U	0.0899	0.281
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148912

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 439737003

Sample Amount 890 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-35-4	1,3,5-Trinitrobenzene	.0899	U	0.0899	0.281
99-35-4	1,3,5-Trinitrobenzene				
99-65-0	m-Dinitrobenzene	.0899	U	0.0899	0.281
99-65-0	m-Dinitrobenzene				
88-72-2	o-Nitrotoluene	.0921	U	0.0921	0.281
88-72-2	o-Nitrotoluene				
78-11-5	PETN	.112	U	0.112	0.562
78-11-5	PETN				
99-99-0	p-Nitrotoluene	.169	U	0.169	0.562
99-99-0	p-Nitrotoluene				
3058-38-6	TATB	.337	U	0.337	1.12
3058-38-6	TATB				
618-87-1	3,5-Dinitroaniline	.337	U	0.337	1.12
618-87-1	3,5-Dinitroaniline				
78-30-8	tris(o-cresyl) phosphate	.337	U	0.337	1.12
78-30-8	tris(o-cresyl) phosphate				
59229-75-3	2,6-Diamino-4-nitrotoluene	.562	U	0.562	2.81
59229-75-3	2,6-Diamino-4-nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	.562	U	0.562	2.81
6629-29-4	2,4-Diamino-6-nitrotoluene				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148944

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 439737005

Sample Amount 920 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1213035.wiff

Date Analyzed: 14-DEC-17 06:25

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.087	U	0.087	0.272
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.087	U	0.087	0.272
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.087	U	0.087	0.272
<i>121-82-4</i>	<i>RDX</i>				
13980-04-6	TNX	.087	U	0.087	0.272
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.087	U	0.087	0.272
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.087	U	0.087	0.272
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.087	U	0.087	0.272
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.087	U	0.087	0.543
<i>479-45-8</i>	<i>Tetryl</i>				
5755-27-1	MNX	.087	U	0.087	0.272
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.087	U	0.087	0.272
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.087	U	0.087	0.272
<i>80251-29-2</i>	<i>DNX</i>				
98-95-3	Nitrobenzene	.087	U	0.087	0.272
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.087	U	0.087	0.272
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148944

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 439737005

Sample Amount 920 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-35-4	1,3,5-Trinitrobenzene	.087	U	0.087	0.272
99-35-4	1,3,5-Trinitrobenzene				
99-65-0	m-Dinitrobenzene	.087	U	0.087	0.272
99-65-0	m-Dinitrobenzene				
88-72-2	o-Nitrotoluene	.0891	U	0.0891	0.272
88-72-2	o-Nitrotoluene				
78-11-5	PETN	.109	U	0.109	0.543
78-11-5	PETN				
99-99-0	p-Nitrotoluene	.163	U	0.163	0.543
99-99-0	p-Nitrotoluene				
3058-38-6	TATB	.326	U	0.326	1.09
3058-38-6	TATB				
618-87-1	3,5-Dinitroaniline	.326	U	0.326	1.09
618-87-1	3,5-Dinitroaniline				
78-30-8	tris(o-cresyl) phosphate	.326	U	0.326	1.09
78-30-8	tris(o-cresyl) phosphate				
59229-75-3	2,6-Diamino-4-nitrotoluene	.543	U	0.543	2.72
59229-75-3	2,6-Diamino-4-nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	.543	U	0.543	2.72
6629-29-4	2,4-Diamino-6-nitrotoluene				



1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148915

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 439737006

Sample Amount 930 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1213036.wiff

Date Analyzed: 14-DEC-17 07:00

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.086	U	0.086	0.269
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.086	U	0.086	0.269
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.086	U	0.086	0.269
<i>121-82-4</i>	<i>RDX</i>				
13980-04-6	TNX	.086	U	0.086	0.269
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.086	U	0.086	0.269
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.086	U	0.086	0.269
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.086	U	0.086	0.269
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.086	U	0.086	0.538
<i>479-45-8</i>	<i>Tetryl</i>				
5755-27-1	MNX	.086	U	0.086	0.269
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.086	U	0.086	0.269
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.086	U	0.086	0.269
<i>80251-29-2</i>	<i>DNX</i>				
98-95-3	Nitrobenzene	.086	U	0.086	0.269
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.086	U	0.086	0.269
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148915

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 439737006

Sample Amount 930 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-35-4	1,3,5-Trinitrobenzene	.086	U	0.086	0.269
99-35-4	1,3,5-Trinitrobenzene				
99-65-0	m-Dinitrobenzene	.086	U	0.086	0.269
99-65-0	m-Dinitrobenzene				
88-72-2	o-Nitrotoluene	.0882	U	0.0882	0.269
88-72-2	o-Nitrotoluene				
78-11-5	PETN	.108	U	0.108	0.538
78-11-5	PETN				
99-99-0	p-Nitrotoluene	.161	U	0.161	0.538
99-99-0	p-Nitrotoluene				
3058-38-6	TATB	.323	U	0.323	1.08
3058-38-6	TATB				
618-87-1	3,5-Dinitroaniline	.323	U	0.323	1.08
618-87-1	3,5-Dinitroaniline				
78-30-8	tris(o-cresyl) phosphate	.323	U	0.323	1.08
78-30-8	tris(o-cresyl) phosphate				
59229-75-3	2,6-Diamino-4-nitrotoluene	.538	U	0.538	2.69
59229-75-3	2,6-Diamino-4-nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	.538	U	0.538	2.69
6629-29-4	2,4-Diamino-6-nitrotoluene				

# **Quality Control Summary**

**High Explosives Surrogate Recovery Summary****Lab Name:** GEL Laboratories LLC**GEL Job No (SDG):** 2018-1201**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
439737001	CAWA-18-148901	110	55 - 115	
439737002	CAWA-18-148945	100	55 - 115	
439737003	CAWA-18-148912	92	55 - 115	
439737005	CAWA-18-148944	96	55 - 115	
439737006	CAWA-18-148915	94	55 - 115	
1203937558	MB for batch 1725851	99	55 - 115	
1203937559	LCS for batch 1725851	88	55 - 115	
1203937560	CAWA-18-148901MS	98	55 - 115	
1203937561	CAWA-18-148901MSD	85	55 - 115	

DNT = 3,4-Dinitrotoluene

**3B**  
**High Explosives LCS/LCS Duplicate Summary**

**Lab Name:** GEL Laboratories LLC

**Client ID:** LCS

**Lab Code:** GEL

**GEL Job No (SDG)** 2018-1201

**Extract Batch Code:** 1725851

**Date Extracted:** 13-DEC-17

**GEL LCS ID:** 1203937559

**GEL LCSDUP ID:**

**Analysis Date/Time:** 14-DEC-17 02:54

**DUP Analysis Date/Time:**

**Reporting Units:** ug/L

**QC Type:** LCS/LCSD

Compound	Spike Added	LCS Conc	LCS Rec #	LCSD Conc	LCSD Rec #	RPD #	RPD	Recovery Limits
3,5-Dinitroaniline	5	4.17	83					70 - 121
4-Amino-2,6-dinitrotoluene	5	4.64	93					74 - 116
DNX	.5	.425	85					65 - 113
HMX	5	4.31	86					58 - 113
MNX	.5	.467	93					66 - 114
Nitrobenzene	5	4.28	86					64 - 115
PETN	5	4.33	87					57 - 126
RDX	5	4.74	95					64 - 117
TATB	3	2.19	73					47 - 135
TNX	.5	.445	89					51 - 110
Tetryl	5	4.33	87					55 - 122
m-Dinitrobenzene	5	4.77	95					74 - 117
m-Nitrotoluene	5	4.7	94					66 - 114
o-Nitrotoluene	5	4.73	95					64 - 115
p-Nitrotoluene	5	5.07	101					66 - 127
tris(o-cresyl) phosphate	5	3.59	72					43 - 104
1,3,5-Trinitrobenzene	5	4.42	88					70 - 110
2,4,6-Trinitrotoluene	5	4.68	94					69 - 113
2,4-Diamino-6-nitrotoluene	5	5.67	113					50 - 121
2,4-Dinitrotoluene	5	4.41	88					71 - 110
2,6-Diamino-4-nitrotoluene	5	5.25	105					53 - 127
2,6-Dinitrotoluene	5	4.08	82					72 - 105
2-Amino-4,6-dinitrotoluene	5	4.78	96					70 - 112

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

**3**  
**High Explosives MS/MSD Summary**

**Lab Name:** GEL Laboratories LLC

**Client ID:** CAWA-18-148901

**Lab Code:** GEL

**GEL Job No (SDG)** 2018-1201

**Extract Batch Code:** 1725851

**Date Extracted:** 13-DEC-17

**GEL Spike ID:** 1203937560

**GEL SpikeDup ID:** 1203937561

**Analysis Date/Time:** 14-DEC-17 04:05

**MSD Analysis Date/Time:** 14-DEC-17 04:40

**Reporting Units:** ug/L

**QC Type:** MS/MSD

Compound	Spike Added	Sample Conc	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Rec Limits
2,4-Diamino-6-nitrotoluene	5.26316	0	7.7	146 *	5.94	112	26	30	50 - 121
2,4-Dinitrotoluene	5.26316	0	5.31	101	4.39	83	19	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.26316	0	7.01	133 *	4.99	94	34 *	30	53 - 127
2,6-Dinitrotoluene	5.26316	0	4.81	91	4.87	91	1	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.26316	0	4.63	88	4.61	87	0	30	67 - 115
3,5-Dinitroaniline	5.26316	0	4.77	91	4.52	85	5	30	70 - 121
4-Amino-2,6-dinitrotoluene	5.26316	0	5.15	98	4.86	91	6	30	65 - 120
DNX	.52632	0	.596	113	.494	93	19	30	53 - 124
HMX	5.26316	.0591	5.8	109	5.59	104	4	30	44 - 128
MNX	.52632	0	.548	104	.535	101	2	30	60 - 121
Nitrobenzene	5.26316	0	4.77	91	4.71	89	1	30	62 - 116
PETN	5.26316	0	5.35	102	5.09	96	5	30	51 - 131
RDX	5.26316	.939	7.16	118	5.99	95	18	30	57 - 125
TATB	3.15789	0	2.6	82	2.9	91	11	30	38 - 149
TNX	.52632	0	.54	103	.496	93	9	30	46 - 120
Tetryl	5.26316	0	5.7	108	4.76	89	18	30	50 - 126
m-Dinitrobenzene	5.26316	0	5.68	108	5.18	97	9	30	74 - 117
m-Nitrotoluene	5.26316	0	4.77	91	5	94	5	30	59 - 120
o-Nitrotoluene	5.26316	0	3.97	75	4.8	90	19	30	56 - 119
p-Nitrotoluene	5.26316	0	5.13	97	4.62	87	10	30	61 - 129
tris(o-cresyl) phosphate	5.26316	0	4.56	87	4.66	88	2	30	38 - 105
1,3,5-Trinitrobenzene	5.26316	.0936	5.31	99	4.71	87	12	30	67 - 111
2,4,6-Trinitrotoluene	5.26316	0	5.1	97	4.74	89	7	30	66 - 112

#Column to be used to flag recovery and RPD values with an asterisk

# Quality Control Data

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1725851

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 1203937558

Sample Amount 1000 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1213028.wiff

Date Analyzed: 14-DEC-17 02:19

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.08	U	0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.08	U	0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.08	U	0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
13980-04-6	TNX	.08	U	0.080	0.250
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.08	U	0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.08	U	0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.08	U	0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.08	U	0.080	0.500
<i>479-45-8</i>	<i>Tetryl</i>				
5755-27-1	MNX	.08	U	0.080	0.250
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.08	U	0.080	0.250
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.08	U	0.080	0.250
<i>80251-29-2</i>	<i>DNX</i>				
98-95-3	Nitrobenzene	.08	U	0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.08	U	0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				



1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1725851

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 1203937558

Sample Amount 1000 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-35-4	1,3,5-Trinitrobenzene	.08	U	0.080	0.250
99-35-4	1,3,5-Trinitrobenzene				
99-65-0	m-Dinitrobenzene	.08	U	0.080	0.250
99-65-0	m-Dinitrobenzene				
88-72-2	o-Nitrotoluene	.082	U	0.082	0.250
88-72-2	o-Nitrotoluene				
78-11-5	PETN	.1	U	0.100	0.500
78-11-5	PETN				
99-99-0	p-Nitrotoluene	.15	U	0.150	0.500
99-99-0	p-Nitrotoluene				
3058-38-6	TATB	.3	U	0.300	1.00
3058-38-6	TATB				
618-87-1	3,5-Dinitroaniline	.3	U	0.300	1.00
618-87-1	3,5-Dinitroaniline				
78-30-8	tris(o-cresyl) phosphate	.3	U	0.300	1.00
78-30-8	tris(o-cresyl) phosphate				
59229-75-3	2,6-Diamino-4-nitrotoluene	.5	U	0.500	2.50
59229-75-3	2,6-Diamino-4-nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	.5	U	0.500	2.50
6629-29-4	2,4-Diamino-6-nitrotoluene				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1725851

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 1203937559

Sample Amount 1000 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1213029.wiff

Date Analyzed: 14-DEC-17 02:54

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
80251-29-2	DNX	.425		0.080	0.250
<i>80251-29-2</i>	<i>DNX</i>				
13980-04-6	TNX	.445		0.080	0.250
<i>13980-04-6</i>	<i>TNX</i>				
5755-27-1	MNX	.467		0.080	0.250
<i>5755-27-1</i>	<i>MNX</i>				
3058-38-6	TATB	2.19		0.300	1.00
<i>3058-38-6</i>	<i>TATB</i>				
78-30-8	tris(o-cresyl) phosphate	3.59		0.300	1.00
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
606-20-2	2,6-Dinitrotoluene	4.08		0.080	0.250
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
618-87-1	3,5-Dinitroaniline	4.17		0.300	1.00
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
98-95-3	Nitrobenzene	4.28		0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
2691-41-0	HMX	4.31		0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
479-45-8	Tetryl	4.33		0.080	0.500
<i>479-45-8</i>	<i>Tetryl</i>				
78-11-5	PETN	4.33		0.100	0.500
<i>78-11-5</i>	<i>PETN</i>				
121-14-2	2,4-Dinitrotoluene	4.41		0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	4.42		0.080	0.250
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1725851

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 1203937559

Sample Amount 1000 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
19406-51-0	4-Amino-2,6-dinitrotoluene	4.64		0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	4.68		0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
99-08-1	m-Nitrotoluene	4.7		0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
88-72-2	o-Nitrotoluene	4.73		0.082	0.250
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
121-82-4	RDX	4.74		0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
99-65-0	m-Dinitrobenzene	4.77		0.080	0.250
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.78		0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
99-99-0	p-Nitrotoluene	5.07		0.150	0.500
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	5.25		0.500	2.50
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	5.67		0.500	2.50
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148901(439737001MS)MS

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 1203937560

Sample Amount 950 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1213031.wiff

Date Analyzed: 14-DEC-17 04:05

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
13980-04-6	TNX	.54		0.0842	0.263
<i>13980-04-6</i>	<i>TNX</i>				
5755-27-1	MNX	.548		0.0842	0.263
<i>5755-27-1</i>	<i>MNX</i>				
80251-29-2	DNX	.596		0.0842	0.263
<i>80251-29-2</i>	<i>DNX</i>				
3058-38-6	TATB	2.6		0.316	1.05
<i>3058-38-6</i>	<i>TATB</i>				
88-72-2	o-Nitrotoluene	3.97		0.0863	0.263
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
78-30-8	tris(o-cresyl) phosphate	4.56		0.316	1.05
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.63		0.0842	0.263
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
618-87-1	3,5-Dinitroaniline	4.77		0.316	1.05
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
98-95-3	Nitrobenzene	4.77		0.0842	0.263
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	4.77		0.0842	0.263
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	4.81		0.0842	0.263
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	5.1		0.0842	0.263
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
99-99-0	p-Nitrotoluene	5.13		0.158	0.526
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148901(439737001MS)MS

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 1203937560

Sample Amount 950 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
19406-51-0	4-Amino-2,6-dinitrotoluene	5.15		0.0842	0.263
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	5.31		0.0842	0.263
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	5.31		0.0842	0.263
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
78-11-5	PETN	5.35		0.105	0.526
<i>78-11-5</i>	<i>PETN</i>				
99-65-0	m-Dinitrobenzene	5.68		0.0842	0.263
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
479-45-8	Tetryl	5.7		0.0842	0.526
<i>479-45-8</i>	<i>Tetryl</i>				
2691-41-0	HMX	5.8		0.0842	0.263
<i>2691-41-0</i>	<i>HMX</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	7.01		0.526	2.63
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
121-82-4	RDX	7.16		0.0842	0.263
<i>121-82-4</i>	<i>RDX</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	7.7		0.526	2.63
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148901(439737001MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 1203937561

Sample Amount 940 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP1213032.wiff

Date Analyzed: 14-DEC-17 04:40

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
80251-29-2	DNX	.494		0.0851	0.266
80251-29-2	DNX				
13980-04-6	TNX	.496		0.0851	0.266
13980-04-6	TNX				
5755-27-1	MNX	.535		0.0851	0.266
5755-27-1	MNX				
3058-38-6	TATB	2.9		0.319	1.06
3058-38-6	TATB				
121-14-2	2,4-Dinitrotoluene	4.39		0.0851	0.266
121-14-2	2,4-Dinitrotoluene				
618-87-1	3,5-Dinitroaniline	4.52		0.319	1.06
618-87-1	3,5-Dinitroaniline				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.61		0.0851	0.266
35572-78-2	2-Amino-4,6-dinitrotoluene				
99-99-0	p-Nitrotoluene	4.62		0.160	0.532
99-99-0	p-Nitrotoluene				
78-30-8	tris(o-cresyl) phosphate	4.66		0.319	1.06
78-30-8	tris(o-cresyl) phosphate				
98-95-3	Nitrobenzene	4.71		0.0851	0.266
98-95-3	Nitrobenzene				
99-35-4	1,3,5-Trinitrobenzene	4.71		0.0851	0.266
99-35-4	1,3,5-Trinitrobenzene				
118-96-7	2,4,6-Trinitrotoluene	4.74		0.0851	0.266
118-96-7	2,4,6-Trinitrotoluene				
479-45-8	Tetryl	4.76		0.0851	0.532
479-45-8	Tetryl				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-148901(439737001MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2018-1201

Matrix: WATER

GEL Sample ID: 1203937561

Sample Amount 940 mL

Date Received: 09-DEC-17

Moisture: .

Extraction Batch ID: 1725851

Extraction Type Sol Exchange

Date Extracted: 13-DEC-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
88-72-2	o-Nitrotoluene	4.8		0.0872	0.266
88-72-2	<i>o-Nitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.86		0.0851	0.266
19406-51-0	<i>4-Amino-2,6-dinitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	4.87		0.0851	0.266
606-20-2	<i>2,6-Dinitrotoluene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.99		0.532	2.66
59229-75-3	<i>2,6-Diamino-4-nitrotoluene</i>				
99-08-1	m-Nitrotoluene	5		0.0851	0.266
99-08-1	<i>m-Nitrotoluene</i>				
78-11-5	PETN	5.09		0.106	0.532
78-11-5	<i>PETN</i>				
99-65-0	m-Dinitrobenzene	5.18		0.0851	0.266
99-65-0	<i>m-Dinitrobenzene</i>				
2691-41-0	HMX	5.59		0.0851	0.266
2691-41-0	<i>HMX</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	5.94		0.532	2.66
6629-29-4	<i>2,4-Diamino-6-nitrotoluene</i>				
121-82-4	RDX	5.99		0.0851	0.266
121-82-4	<i>RDX</i>				

## Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2018-1201Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 13-DEC-17 10:31GEL Data File: EXP1213001.wiffInstrument ID: LCMSMS7Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0



## Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2018-1201Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 13-DEC-17 11:06GEL Data File: EXP1213002.wiffInstrument ID: LCMSMS7Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0

4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1201

Lab Code: GEL

Lab Sample ID: XIBLK02

Analysis Date: 13-DEC-17 15:47

GEL Data File: EXP1213010.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0

**4A**  
**Explosives Continuing Calibration Blank**

**Lab Name:** GEL Laboratories LLC

**GEL Job No(SDG):** 2018-1201

**Lab Code:** GEL

**Lab Sample ID:** XIBLK03

**Analysis Date:** 13-DEC-17 18:07

**GEL Data File:** EXP1213014.wiff

**Instrument ID:** LCMSMS7

**Column:** Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MXN	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0

4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1201

Lab Code: GEL

Lab Sample ID: XIBLK04

Analysis Date: 13-DEC-17 23:24

GEL Data File: EXP1213023.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0

4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1201

Lab Code: GEL

Lab Sample ID: XIBLK05

Analysis Date: 14-DEC-17 00:34

GEL Data File: EXP1213025.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MXN	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0

4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1201

Lab Code: GEL

Lab Sample ID: XIBLK06

Analysis Date: 14-DEC-17 01:44

GEL Data File: EXP1213027.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0

4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1201

Lab Code: GEL

Lab Sample ID: XIBLK07

Analysis Date: 14-DEC-17 07:35

GEL Data File: EXP1213037.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0

4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1201

Lab Code: GEL

Lab Sample ID: XIBLK08

Analysis Date: 14-DEC-17 08:45

GEL Data File: EXP1213039.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0



# Metals Analysis

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**ARS International, LLC (ARSL)**  
**SDG #: 2018-1201**  
**Work Order #: 439737**

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
439737006	CAWA-18-148915
439737007	CAWA-18-148916
1203935513	Method Blank (MB) <b>ICP</b>
1203935514	Laboratory Control Sample (LCS)
1203935517	439736002(CALA-18-150113L) Serial Dilution (SD)
1203935515	439736002(CALA-18-150113D) Sample Duplicate (DUP)
1203935516	439736002(CALA-18-150113S) Matrix Spike (MS)
1203935533	Method Blank (MB) <b>ICP-MS</b>
1203935534	Laboratory Control Sample (LCS)
1203935537	439736002(CALA-18-150113L) Serial Dilution (SD)
1203935535	439736002(CALA-18-150113D) Sample Duplicate (DUP)
1203935536	439736002(CALA-18-150113S) Matrix Spike (MS)
1203945549	Method Blank (MB) <b>CVAA</b>
1203945550	Laboratory Control Sample (LCS)
1203945555	439736002(CALA-18-150113L) Serial Dilution (SD)
1203945551	439736002(CALA-18-150113D) Sample Duplicate (DUP)
1203945553	439736002(CALA-18-150113S) Matrix Spike (MS)

**Sample Analysis**

Samples 439737004,006 and 007 in this SDG were analyzed for metals and mercury on an "as received" basis.

**Method/Analysis Information**

<b>Analytical Batch:</b>	1725086, 1725094, 1728992 and 1729029
<b>Prep Batch :</b>	1725085, 1725093 and 1728991
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 30, GL-MA-E-006 REV# 14, GL-MA-E-014 REV# 32, GL-MA-E-010 REV# 36 and GL-GC-E-107 REV# 10
<b>Analytical Method:</b>	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
<b>Prep Method :</b>	SW846 3005A and EPA 245.1/245.2 Prep

**Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

**System Configuration**

The Hardness as CaCO<sub>3</sub> is calculated from Calcium and Magnesium results.

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

The Metals analysis-ICP was performed on a PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm.

The Metals analysis - ICPMS was performed on a PerkinElmer NexION 350X ICPMS. The instrument is equipped with a ESI PFA-ST nebulizer, quadrupole mass spectrometer, dual mode electron multiplier detector, and Kinetic Energy Discrimination (KED) technology. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

#### **Calibration Information**

##### **Instrument Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

##### **CRDL/PQL Requirements**

The CRDL/PQL standard recoveries met the referenced advisory control limits.

##### **ICSA/ICSAB Statement**

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria. For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

##### **Continuing Calibration Blanks (CCB) Requirements**

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

##### **Continuing Calibration Verification (CCV) Requirements**

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

#### **Quality Control (QC) Information**

##### **Method Blank (MB) Statement**

The MBs analyzed with this SDG met the acceptance criteria.

##### **Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

##### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

##### **Quality Control (QC) Sample Statement**

The following samples were selected as the quality control (QC) samples for this SDG: 439736002 (CALA-18-150113)-ICP, ICP-MS and CVAA.

**Matrix Spike (MS/MSD) Recovery Statement**

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. The relative percent differences (RPD) between the sample and its duplicate (DUP) were within acceptable limits for all applicable analytes.

**Serial Dilution % Difference Statement**

All applicable analytes in the serial dilution (SDILT) demonstrated acceptable correlation to its associated sample and met the established acceptance percent difference criteria.

**Technical Information****Holding Time Specifications**

GEL assigns holding times based on the associated methodology. Holding time is measured by comparison of the date and time of sample collection to the date and time of sample preparation and analysis. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Preparation Information**

The samples in this SDG were not diluted and were prepared according to the cited SOP.

**Miscellaneous Information****Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

**Additional Comments**

Total Hardness by Calculation is determined using the results of Total Calcium (Ca) and Total Magnesium (Mg) determined by ICP or ICP-MS.

$$\text{Hardness} = 2.497 (\text{Ca}) + 4.118 (\text{Mg})$$

Please refer to the Total Ca and Total Mg data to validate results appearing on the Hardness Summary sheet. Both results are in the Inorganic/metals section of the package. There is no Batch QC for calculated results, and thus no QC

Summary for the Hardness by Calculation Batch. The MDLs and PQLs are calculated using the higher of the two calculated values of Ca or Mg.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

## **GEL LABORATORIES LLC**

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

### **Qualifier Definition Report for**

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2018-1201 GEL Work Order: 439737

#### **The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

#### **Review/Validation**

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

**Signature:**



**Name: Jamie Johnson**

**Date: 05 JAN 2018**

**Title: Group Leader**

# **Sample Data Summary**



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**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** 2018-1201**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 439737004**BASIS:** As Received**DATE COLLECTED** 06-DEC-17**CLIENT ID:** CAWA-18-148944**LEVEL:** Low**DATE RECEIVED** 09-DEC-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	AXS5	12/28/17 10:22	122817W1-5	1728992

**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

SDG No: 2018-1201

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 439737004

BASIS: As Received

DATE COLLECTED 06-DEC-17

CLIENT ID: CAWA-18-148944

LEVEL: Low

DATE RECEIVED 09-DEC-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	12/28/17 21:18	171228-3	1725094
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	12/28/17 21:18	171228-3	1725094
7440-39-3	Barium	1	ug/L	U	1	5	5	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	12/28/17 21:18	171228-3	1725094
7440-70-2	Calcium	50	ug/L	U	50	200	200	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	12/28/17 21:18	171228-3	1725094
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	12/28/17 21:18	171228-3	1725094
7439-95-4	Magnesium	110	ug/L	U	110	300	300	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7439-98-7	Molybdenum	0.20	ug/L	U	0.2	0.5	0.5	1	MS	BAJ	12/28/17 21:18	171228-3	1725094
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	12/28/17 21:18	171228-3	1725094
7440-09-7	Potassium	50	ug/L	U	50	150	150	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	12/29/17 13:29	171229-4	1725094
7631-86-9	Silica	53	ug/L	U	53	213	213	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	12/28/17 21:18	171228-3	1725094
7440-23-5	Sodium	100	ug/L	U	100	300	300	1	P	HSC	12/13/17 11:38	121317-2	1725086
7440-24-6	Strontium	1	ug/L	U	1	5	5	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	12/28/17 21:18	171228-3	1725094
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7440-61-1	Uranium	0.067	ug/L	U	0.067	0.2	0.2	1	MS	BAJ	12/29/17 13:29	171229-4	1725094
7440-62-2	Vanadium	1	ug/L	U	1	5	5	1	P	HSC	12/11/17 16:24	121117A-1	1725086
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	12/11/17 16:24	121117A-1	1725086

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**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** 2018-1201**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 439737004**BASIS:** As Received**DATE COLLECTED** 06-DEC-17**CLIENT ID:** CAWA-18-148944**LEVEL:** Low**DATE RECEIVED** 09-DEC-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	0.453	mg/L	U	0.453	1.24	1.24	1		TXT1	12/27/17 15:16		1729029

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1725086	1725085	SW846 3005A	50	mL	50	mL	12/10/17	SXW1
1725094	1725093	SW846 3005A	50	mL	50	mL	12/10/17	SXW1
1728992	1728991	EPA 245.1/245.2 Prep	20	mL	20	mL	12/27/17	AXS5

**\*Analytical Methods:**

**P** SW846 3005A/6010C  
**MS** SW846 3005A/6020A  
**AV** EPA 245.2 1974

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**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** 2018-1201**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 439737006**BASIS:** As Received**DATE COLLECTED** 06-DEC-17**CLIENT ID:** CAWA-18-148915**LEVEL:** Low**DATE RECEIVED** 09-DEC-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	AXS5	12/28/17 10:23	122817W1-5	1728992

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1728992	1728991	EPA 245.1/245.2 Prep	20	mL	20	mL	12/27/17	AXS5

**\*Analytical Methods:**

AV EPA 245.2 1974

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**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** 2018-1201**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 439737007**BASIS:** As Received**DATE COLLECTED** 06-DEC-17**CLIENT ID:** CAWA-18-148916**LEVEL:** Low**DATE RECEIVED** 09-DEC-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	AXS5	12/28/17 10:28	122817W1-5	1728992

**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

SDG No: 2018-1201

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 439737007

BASIS: As Received

DATE COLLECTED 06-DEC-17

CLIENT ID: CAWA-18-148916

LEVEL: Low

DATE RECEIVED 09-DEC-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	101	ug/L	J	68	200	200	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	12/28/17 21:22	171228-3	1725094
7440-38-2	Arsenic	2.54	ug/L	J	2	5	5	1	MS	BAJ	12/28/17 21:22	171228-3	1725094
7440-39-3	Barium	11.4	ug/L		1	5	5	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	12/28/17 21:22	171228-3	1725094
7440-70-2	Calcium	8780	ug/L		50	200	200	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	12/28/17 21:22	171228-3	1725094
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	12/28/17 21:22	171228-3	1725094
7439-95-4	Magnesium	2630	ug/L		110	300	300	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7439-98-7	Molybdenum	2.35	ug/L		0.2	0.5	0.5	1	MS	BAJ	12/28/17 21:22	171228-3	1725094
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	12/28/17 21:22	171228-3	1725094
7440-09-7	Potassium	1390	ug/L		50	150	150	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	12/29/17 13:31	171229-4	1725094
7631-86-9	Silica	56100	ug/L		53	213	213	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	12/28/17 21:22	171228-3	1725094
7440-23-5	Sodium	12200	ug/L		100	300	300	1	P	HSC	12/13/17 11:41	121317-2	1725086
7440-24-6	Strontium	60.9	ug/L		1	5	5	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	12/28/17 21:22	171228-3	1725094
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7440-61-1	Uranium	0.887	ug/L		0.067	0.2	0.2	1	MS	BAJ	12/29/17 13:31	171229-4	1725094
7440-62-2	Vanadium	8.11	ug/L		1	5	5	1	P	HSC	12/11/17 16:27	121117A-1	1725086
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	12/11/17 16:27	121117A-1	1725086

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**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** 2018-1201**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 439737007**BASIS:** As Received**DATE COLLECTED** 06-DEC-17**CLIENT ID:** CAWA-18-148916**LEVEL:** Low**DATE RECEIVED** 09-DEC-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	32.7	mg/L		0.453	1.24	1.24	1		TXT1	12/27/17 15:16		1729029

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1725086	1725085	SW846 3005A	50	mL	50	mL	12/10/17	SXW1
1725094	1725093	SW846 3005A	50	mL	50	mL	12/10/17	SXW1
1728992	1728991	EPA 245.1/245.2 Prep	20	mL	20	mL	12/27/17	AXS5

**\*Analytical Methods:**

**P** SW846 3005A/6010C  
**MS** SW846 3005A/6020A  
**AV** EPA 245.2 1974

# **Quality Control Summary**



**METALS**  
**-3b-**  
**PREPARATION BLANK SUMMARY**

**SDG NO.** 2018-1201  
**Contract:** ESHL00114  
**Matrix:** W

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Acceptance Window</u>	<u>Conc Qual</u>	<u>M*</u>	<u>MDL</u>	<u>RDL</u>
1203935513								
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Aluminum	68	ug/L	+/-200	U	P	68	200
	Potassium	70.8	ug/L	+/-150	J	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203935533								
	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	2	ug/L	+/-5	U	MS	2	5
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203945549								
	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2

**\*Analytical Methods:**

**P** SW846 3005A/6010C  
**MS** SW846 3005A/6020A  
**AV** EPA 245.1/245.2

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2018-1201 Client ID: CALA-18-150113S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 439736002 Spike ID: 1203935516

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Aluminum	ug/L	75-125	4770		68	U	5000	94.1		P
Barium	ug/L	75-125	529		41.8		500	97.4		P
Beryllium	ug/L	75-125	498		1	U	500	99.5		P
Boron	ug/L	75-125	568		49.4	J	500	104		P
Calcium	ug/L	75-125	23600		18800		5000	95.8		P
Cobalt	ug/L	75-125	505		1	U	500	101		P
Copper	ug/L	75-125	511		3	U	500	102		P
Iron	ug/L	75-125	5060		30	U	5000	101		P
Magnesium	ug/L	75-125	12300		7430		5000	98		P
Manganese	ug/L	75-125	493		2	U	500	98.6		P
Potassium	ug/L	75-125	8070		3290		5000	95.6		P
Silica	ug/L		95300		86100		10700	85.3	N/A	P
Sodium	ug/L	75-125	23900		19300		5000	91.9		P
Strontium	ug/L	75-125	607		106		500	100		P
Tin	ug/L	75-125	501		3.92	J	500	99.4		P
Vanadium	ug/L	75-125	518		14.4		500	101		P
Zinc	ug/L	75-125	480		3.39	J	500	95.2		P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2018-1201 Client ID: CALA-18-150113S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 439736002 Spike ID: 1203935536

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Antimony	ug/L	75-125	51.9		1	U	50	103		MS
Arsenic	ug/L	75-125	57.3		2.56	J	50	110		MS
Cadmium	ug/L	75-125	55.7		0.3	U	50	111		MS
Chromium	ug/L	75-125	54.7		4.66	J	50	100		MS
Lead	ug/L	75-125	53.2		0.5	U	50	106		MS
Molybdenum	ug/L	75-125	55.5		1.31		50	108		MS
Nickel	ug/L	75-125	51		0.6	U	50	101		MS
Selenium	ug/L	75-125	56.8		2	U	50	113		MS
Silver	ug/L	75-125	49		0.3	U	50	97.9		MS
Thallium	ug/L	75-125	52.3		0.6	U	50	104		MS
Uranium	ug/L	75-125	52.5		0.699		50	104		MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-5a-

## Matrix Spike Summary

**SDG NO.** 2018-1201 **Client ID:** CALA-18-150113S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 439736002 **Spike ID:** 1203945553

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	1.98		0.067	U	2	98.9		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

**Metals**  
**-6-**  
**Duplicate Sample Summary**

SDG No.: 2018-1201

Lab Code: GEL

Contract: ESHL00114

Client ID: CALA-18-150113D

Matrix: WATER

Level: Low

Sample ID: 439736002

Duplicate ID: 1203935515

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		79.3 J		200		P
Barium	ug/L	+/-20%	41.8		41.4		.798		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	49.4 J		48.9 J		.998		P
Calcium	ug/L	+/-20%	18800		18600		.904		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	7430		7380		.734		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	3290		3290		.0547		P
Silica	ug/L	+/-20%	86100		85500		.706		P
Sodium	ug/L	+/-20%	19300		19000		1.18		P
Strontium	ug/L	+/-20%	106		107		.865		P
Tin	ug/L	+/-10	3.92 J		3.08 J		24		P
Vanadium	ug/L	+/-5	14.4		14.4		.0972		P
Zinc	ug/L		3.39 J		3.3 U		200		P

\*Analytical Methods:

P SW846 3005A/6010C

**Metals**  
**-6-**  
**Duplicate Sample Summary**

SDG No.: 2018-1201

Lab Code: GEL

Contract: ESHL00114

Client ID: CALA-18-150113D

Matrix: WATER

Level: Low

Sample ID: 439736002

Duplicate ID: 1203935535

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L	+/-5	2.56 J		2.68 J		4.73		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L	+/-10	4.66 J		4.38 J		6.33		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.31		1.27		3.5		MS
Nickel	ug/L		0.6 U		0.6 U				MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.3 U		0.3 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L	+/- .2	0.699		0.689		1.44		MS

\*Analytical Methods:

MS SW846 3005A/6020A

**Metals**  
**-6-**  
**Duplicate Sample Summary**

**SDG No.:** 2018-1201**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CALA-18-150113D**Matrix:** WATER**Level:** Low**Sample ID:** 439736002**Duplicate ID:** 1203945551**Percent Solids for Dup:** N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Mercury	ug/L		0.067	U	0.067	U			AV

\*Analytical Methods:

AV EPA 245.1/245.2

## METALS

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## Laboratory Control Sample Summary

SDG NO. 2018-1201

Contract: ESHL00114

Aqueous LCS Source:OS2I

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203935514								
	Aluminum	ug/L	5000	4940		98.8	80-120	P
	Barium	ug/L	500	498		99.6	80-120	P
	Beryllium	ug/L	500	497		99.4	80-120	P
	Boron	ug/L	500	513		103	80-120	P
	Calcium	ug/L	5000	5000		100	80-120	P
	Cobalt	ug/L	500	519		104	80-120	P
	Copper	ug/L	500	508		102	80-120	P
	Iron	ug/L	5000	5200		104	80-120	P
	Magnesium	ug/L	5000	5090		102	80-120	P
	Manganese	ug/L	500	507		101	80-120	P
	Potassium	ug/L	5000	5000		100	80-120	P
	Silica	ug/L	10700	10300		96.3	80-120	P
	Sodium	ug/L	5000	5110		102	80-120	P
	Strontium	ug/L	500	524		105	80-120	P
	Tin	ug/L	500	502		100	80-120	P
	Vanadium	ug/L	500	505		101	80-120	P
	Zinc	ug/L	500	484		96.8	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C



## METALS

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## Laboratory Control Sample Summary

SDG NO. 2018-1201

Contract: ESHL00114

Aqueous LCS Source: Inorganic Ventures

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203935534								
	Antimony	ug/L	50	51.7		103	80-120	MS
	Arsenic	ug/L	50	55.1		110	80-120	MS
	Cadmium	ug/L	50	55		110	80-120	MS
	Chromium	ug/L	50	51.4		103	80-120	MS
	Lead	ug/L	50	54.7		109	80-120	MS
	Molybdenum	ug/L	50	52.7		105	80-120	MS
	Nickel	ug/L	50	54.4		109	80-120	MS
	Selenium	ug/L	50	58.3		117	80-120	MS
	Silver	ug/L	50	49.5		99	80-120	MS
	Thallium	ug/L	50	52.8		106	80-120	MS
	Uranium	ug/L	50	50.4		101	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

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## Laboratory Control Sample Summary

SDG NO. 2018-1201

Contract: ESHL00114

Aqueous LCS Source: GEL

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203945550	Mercury	ug/L	2	2.07		103	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

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## Serial Dilution Sample Summary

SDG NO. 2018-1201

Client ID: CALA-18-150113L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 439736002

Serial Dilution ID: 1203935517

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	41.8		42.7		2.213			P
Beryllium	1	U	5	U				P
Boron	49.4	J	75	U	8.54			P
Calcium	18800		19100		1.512		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	7430		7510		1.018		10	P
Manganese	2	U	10	U				P
Potassium	3290		3500		6.222		10	P
Silica	86100		86200		.139		10	P
Sodium	19300		19900		3.245		10	P
Strontium	106		106		.534		10	P
Tin	3.92	J	12.5	U	106.59			P
Vanadium	14.4		15.6	J	8.147			P
Zinc	3.39	J	18.5	J	446.799			P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2018-1201 **Client ID:** CALA-18-150113L

**Contract:** ESHL00114

**Matrix:** LIQUID **Level:** Low

**Sample ID:** 439736002 **Serial Dilution ID:** 1203935537

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	2.56	J	10	U	18.303			MS
Cadmium	.3	U	1.5	U				MS
Chromium	4.66	J	15	U	2.98			MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.31		1.41	J	7.634			MS
Nickel	.6	U	3	U				MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.699		.72	J	3.004			MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2018-1201 **Client ID:** CALA-18-150113L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 439736002 **Serial Dilution ID:** 1203945555

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Mercury	.067	U	.335	U				AV

## \*Analytical Methods:

AV EPA 245.1/245.2

# **General Chem Analysis**

# Case Narrative

**General Chemistry  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1201  
Work Order #: 439737**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1725569

**Method:** SW 9060 Total Organic Carbon

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW-846:9060:

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
1203939348	Method Blank (MB)
1203939349	Laboratory Control Sample (LCS)
1203939350	439737004(CAWA-18-148944) Sample Duplicate (DUP)
1203939352	439737004(CAWA-18-148944) Post Spike (PS)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-093 REV# 15.

**Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

**Calibration Information**

The Carbon analysis was performed on a O-I Analytical 1030W Carbon Analyzer.

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

**Calibration Verification Information (CCV)**

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within



acceptance limits.

### **Quality Control (QC) Information**

#### **Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

#### **Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

#### **Quality Control (QC) Designation**

Sample 439737004 (CAWA-18-148944) was selected for QC analysis.

#### **Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The MS/PS recovery for this sample set was within the required acceptance limits where applicable.

#### **Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

### **Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

#### **Holding Times**

All samples in this SDG met the specified holding time.

#### **Sample Preservation/Integrity**

All the samples from this sample group met the preservation and integrity requirements of the method.

#### **Sample Dilutions**

The samples in this SDG did not require dilutions.

#### **Sample Re-analysis**

The samples in this SDG did not require re-analysis.

### **Miscellaneous Information**

#### **Additional Comments**

Additional comments were not required for this SDG.

#### **Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will

always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **Method/Analysis Information**

<b>Product:</b>	<b>Cyanide and Total</b>		
<b>Analytical Batch:</b>	1725125	<b>Method:</b>	WSP-CN(T)
<b>Prep Batch :</b>	1725124	<b>Method:</b>	EPA 335.4

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA 335.4 1993:

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
439737006	CAWA-18-148915
1203935625	Method Blank (MB)
1203935626	Laboratory Control Sample (LCS)
1203935627	439737004(CAWA-18-148944) Sample Duplicate (DUP)
1203935629	439737004(CAWA-18-148944) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 21.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Flow Injection analysis was performed on a Lachat QuickChem FIA+ 8000 Series.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

### **Calibration Verification Information (CCV)**

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

**Y Intercept Rule**

The absolute value of the intercept is less than 3 times the MDL.

**Quality Control (QC) Information****Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 439737004 (CAWA-18-148944) was selected for QC analysis.

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The percent recoveries (%R) obtained from the spike analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity.

Analyte	Sample	Value
Cyanide, Total	1203935629 (CAWA-18-148944MS)	112* (90%-110%)

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

All the samples from this sample group met the preservation and integrity requirements of the method.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information****Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

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### **Method/Analysis Information**

**Product:** Ion Chromatography

**Analytical Batch:** 1726418

**Method:** WSP-ANIONS

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA:300.0:

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
439737007	CAWA-18-148916
1203939072	Method Blank (MB)
1203939073	Laboratory Control Sample (LCS)
1203939074	439736002(CALA-18-150113) Sample Duplicate (DUP)
1203939075	439736002(CALA-18-150113) Post Spike (PS)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 25.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Ion Chromatography analysis was performed on a Dionex ICS-5000 Ion Chromatograph.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

### **Calibration Verification Information (CCV)**

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

### **Y Intercept Rule**

The absolute value of the intercept is less than 3 times the MDL.

### **Quality Control (QC) Information**

#### **Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

#### **Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

#### **Quality Control (QC) Designation**

Sample 439736002 (CALA-18-150113) was selected for QC analysis.

#### **Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The MS/PS recovery for this sample set was within the required acceptance limits where applicable.

#### **Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

### **Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

#### **Holding Times**

All samples in this SDG met the specified holding time.

#### **Sample Dilutions**

The samples in this SDG did not require dilutions.

#### **Sample Re-analysis**

The samples in this SDG did not require re-analysis.

### **Miscellaneous Information**

#### **Manual Integrations**

Samples 1203939074 (CALA-18-150113DUP), 439737004 (CAWA-18-148944) and 439737007 (CAWA-18-148916) were manually integrated to correctly position the baseline as set in the calibration standards.

#### **Additional Comments**

Additional comments were not required for this SDG.

#### **Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will

always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.



### **Method/Analysis Information**

<b>Product:</b>	<b>Ammonia Nitrogen</b>		
<b>Analytical Batch:</b>	1724782	<b>Method:</b>	NH3
<b>Prep Batch :</b>	1724781	<b>Method:</b>	EPA 350.1 Prep

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA:350.1:

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
439737007	CAWA-18-148916
1203934794	Method Blank (MB)
1203934795	Laboratory Control Sample (LCS)
1203935631	439736002(CALA-18-150113) Sample Duplicate (DUP)
1203935632	439736002(CALA-18-150113) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-106 REV# 10.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8000 Series.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

### **Continuing Calibration Blanks**

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

### **Calibration Verification Information (CCV)**

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

**Y Intercept Rule**

The absolute value of the intercept is less than 3 times the MDL.

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 439736002 (CALA-18-150113) was selected for QC analysis.

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The MS/PS recovery for this sample set was within the required acceptance limits where applicable.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

All the samples from this sample group met the preservation and integrity requirements of the method.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information**

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an

effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **Method/Analysis Information**

<b>Product:</b>	<b>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1725130	<b>Method:</b>	TKN
<b>Prep Batch :</b>	1725129	<b>Method:</b>	EPA 351.2 Prep

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA:351.2:

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
1203935645	Method Blank (MB)
1203935646	Laboratory Control Sample (LCS)
1203935647	439735001(WST33-18-147841) Sample Duplicate (DUP)
1203935648	439737004(CAWA-18-148944) Sample Duplicate (DUP)
1203935649	439735001(WST33-18-147841) Matrix Spike (MS)
1203935650	439737004(CAWA-18-148944) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-104 REV# 15.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8000 Series.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

### **Continuing Calibration Blanks**

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

**Calibration Verification Information (CCV)**

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

**Y Intercept Rule**

The absolute value of the intercept is less than 3 times the MDL.

**Quality Control (QC) Information****Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Samples 439735001 (WST33-18-147841) and 439737004 (CAWA-18-148944) were selected for QC analysis.

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The MS/PS recoveries for this sample set were within the required acceptance limits where applicable.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

All the samples from this sample group met the preservation and integrity requirements of the method.

**Sample Dilutions**

The following samples 1203935647 (WST33-18-147841DUP) and 1203935649 (WST33-18-147841MS) were diluted because target analyte concentrations exceeded the calibration range. Samples 1203935647 (WST33-18-147841DUP) and 1203935649 (WST33-18-147841MS) were diluted at the prep step due to high concentration. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

**Sample Re-analysis**

Sample 1203935645 (MB) was re-analyzed due to instrument failure. The results from the reanalysis are reported. Samples 1203935647 (WST33-18-147841DUP), 1203935649 (WST33-18-147841MS) and 439737004 (CAWA-18-148944) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

**Miscellaneous Information**

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

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### **Method/Analysis Information**

**Product:** Nitrate Nitrite by Cadmium Reduction

**Analytical Batch:** 1725128

**Method:** NO3NO2

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA:353.2:

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
439737007	CAWA-18-148916
1203935639	Method Blank (MB)
1203935640	Laboratory Control Sample (LCS)
1203935641	439736002(CALA-18-150113) Sample Duplicate (DUP)
1203935643	439736002(CALA-18-150113) Post Spike (PS)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-128 REV# 10.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8500 Series.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

### **Continuing Calibration Blanks**

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

### **Calibration Verification Information (CCV)**

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

**Y Intercept Rule**

The absolute value of the intercept is less than 3 times the MDL.

**Quality Control (QC) Information****Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 439736002 (CALA-18-150113) was selected for QC analysis.

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The MS/PS recoveries for this sample set were within the required acceptance limits where applicable.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

All the samples from this sample group met the preservation and integrity requirements of the method.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information****Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:



Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **Method/Analysis Information**

<b>Product:</b>	<b>Total Phosphorus</b>		
<b>Analytical Batch:</b>	1725512	<b>Method:</b>	PO4
<b>Prep Batch :</b>	1725511	<b>Method:</b>	EPA 365.4 Prep

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA 365.4 1974:

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
439737007	CAWA-18-148916
1203936758	Method Blank (MB)
1203936759	Laboratory Control Sample (LCS)
1203936760	439737004(CAWA-18-148944) Sample Duplicate (DUP)
1203936761	439737004(CAWA-18-148944) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-103 REV# 11.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8000 Series.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

### **Calibration Verification Information (CCV)**

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

**Y Intercept Rule**

The absolute value of the intercept is less than 3 times the MDL.

**Quality Control (QC) Information****Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 439737004 (CAWA-18-148944) was selected for QC analysis.

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The MS/PS recovery for this sample set was within the required acceptance limits where applicable.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

All the samples from this sample group met the preservation and integrity requirements of the method.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information****Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are

present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **Method/Analysis Information**

**Product:** Solids and Total Dissolved

**Analytical Batch:** 1725263

**Method:** TDS

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA:160.1:

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
439737007	CAWA-18-148916
1203936155	Method Blank (MB)
1203936156	Laboratory Control Sample (LCS)
1203936159	439735002(WST33-18-147906) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-001 REV# 15.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Solids analysis was performed on a Sartorius Balance BAL216. Solids lab

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Quality Control (QC) Information**

#### **Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

#### **Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Consecutive Weight Checks**

All consecutive weight checks were met.

**Quality Control (QC) Designation**

Sample 439735002 (WST33-18-147906) was selected for QC analysis.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information****Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **Method/Analysis Information**

**Product:** Specific Conductivity

**Analytical Batch:** 1725585

**Method:** EPA120.1 Specific Conductivity

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA:120.1:

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
439737007	CAWA-18-148916
1203936936	Laboratory Control Sample (LCS)
1203936938	439737004(CAWA-18-148944) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-009 REV# 15.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Titration and Ion analysis was performed on a Orion 160 Conductivity Meter.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Initial Standardization**

The titrant was properly standardized

### **Quality Control (QC) Information**

#### **Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

### **Quality Control (QC) Designation**

Sample 439737004 (CAWA-18-148944) was selected for QC analysis.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information**

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.



### **Method/Analysis Information**

**Product:** pH  
**Analytical Batch:** 1725084 **Method:** PH

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA 150.1 1982:

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
439737007	CAWA-18-148916
1203935510	Laboratory Control Sample (LCS)
1203935512	439736002(CALA-18-150113) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-008 REV# 22.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Titration and Ion analysis was performed on a Thermo Orion Star A111. Immediates

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Initial Standardization**

The titrant was properly standardized

### **Quality Control (QC) Information**

#### **Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

### **Quality Control (QC) Designation**

Sample 439736002 (CALA-18-150113) was selected for QC analysis.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1203935512 (CALA-18-150113DUP)	pH	Received 09-DEC-17, out of holding 07-DEC-17
439737004 (CAWA-18-148944)	pH	Received 09-DEC-17, out of holding 06-DEC-17
439737007 (CAWA-18-148916)	pH	Received 09-DEC-17, out of holding 06-DEC-17

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information**

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

### **Method/Analysis Information**

**Product:** Alkalinity

**Analytical Batch:** 1725083      **Method:** EPA 310.1 Total Alkalinity

### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA:310.1:

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
439737007	CAWA-18-148916
1203935504	Laboratory Control Sample (LCS)
1203935507	439736002(CALA-18-150113) Sample Duplicate (DUP)
1203935509	439736002(CALA-18-150113) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 13.

### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

### **Calibration Information**

The Titration and Ion analysis was performed on a Electronic bottle-top buret.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Initial Standardization**

The titrant was properly standardized

### **Quality Control (QC) Information**

#### **Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 439736002 (CALA-18-150113) was selected for QC analysis.

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The MS/PS recovery for this sample set was within the required acceptance limits where applicable.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information****Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

### Qualifier Definition Report for

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2018-1201 GEL Work Order: 439737

#### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

#### Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Kristen Mizzell

Date: 08 JAN 2018

Title: Team Leader

# Sample Data Summary

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: January 8, 2018

Company : Los Alamos National Laboratory  
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545  
Contact: Ms. Nita Patel  
Project: LANL- WQH Water Samples

Client SDG: 2018-1201

Client Sample ID: CAWA-18-148944  
Sample ID: 439737004  
Matrix: W  
Collect Date: 06-DEC-17 07:56  
Receive Date: 09-DEC-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L		1	TSM	12/15/17	2117	1725569	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	12/13/17	0752	1725125	2
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	JXH5	12/19/17	0108	1726418	3
Chloride	J	0.0893	0.067	0.200	mg/L		1					
Fluoride	U	ND	0.033	0.100	mg/L		1					
Sulfate	U	ND	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0452	0.017	0.050	mg/L	1.00	1	KLP1	12/11/17	1349	1724782	4
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.0527	0.017	0.050	mg/L		1	AXH3	12/11/17	1157	1725128	5
PO4 "As Received"												
Phosphorus, Total as P		0.0666	0.020	0.050	mg/L	1.00	1	KLP1	12/15/17	1416	1725512	6
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	12/12/17	1434	1725130	7
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids	U	ND	3.40	14.3	mg/L			KLP1	12/12/17	1421	1725263	8
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3	U	ND	1.45	4.00	mg/L			RXB5	12/13/17	1433	1725083	9
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		1.09	1.00	1.00	umhos/cm		1	HXC1	12/12/17	1246	1725585	10
PH "As Received"												
pH at Temp 18.6C	H	5.81	0.010	0.100	SU		1	RXB5	12/13/17	1431	1725084	11

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
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# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: January 8, 2018

Company : Los Alamos National Laboratory  
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545  
Contact: Ms. Nita Patel  
Project: LANL- WQH Water Samples

Client SDG: 2018-1201

Client Sample ID: CAWA-18-148944  
Sample ID: 439737004

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
EPA 335.4	EPA 335.4 Total Cyanide			AXH3	12/13/17		0730		1725124		
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep			AXH3	12/11/17		0837		1724781		
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep			AXH3	12/12/17		0930		1725129		
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR			KLP1	12/14/17		1700		1725511		

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW-846:9060	
2	EPA 335.4 1993	
3	EPA:300.0	
4	EPA:350.1	
5	EPA:353.2	
6	EPA 365.4 1974	
7	EPA:351.2	
8	EPA:160.1	
9	EPA:310.1	
10	EPA:120.1	
11	EPA 150.1 1982	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: January 8, 2018

Company : Los Alamos National Laboratory  
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545  
Contact: Ms. Nita Patel  
Project: LANL- WQH Water Samples

Client SDG: 2018-1201

Client Sample ID: CAWA-18-148915  
Sample ID: 439737006  
Matrix: W  
Collect Date: 06-DEC-17 13:04  
Receive Date: 09-DEC-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	12/13/17	0759	1725125	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	12/13/17	0730	1725124

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 335.4 1993	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: January 8, 2018

Company : Los Alamos National Laboratory  
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545  
Contact: Ms. Nita Patel  
Project: LANL- WQH Water Samples

Client SDG: 2018-1201

Client Sample ID: CAWA-18-148916  
Sample ID: 439737007  
Matrix: W  
Collect Date: 06-DEC-17 13:04  
Receive Date: 09-DEC-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	JXH5	12/19/17	0137	1726418	1
Chloride		1.63	0.067	0.200	mg/L		1					
Fluoride	J	0.0811	0.033	0.100	mg/L		1					
Sulfate		4.11	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0535	0.017	0.050	mg/L	1.00	1	KLP1	12/11/17	1350	1724782	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.370	0.017	0.050	mg/L		1	AXH3	12/11/17	1158	1725128	3
PO4 "As Received"												
Phosphorus, Total as P		0.0559	0.020	0.050	mg/L	1.00	1	KLP1	12/15/17	1418	1725512	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		111	3.40	14.3	mg/L			KLP1	12/12/17	1421	1725263	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		57.8	1.45	4.00	mg/L			RXB5	12/13/17	1436	1725083	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		148	1.00	1.00	umhos/cm		1	HXC1	12/12/17	1247	1725585	7
PH "As Received"												
pH at Temp 16.4C	H	8.17	0.010	0.100	SU		1	RXB5	12/13/17	1435	1725084	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	12/11/17	0837	1724781
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	12/14/17	1700	1725511

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## Certificate of Analysis

Report Date: January 8, 2018

Company : Los Alamos National Laboratory  
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545  
Contact: Ms. Nita Patel  
Project: LANL- WQH Water Samples

Client SDG: 2018-1201

Client Sample ID: CAWA-18-148916  
Sample ID: 439737007

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
The following Analytical Methods were performed:												
Method	Description					Analyst Comments						
1	EPA:300.0											
2	EPA:350.1											
3	EPA:353.2											
4	EPA 365.4 1974											
5	EPA:160.1											
6	EPA:310.1											
7	EPA:120.1											
8	EPA 150.1 1982											

### Notes:

#### Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# **Quality Control Summary**

# GEL LABORATORIES LLC

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## QC Summary

Report Date: January 8, 2018

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Los Alamos National Laboratory  
TA-00, SM1237, Rm104C  
Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 439737

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1725569										
QC1203939350	439737004	DUP									
Total Organic Carbon Average		U	ND	U	ND	mg/L	N/A		TSM	12/15/17	21:56
QC1203939349	LCS										
Total Organic Carbon Average	10.0				10.4	mg/L	104	(80%-120%)		12/15/17	20:28
QC1203939348	MB										
Total Organic Carbon Average			U	ND	mg/L					12/15/17	20:18
QC1203939352	439737004	PS									
Total Organic Carbon Average	10.0	U	ND		10.5	mg/L	105	(75%-125%)		12/15/17	22:36
<b>Flow Injection Analysis</b>											
Batch	1725125										
QC1203935627	439737004	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	12/13/17	07:53
QC1203935626	LCS										
Cyanide, Total	50.0				50.6	ug/L	101	(90%-110%)		12/13/17	07:48
QC1203935625	MB										
Cyanide, Total			U	ND	ug/L					12/13/17	07:47
QC1203935629	439737004	MS									
Cyanide, Total	100	U	ND		112	ug/L	112 *	(90%-110%)		12/13/17	07:54
<b>Ion Chromatography</b>											
Batch	1726418										
QC1203939074	439736002	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		JXH5	12/19/17	00:10

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## QC Summary

Workorder: 439737

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1726418										
Chloride		7.44		7.47	mg/L	0.322		(0%-20%)	JXH5	12/19/17	00:10
Fluoride		0.170		0.162	mg/L	4.83	^	(+/-0.100)			
Sulfate		5.43		5.39	mg/L	0.601		(0%-20%)			
QC1203939073 LCS											
Bromide	1.25			1.24	mg/L		99.2	(80%-120%)		12/18/17	22:43
Chloride	5.00			4.66	mg/L		93.3	(80%-120%)			
Fluoride	2.50			2.39	mg/L		95.8	(80%-120%)			
Sulfate	10.0			9.48	mg/L		94.8	(80%-120%)			
QC1203939072 MB											
Bromide			U	ND	mg/L					12/18/17	22:14
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203939075 439736002 PS											
Bromide	1.25	U	ND	1.31	mg/L		99.8	(75%-125%)		12/19/17	00:39
Chloride	5.00		7.44	13.0	mg/L		111	(75%-125%)			
Fluoride	2.50		0.170	2.70	mg/L		101	(75%-125%)			
Sulfate	10.0		5.43	15.2	mg/L		97.9	(75%-125%)			

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## QC Summary

Workorder: 439737

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1724782										
QC1203935631	439736002	DUP									
Nitrogen, Ammonia		0.0682	J	0.0442	mg/L	42.7	^	(+/-0.050)	KLP1	12/11/17	13:43
QC1203934795	LCS										
Nitrogen, Ammonia	1.00			1.06	mg/L			106 (90%-110%)		12/11/17	13:26
QC1203934794	MB										
Nitrogen, Ammonia			U	ND	mg/L					12/11/17	13:25
QC1203935632	439736002	MS									
Nitrogen, Ammonia	1.00	0.0682		1.07	mg/L			100 (90%-110%)		12/11/17	13:44
Batch	1725128										
QC1203935641	439736002	DUP									
Nitrogen, Nitrate/Nitrite		0.413		0.417	mg/L	0.964		(0%-20%)	AXH3	12/11/17	11:54
QC1203935640	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.03	mg/L			103 (90%-110%)		12/11/17	11:15
QC1203935639	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					12/11/17	11:14
QC1203935643	439736002	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.413		1.33	mg/L			91.7 (90%-110%)		12/11/17	11:55
Batch	1725130										
QC1203935647	439735001	DUP									
Nitrogen, Total Kjeldahl		101		88.8	mg/L	12.7		(0%-20%)	KLP1	12/12/17	14:27
QC1203935648	439737004	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A			12/12/17	14:34
QC1203935646	LCS										
Nitrogen, Total Kjeldahl	1.00			0.950	mg/L			95 (90%-110%)		12/12/17	13:51

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## QC Summary

Workorder: 439737

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1725130										
QC1203935645	MB										
Nitrogen, Total Kjeldahl			J	0.0474	mg/L				KLP1	12/12/17	14:21
QC1203935649	439735001	MS									
Nitrogen, Total Kjeldahl	4.00	101		84.0	mg/L		N/A	(90%-110%)		12/12/17	14:28
QC1203935650	439737004	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	1.05	mg/L		105	(90%-110%)		12/12/17	14:35
Batch	1725512										
QC1203936760	439737004	DUP									
Phosphorus, Total as P		0.0666		0.0605	mg/L	9.6	^	(+/-0.050)	KLP1	12/15/17	14:17
QC1203936759	LCS										
Phosphorus, Total as P	1.00			1.00	mg/L		100	(80%-124%)		12/15/17	14:15
QC1203936758	MB										
Phosphorus, Total as P			J	0.0201	mg/L					12/15/17	14:14
QC1203936761	439737004	MS									
Phosphorus, Total as P	1.00	0.0666		1.09	mg/L		102	(63%-139%)		12/15/17	14:18
<b>Solids Analysis</b>											
Batch	1725263										
QC1203936159	439735002	DUP									
Total Dissolved Solids		370		380	mg/L	2.67		(0%-5%)	KLP1	12/12/17	14:21
QC1203936156	LCS										
Total Dissolved Solids	300			289	mg/L		96.2	(95%-105%)		12/12/17	14:21
QC1203936155	MB										
Total Dissolved Solids			U	ND	mg/L					12/12/17	14:21



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## QC Summary

Workorder: 439737

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1725083										
QC1203935507	439736002	DUP									
Alkalinity, Total as CaCO3		114		112	mg/L	2.14		(0%-20%)	RXB5	12/13/17	14:26
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203935504	LCS										
Alkalinity, Total as CaCO3	100			107	mg/L		107	(90%-110%)		12/13/17	11:30
QC1203935509	439736002	MS									
Alkalinity, Total as CaCO3	100	114		219	mg/L		105	(80%-120%)		12/13/17	14:27
Batch	1725084										
QC1203935512	439736002	DUP									
pH	H	7.97	H	7.99	SU	0.251		(0%-5%)	RXB5	12/13/17	14:25
QC1203935510	LCS										
pH	7.00			7.01	SU		100	(99%-101%)		12/13/17	11:42
Batch	1725585										
QC1203936938	439737004	DUP									
Conductivity		1.09		1.14	umhos/cm	4.48 ^		(+/-1.00)	HXC1	12/12/17	12:46
QC1203936936	LCS										
Conductivity	1410			1400	umhos/cm		98.9	(95%-105%)		12/12/17	12:41

- Notes:**
- < Result is less than value reported
  - > Result is greater than value reported
  - B The target analyte was detected in the associated blank.
  - E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
  - H Analytical holding time was exceeded
  - J Value is estimated
  - N/A RPD or %Recovery limits do not apply.
  - N1 See case narrative

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## QC Summary

Workorder: 439737

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
d	5-day BOD--The 2:1 depletion requirement was not met for this sample										
e	5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes										
h	Preparation or preservation holding time was exceeded										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

# **Radiological Analysis**

# Case Narrative

**Radiochemistry  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-1201  
Work Order #: 439737**

**Method/Analysis Information**

**Product:** Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Batch Number: 1725235

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
1203936057	Method Blank (MB)
1203936059	Laboratory Control Sample (LCS)
1203936058	439739003(BDW01-18-150415) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 26.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244. The initial Calibration was performed in December 2017.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

Aliquots for samples 1203936057 (MB) and 1203936059 (LCS) were changed to 1.0, and the MDCs (and Lc if requested) for all samples are calculated using a blank population per client request.

**Method Blank Criteria**

The Method Blank (MB) met acceptance criteria.

**CSU**

The blank result is less than 1.65 times the CSU.

**Blank Decision Level**

The blank result is less than the decision level.

**Tracer/Carrier Yield**

All yields met the required acceptance limits.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Designated QC**

The following sample was used for QC: 439739003 (BDW01-18-150415). The QC was from ARSL work order 439739.

**Duplication Criteria between QC Sample and Duplicate Sample**

The QC Sample and Duplicate Sample (DUP) met the duplication acceptance criteria.

**RDL Met**

The method RDL has been met.

**Technical Information:****Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Negative > 3 sigma TPU**

Sample result are not more negative than three sigma TPU.

**Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:****Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** ISOPU  
**Analytical Method:** HASL-300:ISOPU  
**Analytical Batch Number:** 1725240

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
1203936067	Method Blank (MB)
1203936069	Laboratory Control Sample (LCS)
1203936068	439739003(BDW01-18-150415) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 26.

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244. The initial Calibration was performed in December 2017.

##### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

##### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

#### **Quality Control (QC) Information:**

##### **Blank Information**

Aliquots for samples 1203936067 (MB) and 1203936069 (LCS) were changed to 1.0, and the MDCs (and Lc if requested) for all samples are calculated using a blank population per client request.

##### **Method Blank Criteria**

The Method Blank (MB) met acceptance criteria.

##### **CSU**

The blank result is less than 1.65 times the CSU.

##### **Blank Decision Level**

The blank result is less than the decision level.

##### **Tracer/Carrier Yield**

All yields met the required acceptance limits.

##### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Designated QC**

The following sample was used for QC: 439739003 (BDW01-18-150415). The QC was from ARSL work order 439739.

**Duplication Criteria between QC Sample and Duplicate Sample**

The QC Sample and Duplicate Sample (DUP) met the duplication acceptance criteria.

**RDL Met**

The method RDL has been met.

**Technical Information:****Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Negative > 3 sigma TPU**

Sample result are not more negative than three sigma TPU.

**Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

**Recounts**

Sample 1203936069 (LCS) was recounted due to a peak shift. The recount is reported.

**Miscellaneous Information:****Manual Integration**

No manual integrations were performed on data in this batch.

**Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**

The tracer peak centroid for sample 1203936068 (BDW01-18-150415DUP) is greater than 50 keV from the expected library energy value for the tracer; however, the tracer yield requirement was met and the tracer peak is within the tracer region of interest.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>IsoU</b>
Analytical Method:	HASL-300:ISOU
Analytical Batch Number:	1725243

<b>Sample ID</b>	<b>Client ID</b>
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439737004	CAWA-18-148944
1203936073	Method Blank (MB)
1203936075	Laboratory Control Sample (LCS)
1203936074	439739003(BDW01-18-150415) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 26.

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244. The initial Calibration was performed in December 2017.

##### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

##### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

#### **Quality Control (QC) Information:**

##### **Blank Information**

Aliquots for samples 1203936073 (MB) and 1203936075 (LCS) were changed to 1.0, and the MDCs (and Lc if requested) for all samples are calculated using a blank population per client request.

##### **Method Blank Criteria**

The Method Blank (MB) met acceptance criteria.

##### **CSU**

The blank (See Below) result is greater than 1.65 times the CSU but less than the MDC.

Sample	Analyte	Value
1203936073 (MB)	Uranium-233/234, Uranium-235/236 and Uranium-238	Blank result > 1.65 CSU

##### **Blank Decision Level**

The blank (See Below) result is greater than the decision level but less than the MDC.

Sample	Analyte	Value
1203936073 (MB)	Uranium-233/234, Uranium-235/236 and Uranium-238	Blank result > DL

##### **Tracer/Carrier Yield**

All yields met the required acceptance limits.

##### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

#### **Designated QC**

The following sample was used for QC: 439739003 (BDW01-18-150415). The QC was from ARSL work order 439739.

#### **Duplication Criteria between QC Sample and Duplicate Sample**

The QC Sample and Duplicate Sample (DUP) met the duplication acceptance criteria.

#### **RDL Met**

The method RDL has been met.

#### **Technical Information:**

##### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

##### **Negative > 3 sigma TPU**

Sample result are not more negative than three sigma TPU.

##### **Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

##### **Recounts**

None of the samples in this sample set were recounted.

#### **Miscellaneous Information:**

##### **Manual Integration**

No manual integrations were performed on data in this batch.

##### **Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

##### **Additional Comments**

Additional comments were not required for this sample set.

#### **Qualifier Information**

Manual qualifiers were not required.

#### **Method/Analysis Information**

<b>Product:</b>	<b>Gammascpec</b>
Analytical Method:	EPA:901.1
Analytical Batch Number:	1725107

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944

1203935580 Method Blank (MB)  
1203935582 Laboratory Control Sample (LCS)  
1203935581 439739003(BDW01-18-150415) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 27.

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibrations were performed in July 2017, June 2017, May 2017 and November 2017.

##### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

##### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

#### **Quality Control (QC) Information:**

##### **Blank Information**

The blank volume is representative of the sample volume in this batch.

##### **Method Blank Criteria**

The Method Blank (MB) met acceptance criteria.

##### **CSU**

The blank (See Below) result is greater than 1.65 times the CSU but less than the MDC.

Sample	Analyte	Value
1203935580 (MB)	Cesium-137	Blank result > 1.65 CSU

##### **Blank Decision Level**

The blank (See Below) result is greater than the decision level but less than the MDC.

Sample	Analyte	Value
1203935580 (MB)	Cesium-137 and Potassium-40	Blank result > DL

##### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

##### **Designated QC**

The following sample was used for QC: 439739003 (BDW01-18-150415). The QC was from ARSL work order 439739.

**Duplication Criteria between QC Sample and Duplicate Sample**

The QC Sample and Duplicate Sample (DUP) met the duplication acceptance criteria.

**RDL Met**

The method RDL has been met.

**Technical Information:****Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:****Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** GFPC, Sr90, liquid

Analytical Method: EPA:905.0

Analytical Batch Number: 1726106

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
1203938211	Method Blank (MB)
1203938214	Laboratory Control Sample (LCS)
1203938212	439739003(BDW01-18-150415) Sample Duplicate (DUP)
1203938213	439739003(BDW01-18-150415) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 19.

### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibration was performed in April 2016.

#### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

### **Quality Control (QC) Information:**

#### **Blank Information**

Aliquots for samples 1203938211 (MB) and 1203938214 (LCS) were changed to 1.0 per client request.

#### **Method Blank Criteria**

The Method Blank (MB) met acceptance criteria.

#### **CSU**

The blank result is less than 1.65 times the CSU.

#### **Blank Decision Level**

The blank result is less than the decision level.

#### **Tracer/Carrier Yield**

All yields met the required acceptance limits.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

#### **Designated QC**

The following sample was used for QC: 439739003 (BDW01-18-150415). The QC was from ARSL work order 439739.

#### **Matrix Spike (MS) Recovery**

The MS spike recoveries met acceptance limits.

#### **Duplication Criteria between QC Sample and Duplicate Sample**

The QC Sample and Duplicate Sample (DUP) met the duplication acceptance criteria.

#### **RDL Met**

The method RDL has been met.

### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Negative > 3 sigma TPU**

Sample result are not more negative than three sigma TPU.

#### **Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

**Recounts**

Sample 1203938212 (BDW01-18-150415DUP) was recounted due to results more negative than the three sigma TPU. The second count is reported.

**Miscellaneous Information:****Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**

The matrix spike, 1203938213 (BDW01-18-150415MS), aliquot was reduced to conserve sample volume.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>WSP-GrossA/B</b>
Analytical Method:	EPA 900.0/SW846 9310
Analytical Batch Number:	1726298

<b>Sample ID</b>	<b>Client ID</b>
439737004	CAWA-18-148944
1203938766	Method Blank (MB)
1203938770	Laboratory Control Sample (LCS)
1203938767	439739003(BDW01-18-150415) Sample Duplicate (DUP)
1203938768	439739003(BDW01-18-150415) Matrix Spike (MS)
1203938769	439739003(BDW01-18-150415) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001 REV# 19.

**Calibration Information:****Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibration was performed in December 2017.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:****Blank Information**

Aliquots for samples 1203938766 (MB) and 1203938770 (LCS) were changed to 1.0 per client request.

**Method Blank Criteria**

The Method Blank (MB) met acceptance criteria.

**CSU**

The blank result is less than 1.65 times the CSU.

**Blank Decision Level**

The blank result is less than the decision level.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Designated QC**

The following sample was used for QC: 439739003 (BDW01-18-150415). The QC was from ARSL work order 439739.

**Matrix Spike (MS) Recovery**

The MS spike recoveries met acceptance limits.

**Duplication Criteria between MS and MSD**

The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) met the duplication acceptance criteria.

**Duplication Criteria between QC Sample and Duplicate Sample**

The QC Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1203938767 (BDW01-18-150415DUP)	ALPHA	RPD 34.5* (0.00%-20.00%) RER 0.587 (0-1)

**RDL Met**

The method RDL has been met.

**Technical Information:****Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Negative > 3 sigma TPU**

Samples results are not more negative than three sigma TPU.

**Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

**Gross Alpha/Beta Preparation Information**

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame

until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating, especially to a dull red heat. For this sample set, the prepared planchet was counted for beta activity before being flamed. After flaming, the planchet was counted for alpha activity.

**Recounts**

None of the samples in this sample set were recounted.

**Miscellaneous Information:****Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

**Additional Comments**

The matrix spike and matrix spike duplicate, 1203938768 (BDW01-18-150415MS) and 1203938769 (BDW01-18-150415MSD), aliquots were reduced to conserve sample volume.

**Qualifier Information**

Manual qualifiers were not required.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.



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### Qualifier Definition Report for

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2018-1201 GEL Work Order: 439737

**The Qualifiers in this report are defined as follows:**

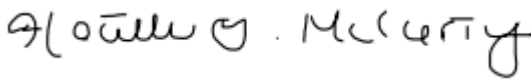
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

**Review/Validation**

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

**Signature:**



**Name:** Heather McCarty

**Date:** 03 JAN 2018

**Title:** Analyst II

# Sample Data Summary

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Los Alamos National Laboratory  
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Report Date: January 3, 2018

Client Sample ID: CAWA-18-148944  
Sample ID: 439737004  
Matrix: W  
Collect Date: 06-DEC-17  
Receive Date: 09-DEC-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241	U	3.20E-09	+/-0.0102	0.0393	0.0164	+/-0.0102	0.050	pCi/L			HAKB	12/16/17	1659	1725235	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	-0.00865	+/-0.00684	0.0436	0.0189	+/-0.00684	0.050	pCi/L			HAKB	12/16/17	1658	1725240	2
Plutonium-239/240	U	-0.0108	+/-0.00838	0.0469	0.0205	+/-0.00838	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234	U	0.0683	+/-0.015	0.126	0.0595	+/-0.0154	1.00	pCi/L			HAKB	12/16/17	1636	1725243	3
Uranium-235/236	U	0.0271	+/-0.010	0.0589	0.0254	+/-0.0101	1.00	pCi/L							
Uranium-238	U	0.0171	+/-0.0127	0.0623	0.0278	+/-0.0127	0.500	pCi/L							
<b>Rad Gamma Spec Analysis</b>															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	-1.46	+/-1.08	3.58	1.47	+/-1.14	8.00	pCi/L			BSW1	12/12/17	0940	1725107	4
Cobalt-60	U	1.22	+/-1.17	5.28	2.17	+/-1.20	8.00	pCi/L							
Neptunium-237	U	-3.0	+/-2.31	7.09	3.13	+/-2.41		pCi/L							
Potassium-40	U	23.3	+/-16.3	50.8	20.6	+/-16.4		pCi/L							
Sodium-22	U	1.21	+/-1.13	5.21	2.15	+/-1.16		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	-0.144	+/-0.124	0.478	0.218	+/-0.124	0.500	pCi/L			LXB3	12/19/17	1551	1726106	5
<i>WSP-GrossA/B "As Received"</i>															
Beta	U	-0.293	+/-0.401	1.37	0.668	+/-0.401	3.00	pCi/L			AXH4	12/18/17	1922	1726298	6
Alpha	U	0.333	+/-0.744	2.83	1.14	+/-0.745	3.00	pCi/L			AXH4	12/19/17	1058	1726298	7

### The following Analytical Methods were performed

Method	Description
1	HASL-300:AM-241
2	HASL-300:ISOPU
3	HASL-300:ISOU
4	EPA:901.1
5	EPA:905.0
6	EPA 900.0/SW846 9310
7	EPA 900.0/SW846 9310

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer	Alphaspec Am241 Liquid "As Received"	1725235	78.5	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1725240	74.5	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1725243	71.8	(50%-105%)

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Los Alamos National Laboratory  
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAWA-18-148944

Sample ID: 439737004

Report Date: January 3, 2018

Project: ESHL00114

Client ID: ARSL004

Parameter	Qualifier	Result Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test							Batch ID	Recovery%	Acceptable Limits				
Strontium Carrier		GFPC, Sr90, liquid "As Received"						1726106	99.4	(50%-105%)				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 68% confidence level (1-sigma).

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

# **Quality Control Summary**

# GEL LABORATORIES LLC

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## QC Summary

**Client :** Los Alamos National Laboratory  
TA-00, SM1237, Rm104C

**Report Date:** January 3, 2018  
**Page 1 of 6**

**Los Alamos, New Mexico**

**Contact:** Ms. Nita Patel

**Workorder:** 439737

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1725235										
QC1203936058	439739003	DUP									
Americium-241	U	0.00752	U	0.00214	pCi/L	0.212		(0-1)	HAKB	12/16/17	16:58
	Uncert:	+/-0.00703		+/-0.00565							
	TPU:	+/-0.00704		+/-0.00565							
**Americium-243 Tracer	2.62	2.42		2.26	pCi/L		86.2	(50%-105%)			
	Uncert:	+/-0.0701		+/-0.0746							
	TPU:	+/-0.133		+/-0.137							
QC1203936059	LCS										
Americium-241	1.97			2.01	pCi/L		102	(80%-120%)	HAKB	12/16/17	16:58
	Uncert:			+/-0.0539							
	TPU:			+/-0.101							
**Americium-243 Tracer	2.10			2.05	pCi/L		97.9	(50%-105%)			
	Uncert:			+/-0.0549							
	TPU:			+/-0.105							
QC1203936057	MB										
Americium-241			U	0.00931	pCi/L				HAKB	12/16/17	16:59
	Uncert:			+/-0.0076							
	TPU:			+/-0.00761							
**Americium-243 Tracer	2.10			1.81	pCi/L		86.4	(50%-105%)			
	Uncert:			+/-0.057							
	TPU:			+/-0.107							
Batch	1725240										
QC1203936068	439739003	DUP									
Plutonium-238	U	0.00988	U	0.00	pCi/L	0.525		(0-1)	HAKB	12/16/17	16:59
	Uncert:	+/-0.00593		+/-0.00346							
	TPU:	+/-0.00594		+/-0.00346							
Plutonium-239/240	U	-0.00395	U	-0.0171	pCi/L	0.421		(0-1)			
	Uncert:	+/-0.00684		+/-0.00883							
	TPU:	+/-0.00684		+/-0.00883							
**Plutonium-242 Tracer	2.47	2.32		1.73	pCi/L		70.2	(50%-105%)			
	Uncert:	+/-0.0703		+/-0.0782							
	TPU:	+/-0.121		+/-0.130							
QC1203936069	LCS										
Plutonium-238			U	0.0181	pCi/L			(80%-120%)	HAKB	12/19/17	12:32
	Uncert:			+/-0.00973							
	TPU:			+/-0.00977							
Plutonium-239/240	1.98			2.06	pCi/L		104	(80%-120%)			
	Uncert:			+/-0.0724							
	TPU:			+/-0.119							
**Plutonium-242 Tracer	1.97			1.39	pCi/L		70.6	(50%-105%)			
	Uncert:			+/-0.0716							
	TPU:			+/-0.116							

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## QC Summary

Workorder: 439737

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1725240										
QC1203936067	MB										
Plutonium-238			U	3.07E-10	pCi/L				HAKB	12/16/17	16:59
				Uncert:							
				TPU:							
Plutonium-239/240			U	0.00184	pCi/L						
				Uncert:							
				TPU:							
**Plutonium-242 Tracer	1.97			1.55	pCi/L		78.4	(50%-105%)			
				Uncert:							
				TPU:							
Batch	1725243										
QC1203936074	439739003	DUP									
Uranium-234		8.33		8.68	pCi/L	0.193		(0-1)	HAKB	12/16/17	16:36
		Uncert:		+/-0.151							
		TPU:		+/-0.439							
Uranium-235/236		0.413		0.368	pCi/L	0.27		(0-1)			
		Uncert:		+/-0.0377							
		TPU:		+/-0.0429							
Uranium-238		5.53		5.46	pCi/L	0.0602		(0-1)			
		Uncert:		+/-0.123							
		TPU:		+/-0.300							
**Uranium-232 Tracer	2.62	1.70		1.80	pCi/L		68.8	(50%-105%)			
		Uncert:		+/-0.0855							
		TPU:		+/-0.155							
QC1203936075	LCS										
Uranium-234				2.74	pCi/L				HAKB	12/16/17	16:36
		Uncert:		+/-0.070							
		TPU:		+/-0.148							
Uranium-235/236				0.238	pCi/L						
		Uncert:		+/-0.024							
		TPU:		+/-0.0266							
Uranium-238	2.70			2.82	pCi/L		104	(80%-120%)			
		Uncert:		+/-0.0707							
		TPU:		+/-0.151							
**Uranium-232 Tracer	2.09			1.60	pCi/L		76.5	(50%-105%)			
		Uncert:		+/-0.0622							
		TPU:		+/-0.117							
QC1203936073	MB										
Uranium-234			U	0.0533	pCi/L				HAKB	12/16/17	16:36
		Uncert:		+/-0.0134							
		TPU:		+/-0.0136							
Uranium-235/236			U	0.0318	pCi/L						
		Uncert:		+/-0.00964							
		TPU:		+/-0.00976							
Uranium-238			U	0.0331	pCi/L						
		Uncert:		+/-0.0116							
		TPU:		+/-0.0117							

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## QC Summary

Workorder: 439737

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1725243										
**Uranium-232 Tracer	2.09			1.78	pCi/L		85.1	(50%-105%)			
	Uncert:			+/-0.0636							
	TPU:			+/-0.119							
<b>Rad Gamma Spec</b>											
Batch	1725107										
QC1203935581	439739003	DUP									
Cesium-137	U	-0.958	U	-0.149	pCi/L	0.141		(0-1)	BSW1	12/12/17	12:00
	Uncert:	+/-1.33		+/-1.53							
	TPU:	+/-1.35		+/-1.53							
Cobalt-60	U	-1.3	U	2.02	pCi/L	0.569		(0-1)			
	Uncert:	+/-1.19		+/-1.62							
	TPU:	+/-1.23		+/-1.69							
Neptunium-237	U	2.96	U	-5.15	pCi/L	0.686		(0-1)			
	Uncert:	+/-2.52		+/-3.07							
	TPU:	+/-2.62		+/-3.30							
Potassium-40	U	4.41	U	-66.4	pCi/L	0.794		(0-1)			
	Uncert:	+/-15.4		+/-24.7							
	TPU:	+/-15.4		+/-29.2							
Sodium-22	U	-1.83	U	-0.178	pCi/L	0.264		(0-1)			
	Uncert:	+/-1.23		+/-1.83							
	TPU:	+/-1.30		+/-1.83							
QC1203935582	LCS										
Americium-241	34300			38200	pCi/L		111	(80%-120%)	BSW1	12/12/17	14:01
	Uncert:			+/-868							
	TPU:			+/-2020							
Cesium-137	13000			13200	pCi/L		102	(80%-120%)			
	Uncert:			+/-177							
	TPU:			+/-579							
Cobalt-60	11100			11600	pCi/L		104	(80%-120%)			
	Uncert:			+/-188							
	TPU:			+/-553							
Neptunium-237				244	pCi/L						
	Uncert:			+/-99.9							
	TPU:			+/-115							
Potassium-40			U	-73.5	pCi/L						
	Uncert:			+/-122							
	TPU:			+/-123							
Sodium-22			U	11.7	pCi/L						
	Uncert:			+/-17.2							
	TPU:			+/-17.5							
QC1203935580	MB										
Cesium-137			U	4.16	pCi/L				BSW1	12/12/17	11:22
	Uncert:			+/-1.28							
	TPU:			+/-1.61							
Cobalt-60			U	0.239	pCi/L						
	Uncert:			+/-1.03							



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## QC Summary

Workorder: 439737

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1725107										
Neptunium-237	TPU:			+/-1.03							
			U	2.26	pCi/L						
	Uncert:			+/-2.31							
Potassium-40	TPU:			+/-2.37							
			U	18.8	pCi/L						
	Uncert:			+/-18.5							
Sodium-22	TPU:			+/-18.5							
			U	-0.0392	pCi/L						
	Uncert:			+/-1.25							
	TPU:			+/-1.25							
<b>Rad Gas Flow</b>											
Batch	1726106										
QC1203938212	439739003	DUP									
Strontium-90	U	0.159	U	0.196	pCi/L	0.0671		(0-1)	LXB3	12/20/17	14:22
	Uncert:	+/-0.134		+/-0.138							
	TPU:	+/-0.134		+/-0.139							
**Strontium Carrier	7.85	6.80		7.50	mg		95.5	(50%-105%)			
QC1203938214	LCS										
Strontium-90	23.6			23.6	pCi/L		99.9	(80%-120%)	LXB3	12/19/17	15:50
	Uncert:			+/-0.687							
	TPU:			+/-2.01							
**Strontium Carrier	7.85			7.00	mg		89.2	(50%-105%)			
QC1203938211	MB										
Strontium-90			U	0.0216	pCi/L				LXB3	12/19/17	15:50
	Uncert:			+/-0.0796							
	TPU:			+/-0.0796							
**Strontium Carrier	7.85			7.50	mg		95.5	(50%-105%)			
QC1203938213	439739003	MS									
Strontium-90	473	U	0.159	478	pCi/L		101	(75%-125%)	LXB3	12/19/17	15:50
	Uncert:		+/-0.134	+/-14.1							
	TPU:		+/-0.134	+/-40.6							
**Strontium Carrier	7.85	6.80		7.40	mg		94.3	(50%-105%)			
Batch	1726298										
QC1203938767	439739003	DUP									
Alpha		11.5		16.3	pCi/L	0.587		(0-1)	AXH4	12/19/17	10:58
	Uncert:	+/-1.54		+/-1.78							
	TPU:	+/-1.84		+/-2.24							
Beta		6.79		5.48	pCi/L	0.457		(0-1)		12/18/17	19:22
	Uncert:	+/-0.543		+/-0.459							
	TPU:	+/-0.786		+/-0.651							
QC1203938770	LCS										
Alpha	12.1			12.7	pCi/L		105	(80%-120%)	AXH4	12/19/17	10:58
	Uncert:			+/-0.585							
	TPU:			+/-1.24							
Beta	47.3			52.6	pCi/L		111	(80%-120%)		12/19/17	06:29

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## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1726298										
				Uncert:							
				TPU:							
QC1203938766	MB										
Alpha			U	-0.145	pCi/L				AXH4	12/19/17	11:00
				Uncert:							
				TPU:							
Beta			U	-0.159	pCi/L					12/19/17	06:23
				Uncert:							
				TPU:							
QC1203938768	439739003	MS									
Alpha		483	11.5	574	pCi/L		116	(75%-125%)	AXH4	12/19/17	10:58
		Uncert:	+/-1.54	+/-28.5							
		TPU:	+/-1.84	+/-56.9							
Beta		1890	6.79	2070	pCi/L		109	(75%-125%)		12/19/17	06:23
		Uncert:	+/-0.543	+/-36.9							
		TPU:	+/-0.786	+/-176							
QC1203938769	439739003	MSD									
Alpha		483	11.5	557	pCi/L	0.0774	113	(0-1)	AXH4	12/19/17	10:58
		Uncert:	+/-1.54	+/-26.7							
		TPU:	+/-1.84	+/-54.2							
Beta		1890	6.79	1910	pCi/L	0.237	101	(0-1)		12/19/17	06:25
		Uncert:	+/-0.543	+/-34.1							
		TPU:	+/-0.786	+/-162							

### Notes:

TPU and Counting Uncertainty are calculated at the 68% confidence level (1-sigma).

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- M REMF Result > MDC/CL and < RDL
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.

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## QC Summary

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Parmname	NOM	Sample Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
R	Sample results are rejected									
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.									
UI	Gamma Spectroscopy--Uncertain identification									
UJ	Gamma Spectroscopy--Uncertain identification									
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.									
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.									
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.									
h	Preparation or preservation holding time was exceeded									

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

\*\* Indicates analyte is a surrogate/tracer compound.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.