

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:



2018-545		TEST - Explosives		YES	NO
Samples collected from a WFO area?					X
Field Test for Explosives Results				YES	NO
Spot test shows presence of explosives residues. If YES - Do not ship.				X	

TEST - Chemical Preservation		YES	NO
Samples are chemically preserved?		X	
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.			X

TEST - Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity?				X
Sample Activity (dpm/100cm <sup>2</sup> )	Shipment Activity (dpm/g/100cm <sup>2</sup> )	Sampled Location	YES	NO
Alpha detectable	Alpha >160,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49		X
Alpha > 125	Alpha >1,250,000	other locations		
Beta > 1,500	Beta >15,000,000	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?		X	
Sample Activity (pCi/g)	Shipment Activity (pCi)	YES	NO
<ul style="list-style-type: none"> <li>Am-241 &gt; 27</li> <li>Cs-137 &gt; 270</li> <li>Pu-238 &gt; 27</li> <li>Pu-239/240 &gt; 27</li> <li>Th-228 &gt; 27</li> <li>U-234 &gt; 270</li> <li>U-238 &gt; 270</li> <li>H-3 &gt; 27,000,000</li> </ul>	<ul style="list-style-type: none"> <li>Am-241 &gt; 270,000</li> <li>Cs-137 &gt; 270,000</li> <li>Pu-238 &gt; 270,000</li> <li>Pu-239/240 &gt; 270,000</li> <li>Th-228 &gt; 270,000</li> <li>U-234 &gt; 1,600,000,000</li> <li>U-238 &gt; unlimited</li> <li>H-3 &gt; 27,000,000,000</li> </ul>		X
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.			X
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.			X

TEST - AK		YES	NO	NA
The shippers documented knowledge of the sample positively identifies appropriate labeling.				X
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.				X

HOLD SAMPLES FOR ANALYSIS	
The samples are held per ER-SOP-10094, Rev. 1, 5.2.2 [7]	

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) Melissa Martin	10/23/17
(Signature)	3W

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) MATT ENGLERT	10-23-17
(Signature) M. Engler	1500

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147558

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-20-17	OK	FIELD MATRIX:	W	OK
TIME COLLECTED (HH:MM):	1250		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	RSP	
LOCATION ID:	R-40 Si		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	TEST	
TOP DEPTH:			SAMPLE USAGE:	TEST	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	NA
	WSP- GENINORG+PerChlorat e	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 Dissolved Oxygen \_\_\_\_\_ Flow (in gpm) \_\_\_\_\_

Oxidation-Reduction \_\_\_\_\_ pH \_\_\_\_\_ Specific \_\_\_\_\_

Potential \_\_\_\_\_ Turbidity \_\_\_\_\_

Temperature \_\_\_\_\_

COLLECTED BY (PRINT): W. Pryce, D. Hughes

RELINQUISHED BY (Printed Name) Tanya Vander Vis (Signature) Tanya Vander Vis	Date/Time 10-20-17 1335	RECEIVED BY MATT ENGLERT (Printed Name) (Signature) [Signature]	Date/Time 10-20-17 1335
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147573

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10/20/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1212	OK	MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-57 S2		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:	↓		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / 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 \_\_\_\_\_ Dissolved Oxygen \_\_\_\_\_ Flow (in gpm) \_\_\_\_\_  
 Oxidation-Reduction \_\_\_\_\_ pH \_\_\_\_\_ Specific \_\_\_\_\_  
 Potential \_\_\_\_\_ Turbidity \_\_\_\_\_ Conductance \_\_\_\_\_  
 Temperature \_\_\_\_\_

COLLECTED BY (PRINT): A. Vigil

RELINQUISHED BY (Printed Name) Daniel Sramb (Signature) <i>DSS</i>	Date/Time 10/20/17 1305	RECEIVED BY <i>S. Sherwood</i> (Printed Name) <i>Sherwood</i> (Signature)	Date/Time 10/20/17 1305
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147572

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10/20/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1036	OK	MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-57 S1		FIELD PREP:	F	
LOCATION TYPE:	M		FIELD QC TYPE:	REG	
TOP DEPTH:	↓	↓	SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / 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      Dissolved Oxygen \_\_\_\_\_      Flow (in gpm) \_\_\_\_\_  
 Oxidation-Reduction Potential \_\_\_\_\_      pH \_\_\_\_\_      Specific Conductance \_\_\_\_\_  
 Temperature \_\_\_\_\_      Turbidity \_\_\_\_\_

COLLECTED BY (PRINT): A. Vigil

RELINQUISHED BY (Printed Name) <i>D. Saramb</i> (Signature) <i>[Signature]</i>	Date/Time 10/20/17 1305	RECEIVED BY <i>MAT ENGLERT</i> (Printed Name) <i>M-Englert</i> (Signature)	Date/Time 10-20-17 1305
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147599

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10/20/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1212	OK	MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-57 S2		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-8082-PCB	1 LITER AMBER GLASS	3	ICE		
	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C- SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-8290-D/F	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: none

LOCATION COMMENTS: Sampled 50 ft from running diesel generator

FIELD PARAMETERS:

Sample Time

NA

HH:MM

Dissolved Oxygen

5.89

Flow (in gpm)

3.65

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

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147599

WORK ORDER:

Oxidation-Reduction Potential	<u>210.2</u>	pH	<u>7.88</u>	Specific Conductance	<u>134.4</u>
Temperature	<u>22.3</u>	Turbidity	<u>0.5</u>		

COLLECTED BY (PRINT): A.V. Gil

RELINQUISHED BY (Printed Name) <u>Dannel J. Serrano</u> (Signature) <u>[Signature]</u>	Date/Time <u>10/20/17</u> <u>1305</u>	RECEIVED BY (Printed Name) <u>S. Serrano</u> (Signature) <u>[Signature]</u>	Date/Time <u>10/20/17</u> <u>1305</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147623

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10/20/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1212	OK	MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-57 S2		FIELD PREP:	UF	
LOCATION TYPE:	N		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <del>NA</del>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2 6/10/2017	HCL	Y	NA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time \_\_\_\_\_ HH:MM Dissolved Oxygen \_\_\_\_\_ Flow (in gpm) \_\_\_\_\_

Oxidation-Reduction Potential \_\_\_\_\_ pH \_\_\_\_\_ Specific Conductance \_\_\_\_\_

Temperature \_\_\_\_\_ Turbidity \_\_\_\_\_

COLLECTED BY (PRINT): A.U. Gil

RELINQUISHED BY (Printed Name) Daniel E. Gil (Signature) <i>[Signature]</i>	Date/Time 10/20/17 1305	RECEIVED BY (Printed Name) S. Sherwood (Signature) <i>[Signature]</i>	Date/Time 10/20/17 1305
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147598

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	<u>10/20/2017</u>	<u>OK</u>	FIELD MATRIX:	<u>WG</u>	<u>OK</u>
TIME COLLECTED (HH:MM):	<u>1036</u>	<u>OK</u>	MEDIA:		
PRS ID:	<u>WA</u>		SAMPLE TECH CODE:	<u>CSL</u>	
LOCATION ID:	<u>R-57 S1</u>		FIELD PREP:	<u>UF</u>	
LOCATION TYPE:	<u>NA</u>		FIELD QC TYPE:	<u>REG</u>	
TOP DEPTH:	<u>↓</u>		SAMPLE USAGE:	<u>INV</u>	<u>↓</u>
BOTTOM DEPTH:	<u>↓</u>	<u>↓</u>	EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
<u>NA</u>	MSGP-Hg	500 ML POLY	1	HNO3	<u>Y</u>	<u>NA</u>
<u>↓</u>	WSP-8082-PCB	1 LITER AMBER GLASS	3	ICE	<u>↓</u>	<u>↓</u>
	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8270C- SVOA	1 LITER AMBER GLASS	2	ICE		
	WSP-8290-D/F	1 LITER AMBER GLASS	2	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-GrossA/B	1 LITER POLY	1	HNO3		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
<u>↓</u>	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	<u>↓</u>	<u>↓</u>

SAMPLE COMMENTS: NoneLOCATION COMMENTS: Sampled 50 ft from running diesel generator

FIELD PARAMETERS:

Sample Time

NA

HH:MM

Dissolved Oxygen

5.67

Flow (in gpm)

3.7

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147598

WORK ORDER:

Oxidation-Reduction Potential	<u>176.3</u>	pH	<u>7.83</u>	Specific Conductance	<u>138.3</u>
Temperature	<u>21.4</u>	Turbidity	<u>0.1</u>		

COLLECTED BY (PRINT): A. Vigil

RELINQUISHED BY (Printed Name) <u>Daniel Serrano</u> (Signature) <u>[Signature]</u>	Date/Time <u>10/20/17</u> <u>1305</u>	RECEIVED BY <u>MATT ENGLERT</u> (Printed Name) (Signature) <u>[Signature]</u>	Date/Time <u>10-20-17</u> <u>1305</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147622

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10/20/2017	ck	FIELD MATRIX:	WG	ck
TIME COLLECTED (HH:MM):	1036	ck	MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	DL	
LOCATION ID:	R-57 S1		FIELD PREP:	UF	
LOCATION TYPE:	NA		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	2 TA	HCL	Y	NA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time \_\_\_\_\_ HH:MM Dissolved Oxygen \_\_\_\_\_ Flow (in gpm) \_\_\_\_\_

Oxidation-Reduction Potential \_\_\_\_\_ pH \_\_\_\_\_ Specific Conductance \_\_\_\_\_

Temperature \_\_\_\_\_ Turbidity \_\_\_\_\_

COLLECTED BY (PRINT): A. Vigil

RELINQUISHED BY (Printed Name) Daniel Scramb (Signature) <i>[Signature]</i>	Date/Time 10/20/17 1305	RECEIVED BY MATT ENGELST (Printed Name) <i>[Signature]</i> (Signature)	Date/Time 10-20-17 1305
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

EVENT NAME: Pajarito (TA-54) & Chromium October  
Monthly MY2018 Q1

SAMPLE ID: CAPA-18-147584

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-20-17	OK	FIELD MATRIX:	W	OK
TIME COLLECTED (HH:MM):	1250		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	RSP	
LOCATION ID:	R-40 Si		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	TEST	
TOP DEPTH:			SAMPLE USAGE:	TEST	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <del>NA</del>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: Breezy while sampling

LOCATION COMMENTS: none

## FIELD PARAMETERS:

Sample Time	1250	HH:MM	Dissolved Oxygen	0.09 mg/L	Flow (in gpm)	0.66
Oxidation-Reduction Potential	-138.4 mV		pH	7.57	Specific Conductance	253.1 $\mu S/cm$
Temperature	16.7°C		Turbidity	0.49 NTU		

COLLECTED BY (PRINT): W. Pryce, D. Hughes

RELINQUISHED BY (Printed Name) Tanya VanderVis (Signature) <i>Tanya VanderVis</i>	Date/Time 10-20-17 1335	RECEIVED BY MATT ENGLERT (Printed Name) (Signature) <i>Matt Englert</i>	Date/Time 10-20-17 1335
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

## DATA VALIDATION REPORT

Chain Of Custody No. 2018-545

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
436027	EPA:120.1	2				
436027	EPA:150.1	2				
436027	EPA:160.1	2				
436027	EPA:170.0	4		2		
436027	EPA:245.2	4				
436027	EPA:300.0	2				
436027	EPA:310.1	2				
436027	EPA:335.4	2				
436027	EPA:350.1	2				
436027	EPA:351.2	2				
436027	EPA:353.2	2				
436027	EPA:365.4	2				
436027	EPA:900	2				
436027	EPA:901.1	2				
436027	EPA:905.0	2				
436027	HASL-300:AM-241	2				
436027	HASL-300:ISOPU	2				
436027	HASL-300:ISOU	2				
436027	SM:A2340B	2				
436027	SW-846:6010C	2				
436027	SW-846:6020	2				
436027	SW-846:6850	2				
436027	SW-846:8082	2				
436027	SW-846:8260B	2		2		
436027	SW-846:8270D	2				
436027	SW-846:9060	2				

## 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
436027	EPA:120.1	1714428	1714428	2										1			1				
436027	EPA:150.1	1714456	1714456	2										1			2				
436027	EPA:160.1	1713394	1713394	2					1					1			1				
436027	EPA:170.0	NA	NA	4		2															
436027	EPA:245.2	1717478	1717476	4					1	1				1			1				
436027	EPA:300.0	1712549	1712549	2					1					1			1				
436027	EPA:310.1	1714454	1714454	2						1				1			1				
436027	EPA:335.4	1712340	1712339	2					1	1				1			1				
436027	EPA:350.1	1714362	1714361	2					1	1				1			1				
436027	EPA:351.2	1714720	1714719	2					1	1				1			1				
436027	EPA:353.2	1713174	1713174	2					1					1			1				
436027	EPA:365.4	1713122	1713121	2					1	2				1			2				
436027	EPA:900	1716449	1716449	2					1	1	1			1			1				
436027	EPA:901.1	1711850	1711850	2					1					1			1				
436027	EPA:905.0	1714184	1714184	2					1	1				1			1				
436027	HASL-300:AM-241	1713388	1713388	2					1					1			1				
436027	HASL-300:ISOPU	1713389	1713389	2					1					1			1				
436027	HASL-300:ISOU	1713390	1713390	2					1					1			1				
436027	SM:A2340B	1719596	1719596	2																	
436027	SW-846:6010C	1712490	1712489	2					1	1				1			1				
436027	SW-846:6020	1712520	1712519	2					1	1				1			1				
436027	SW-846:6850	1713226	1713223	2					1	1	1			1							
436027	SW-846:8082	1716000	1715999	2					1	1	1			1							
436027	SW-846:8260B	1714932	1714932	2		2			2					4							
436027	SW-846:8270D	1712677	1712676	2					1	1	1			1							
436027	SW-846:9060	1711615	1711615	2					1					1			1				

### 2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
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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:120.1	GENERAL CHEMISTRY	CAPA-18-147558	1203908703	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPA-18-147558	436027001	TEST	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPA-18-147572	436027003	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPA-18-147573	436027007	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203908702	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147549	1203908781	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147558	436027001	TEST	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147569	1203908841	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147572	436027003	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147573	436027007	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203908780	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147558	436027001	TEST	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147572	436027003	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147573	1203905963	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147573	436027007	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203905962	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203905961	MB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147558	436027001	TEST	1	0	0	0
EPA:170.0	VOC	CAPA-18-147572	436027003	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147573	436027007	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147584	436027002	TEST	1	0	0	0
EPA:170.0	VOC	CAPA-18-147598	436027004	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147599	436027008	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147622	436027006	FTB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147623	436027010	FTB	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147558	1203916130	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147558	1203916132	MS	0	0	1	0
EPA:245.2	INORGANIC	CAPA-18-147558	436027001	TEST	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147572	436027003	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147573	436027007	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147584	436027002	TEST	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147598	436027004	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147599	436027008	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203916129	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203916128	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147558	1203903843	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147558	436027001	TEST	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147572	436027003	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147573	436027007	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203903842	LCS	0	0	4	0

## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:300.0	GENERAL CHEMISTRY	MB	1203903841	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147549	1203908768	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147549	1203908770	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147558	436027001	TEST	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147572	436027003	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147573	436027007	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203908765	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAPA-18-147584	436027002	TEST	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147598	436027004	REG	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147599	436027008	REG	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203903407	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203903406	MB	1	0	0	0
EPA:335.4	INORGANIC	NP160-18-147918	1203903408	DUP	1	0	0	0
EPA:335.4	INORGANIC	NP160-18-147918	1203903409	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147558	1203908497	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147558	1203908498	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147558	436027001	TEST	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147572	436027003	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147573	436027007	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203908496	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203908495	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147584	436027002	TEST	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147589	1203909430	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147589	1203909431	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147598	436027004	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147599	436027008	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203909429	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203909428	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147558	436027001	TEST	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147560	1203905379	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147572	436027003	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147573	436027007	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203905377	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203905376	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147558	436027001	TEST	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147560	1203905251	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147560	1203905252	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147561	1203905253	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147561	1203905254	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147572	436027003	REG	1	0	0	0

## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147573	436027007	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203905250	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203905249	MB	1	0	0	0
EPA:900	RAD	CAPA-18-147598	436027004	REG	2	0	0	0
EPA:900	RAD	CAPA-18-147599	436027008	REG	2	0	0	0
EPA:900	RAD	CAPA-18-147631	1203913665	DUP	2	0	0	0
EPA:900	RAD	CAPA-18-147631	1203913666	MS	0	0	2	0
EPA:900	RAD	CAPA-18-147631	1203913667	MSD	0	0	2	0
EPA:900	RAD	LCS	1203913668	LCS	0	0	2	0
EPA:900	RAD	MB	1203913664	MB	2	0	0	0
EPA:901.1	RAD	CAMO-18-147652	1203902341	DUP	5	0	0	0
EPA:901.1	RAD	CAPA-18-147598	436027004	REG	5	0	0	0
EPA:901.1	RAD	CAPA-18-147599	436027008	REG	5	0	0	0
EPA:901.1	RAD	LCS	1203902342	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203902340	MB	5	0	0	0
EPA:905.0	RAD	CAPA-18-147574	1203907995	DUP	1	0	0	0
EPA:905.0	RAD	CAPA-18-147574	1203907996	MS	0	0	1	0
EPA:905.0	RAD	CAPA-18-147598	436027004	REG	1	0	0	0
EPA:905.0	RAD	CAPA-18-147599	436027008	REG	1	0	0	0
EPA:905.0	RAD	LCS	1203907997	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203907994	MB	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147586	1203905947	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147598	436027004	REG	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147599	436027008	REG	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203905948	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203905946	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147578	1203905950	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147598	436027004	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147599	436027008	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203905951	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203905949	MB	2	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147586	1203905953	DUP	3	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147598	436027004	REG	3	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147599	436027008	REG	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203905954	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203905952	MB	3	0	0	0
SM:A2340B	INORGANIC	CAPA-18-147558	436027001	TEST	1	0	0	0
SM:A2340B	INORGANIC	CAPA-18-147572	436027003	REG	1	0	0	0
SM:A2340B	INORGANIC	CAPA-18-147573	436027007	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147558	1203903673	DUP	17	0	0	0

## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6010C	INORGANIC	CAPA-18-147558	1203903674	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAPA-18-147558	436027001	TEST	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147572	436027003	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147573	436027007	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203903672	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203903671	MB	17	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147558	1203903757	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147558	1203903758	MS	0	0	11	0
SW-846:6020	INORGANIC	CAPA-18-147558	436027001	TEST	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147572	436027003	REG	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147573	436027007	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203903756	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203903755	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147558	436027001	TEST	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147560	1203905526	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147560	1203905527	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147572	436027003	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147573	436027007	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203905525	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203905524	MB	1	0	0	0
SW-846:8082	PESTPCB	CAPA-18-147598	436027005	REG	8	2	0	0
SW-846:8082	PESTPCB	CAPA-18-147599	436027009	REG	8	2	0	0
SW-846:8082	PESTPCB	CAPA-18-147686	1203912462	MS	0	2	2	0
SW-846:8082	PESTPCB	CAPA-18-147686	1203912463	MSD	0	2	2	0
SW-846:8082	PESTPCB	LCS	1203912461	LCS	0	2	2	0
SW-846:8082	PESTPCB	MB	1203912460	MB	8	2	0	0
SW-846:8260B	VOC	CAPA-18-147598	436027004	REG	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147599	436027008	REG	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147622	436027006	FTB	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147623	436027010	FTB	80	3	0	0
SW-846:8260B	VOC	LCS	1203909913	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203909914	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203910785	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203910786	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203909912	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203910784	MB	80	3	0	0
SW-846:8270D	SVOC	CAPA-18-147598	436027004	REG	80	6	0	0
SW-846:8270D	SVOC	CAPA-18-147599	436027008	REG	80	6	0	0
SW-846:8270D	SVOC	LCS	1203904117	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203904116	MB	80	6	0	0

## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:8270D	SVOC	WST15-17-148254	1203904118	MS	0	6	76	0
SW-846:8270D	SVOC	WST15-17-148254	1203904119	MSD	0	6	76	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147584	436027002	TEST	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147598	1203905562	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147598	436027004	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147599	436027008	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203905560	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203905559	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

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	1203905249	METHOD BLANK	EPA:365.4	W	Total Phosphate as Phosphorus	0.0361	J	mg/L	0.050
CAPA-18-147622	436027006	TRIP BLANK	EPA:170.0	W	Temperature	3		Deg C	
CAPA-18-147623	436027010	TRIP BLANK	EPA:170.0	W	Temperature	3		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
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## DATA VALIDATION REPORT

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
CAPA-18-147558	1203905249	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0361	mg/L	0.0961		0.050	Y	5	100	Y
CAPA-18-147572	1203905249	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0361	mg/L	0.0724		0.050	Y	5	100	Y
CAPA-18-147573	1203905249	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0361	mg/L	0.0716		0.050	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

Field Sample ID	Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Spike Recovery	Upper Limit	Lower Limit	Rejection Limit
MB	1203912460	SW-846:8082	4cmx	1716000	11-07-2017	32	122	33	10

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
CAPA-18-147589	1203909431		EPA:351.2	Total Kjeldahl Nitrogen	1714719	11-02-2017	W	111		110	90	10		

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

## DATA VALIDATION REPORT

10. Any Lab Duplicate RPDs outside the desired limits?

Field Sample ID	Lab Sample ID	LD Lab Sample ID	Analytical Method	Parameter Name	Sample Matrix	Lab Result	LD Lab Result	Lab Units	Detect Flag	LD Detect Flag	RPD	RPD Limit
CAPA-18-147573	436027007	1203905963	EPA:160.1	Total Dissolved	W	136	121	mg/L	Y	Y	14.2	5

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

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
R-40 Si	2018-545	CAPA-18-147558	TEST	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.0961	mg/L	0.0961	mg/L			W	10/20/2017		1713122	VAL	Y
R-57 S1	2018-545	CAPA-18-147572	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.0724	mg/L	0.0724	mg/L			W	10/20/2017		1713122	VAL	Y
R-57 S2	2018-545	CAPA-18-147573	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.0716	mg/L	0.0716	mg/L			W	10/20/2017		1713122	VAL	Y
R-57 S1	2018-545	CAPA-18-147598	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	-0.0121	pCi/L	-0.0121	pCi/L	0.0528	0.00852	W	10/20/2017		1713388	VAL	Y
R-57 S1	2018-545	CAPA-18-147598	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	1.66	pCi/L	1.66	pCi/L	8.01	1.97	W	10/20/2017		1711850	VAL	Y
R-57 S1	2018-545	CAPA-18-147598	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-1.75	pCi/L	-1.75	pCi/L	7.11	1.94	W	10/20/2017		1711850	VAL	Y
R-57 S1	2018-545	CAPA-18-147598	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	1.1	pCi/L	1.1	pCi/L	2.71	0.795	W	10/20/2017		1716449	VAL	Y
R-57 S1	2018-545	CAPA-18-147598	REG	INIT	VOC	SW-846:8260B	Methylene Chloride	U	U	V4	N	1.1	ug/L	1.1	ug/L			W	10/20/2017		1714932	VAL	Y
R-57 S1	2018-545	CAPA-18-147598	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	0.543	pCi/L	0.543	pCi/L	10.8	3.01	W	10/20/2017		1711850	VAL	Y
R-57 S1	2018-545	CAPA-18-147598	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0	pCi/L	0	pCi/L	0.0664	0.00766	W	10/20/2017		1713389	VAL	Y
R-57 S1	2018-545	CAPA-18-147598	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.00383	pCi/L	-0.00383	pCi/L	0.0861	0.00856	W	10/20/2017		1713389	VAL	Y
R-57 S1	2018-545	CAPA-18-147598	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-30.4	pCi/L	-30.4	pCi/L	79.1	20.1	W	10/20/2017		1711850	VAL	Y
R-57 S1	2018-545	CAPA-18-147598	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-0.606	pCi/L	-0.606	pCi/L	7.43	1.85	W	10/20/2017		1711850	VAL	Y
R-57 S1	2018-545	CAPA-18-147598	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.0699	pCi/L	0.0699	pCi/L	0.430	0.119	W	10/20/2017		1714184	VAL	Y
R-57 S1	2018-545	CAPA-18-147598	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0313	pCi/L	0.0313	pCi/L	0.0634	0.0144	W	10/20/2017		1713390	VAL	Y
R-57 S2	2018-545	CAPA-18-147599	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	-0.00216	pCi/L	-0.00216	pCi/L	0.0379	0.00648	W	10/20/2017		1713388	VAL	Y
R-57 S2	2018-545	CAPA-18-147599	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	-1.59	pCi/L	-1.59	pCi/L	3.82	1.17	W	10/20/2017		1711850	VAL	Y
R-57 S2	2018-545	CAPA-18-147599	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	1.06	pCi/L	1.06	pCi/L	5.42	1.20	W	10/20/2017		1711850	VAL	Y
R-57 S2	2018-545	CAPA-18-147599	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	1.22	pCi/L	1.22	pCi/L	2.86	0.847	W	10/20/2017		1716449	VAL	Y

## DATA VALIDATION REPORT

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
R-57 S2	2018-545	CAPA-18-147599	REG	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	1.78	pCi/L	1.78	pCi/L	2.52	0.788	W	10/20/2017		1716449	VAL	Y
R-57 S2	2018-545	CAPA-18-147599	REG	INIT	VOC	SW-846:8260B	Methylene Chloride	U	U	V4	N	1.15	ug/L	1.15	ug/L			W	10/20/2017		1714932	VAL	Y
R-57 S2	2018-545	CAPA-18-147599	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-0.805	pCi/L	-0.805	pCi/L	8.34	2.24	W	10/20/2017		1711850	VAL	Y
R-57 S2	2018-545	CAPA-18-147599	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.0429	pCi/L	-0.0429	pCi/L	0.0572	0.0165	W	10/20/2017		1713389	VAL	Y
R-57 S2	2018-545	CAPA-18-147599	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0297	pCi/L	-0.0297	pCi/L	0.0742	0.0195	W	10/20/2017		1713389	VAL	Y
R-57 S2	2018-545	CAPA-18-147599	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	6.84	pCi/L	6.84	pCi/L	69.7	17.6	W	10/20/2017		1711850	VAL	Y
R-57 S2	2018-545	CAPA-18-147599	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	0.159	pCi/L	0.159	pCi/L	4.75	1.13	W	10/20/2017		1711850	VAL	Y
R-57 S2	2018-545	CAPA-18-147599	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.301	pCi/L	0.301	pCi/L	0.444	0.140	W	10/20/2017		1714184	VAL	Y
R-57 S2	2018-545	CAPA-18-147599	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0323	pCi/L	0.0323	pCi/L	0.0655	0.013	W	10/20/2017		1713390	VAL	Y

### Reason Code

### Description

I4

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

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.

U\_LAB

The analytical laboratory qualified the analyte as not detected.

V4

The sample result is less than or equal to 5 times (10 times for acetone, methylene chloride, and 2-butanone) the concentration of the related analyte in the method blank, which indicates the reported detection is considered indistinguishable from contamination in the blank.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147558	R-40 Si	TEST	EPA:120.1	0	1
CAPA-18-147558	R-40 Si	TEST	EPA:150.1	0	1
CAPA-18-147558	R-40 Si	TEST	EPA:160.1	0	1
CAPA-18-147558	R-40 Si	TEST	EPA:170.0	0	1
CAPA-18-147558	R-40 Si	TEST	EPA:245.2	0	1
CAPA-18-147558	R-40 Si	TEST	EPA:300.0	0	4
CAPA-18-147558	R-40 Si	TEST	EPA:310.1	0	2
CAPA-18-147558	R-40 Si	TEST	EPA:350.1	0	1

## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147558	R-40 Si	TEST	EPA:353.2	0	1
CAPA-18-147558	R-40 Si	TEST	EPA:365.4	0	1
CAPA-18-147558	R-40 Si	TEST	SM:A2340B	0	1
CAPA-18-147558	R-40 Si	TEST	SW-846:6010C	0	17
CAPA-18-147558	R-40 Si	TEST	SW-846:6020	0	11
CAPA-18-147558	R-40 Si	TEST	SW-846:6850	0	1
CAPA-18-147572	R-57 S1	REG	EPA:120.1	0	1
CAPA-18-147572	R-57 S1	REG	EPA:150.1	0	1
CAPA-18-147572	R-57 S1	REG	EPA:160.1	0	1
CAPA-18-147572	R-57 S1	REG	EPA:170.0	0	1
CAPA-18-147572	R-57 S1	REG	EPA:245.2	0	1
CAPA-18-147572	R-57 S1	REG	EPA:300.0	0	4
CAPA-18-147572	R-57 S1	REG	EPA:310.1	0	2
CAPA-18-147572	R-57 S1	REG	EPA:350.1	0	1
CAPA-18-147572	R-57 S1	REG	EPA:353.2	0	1
CAPA-18-147572	R-57 S1	REG	EPA:365.4	0	1
CAPA-18-147572	R-57 S1	REG	SM:A2340B	0	1
CAPA-18-147572	R-57 S1	REG	SW-846:6010C	0	17
CAPA-18-147572	R-57 S1	REG	SW-846:6020	0	11
CAPA-18-147572	R-57 S1	REG	SW-846:6850	0	1
CAPA-18-147573	R-57 S2	REG	EPA:120.1	0	1
CAPA-18-147573	R-57 S2	REG	EPA:150.1	0	1
CAPA-18-147573	R-57 S2	REG	EPA:160.1	0	1
CAPA-18-147573	R-57 S2	REG	EPA:170.0	0	1
CAPA-18-147573	R-57 S2	REG	EPA:245.2	0	1
CAPA-18-147573	R-57 S2	REG	EPA:300.0	0	4
CAPA-18-147573	R-57 S2	REG	EPA:310.1	0	2
CAPA-18-147573	R-57 S2	REG	EPA:350.1	0	1
CAPA-18-147573	R-57 S2	REG	EPA:353.2	0	1
CAPA-18-147573	R-57 S2	REG	EPA:365.4	0	1
CAPA-18-147573	R-57 S2	REG	SM:A2340B	0	1
CAPA-18-147573	R-57 S2	REG	SW-846:6010C	0	17
CAPA-18-147573	R-57 S2	REG	SW-846:6020	0	11
CAPA-18-147573	R-57 S2	REG	SW-846:6850	0	1
CAPA-18-147584	R-40 Si	TEST	EPA:170.0	0	1
CAPA-18-147584	R-40 Si	TEST	EPA:245.2	0	1
CAPA-18-147584	R-40 Si	TEST	EPA:335.4	0	1

## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147584	R-40 Si	TEST	EPA:351.2	0	1
CAPA-18-147584	R-40 Si	TEST	SW-846:9060	0	1
CAPA-18-147598	R-57 S1	REG	EPA:170.0	0	1
CAPA-18-147598	R-57 S1	REG	EPA:245.2	0	1
CAPA-18-147598	R-57 S1	REG	EPA:335.4	0	1
CAPA-18-147598	R-57 S1	REG	EPA:351.2	0	1
CAPA-18-147598	R-57 S1	REG	EPA:900	0	2
CAPA-18-147598	R-57 S1	REG	EPA:901.1	0	5
CAPA-18-147598	R-57 S1	REG	EPA:905.0	0	1
CAPA-18-147598	R-57 S1	REG	HASL-300:AM-241	0	1
CAPA-18-147598	R-57 S1	REG	HASL-300:ISOPU	0	2
CAPA-18-147598	R-57 S1	REG	HASL-300:ISOU	0	3
CAPA-18-147598	R-57 S1	REG	SW-846:8082	0	8
CAPA-18-147598	R-57 S1	REG	SW-846:8260B	0	80
CAPA-18-147598	R-57 S1	REG	SW-846:8270D	0	80
CAPA-18-147598	R-57 S1	REG	SW-846:9060	0	1
CAPA-18-147599	R-57 S2	REG	EPA:170.0	0	1
CAPA-18-147599	R-57 S2	REG	EPA:245.2	0	1
CAPA-18-147599	R-57 S2	REG	EPA:335.4	0	1
CAPA-18-147599	R-57 S2	REG	EPA:351.2	0	1
CAPA-18-147599	R-57 S2	REG	EPA:900	0	2
CAPA-18-147599	R-57 S2	REG	EPA:901.1	0	5
CAPA-18-147599	R-57 S2	REG	EPA:905.0	0	1
CAPA-18-147599	R-57 S2	REG	HASL-300:AM-241	0	1
CAPA-18-147599	R-57 S2	REG	HASL-300:ISOPU	0	2
CAPA-18-147599	R-57 S2	REG	HASL-300:ISOU	0	3
CAPA-18-147599	R-57 S2	REG	SW-846:8082	0	8
CAPA-18-147599	R-57 S2	REG	SW-846:8260B	0	80
CAPA-18-147599	R-57 S2	REG	SW-846:8270D	0	80
CAPA-18-147599	R-57 S2	REG	SW-846:9060	0	1
CAPA-18-147622	R-57 S1	FTB	EPA:170.0	0	1
CAPA-18-147622	R-57 S1	FTB	SW-846:8260B	0	80
CAPA-18-147623	R-57 S2	FTB	EPA:170.0	0	1
CAPA-18-147623	R-57 S2	FTB	SW-846:8260B	0	80

November 16, 2017

[gel.com](http://gel.com)

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

Re: LANL- WQH Water Samples  
Work Order: 436027  
SDG: 2018-545

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on October 24, 2017, and analyzed for GC Semivolatile PCB, 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,



Katrina Hiott for  
Valerie Davis  
Project Manager

Chain of Custody: 2018-545  
Enclosures



**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 436027**  
**SDG: 2018-545**

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# Case Narrative

**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 436027  
SDG # : 2018-545**

**November 16, 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 October 24, 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). There are no additional comments concerning sample receipt.

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

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
436027001	CAPA-18-147558
436027002	CAPA-18-147584
436027003	CAPA-18-147572
436027004	CAPA-18-147598
436027005	CAPA-18-147598
436027006	CAPA-18-147622
436027007	CAPA-18-147573
436027008	CAPA-18-147599
436027009	CAPA-18-147599
436027010	CAPA-18-147623

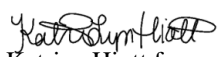
**Case Narrative**

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: GC Semivolatile PCB, 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.



Katrina Hiott for  
Valerie Davis  
Project Manager

**List of current GEL Certifications as of 16 November 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	SC000122017-24
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# **Chain of Custody and Supporting Documentation**



LOC:

2018-545		TEST - Explosives		YES	NO
Samples collected from a WFO area?					X
Field Test for Explosives Results				YES	NO NA
Spot test shows presence of explosives residues. If YES - Do not ship.				X	

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

TEST - Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity?				X
Sample Activity (dpm/100cm <sup>2</sup> )	Shipment Activity (dpm*g/100cm <sup>2</sup> )	Sampled Location	YES	NO NA
Alpha detectable	Alpha >160,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49		X
Alpha > 125	Alpha >1,250,000	other locations		
Beta > 1,500	Beta >15,000,000	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?		X	
Sample Activity (pCi/g)	Shipment Activity (pCi)	YES	NO NA
<ul style="list-style-type: none"> <li>Am-241 &gt; 27</li> <li>Cs-137 &gt; 270</li> <li>Pu-238 &gt; 27</li> <li>Pu-239/240 &gt; 27</li> <li>Th-228 &gt; 27</li> <li>U-234 &gt; 270</li> <li>U-238 &gt; 270</li> <li>H-3 &gt; 27,000,000</li> </ul>	<ul style="list-style-type: none"> <li>Am-241 &gt; 270,000</li> <li>Cs-137 &gt; 270,000</li> <li>Pu-238 &gt; 270,000</li> <li>Pu-239/240 &gt; 270,000</li> <li>Th-228 &gt; 270,000</li> <li>U-234 &gt; 1,600,000,000</li> <li>U-238 &gt; unlimited</li> <li>H-3 &gt; 27,000,000,000</li> </ul>		X
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.			X
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.			X

TEST - AK		YES	NO	NA
The shippers documented knowledge of the sample positively identifies appropriate labeling.				X
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.				X

HOLD SAMPLES FOR ANALYSIS	
The samples are held per ER-SOP-10094, Rev. 1, 5.2.2 [7]	

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) Melissa Martin	10/23/17
(Signature)	3:00

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) Matt Englert	10-23-17
(Signature) M. Englert	15:00



Laboratories LLC

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <u>ESHL</u>		SDG/AR/COC/Work Order: <u>436027</u>	
Received By: <u>ZKW</u>		Date Received: <u>10/24/17</u>	
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input checked="" type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>5908 1783 0276-3C</u> <u>5906 1783 0243-212 (van)</u> <u>5908 1783 0254-3C</u> <u>5906 1783 0265-3C</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> <u>CPM</u> / 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 <input checked="" type="checkbox"/> Ice Packs Dry ice <input checked="" type="checkbox"/> None Other: _____ *all temperatures are recorded in Celsius TEMP: <u>See Above</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR3-16</u> 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 Damaged container Leaking container Other (describe)
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 ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No ___ 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 type="checkbox"/>	<input type="checkbox"/>	<input checked="" 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

Date

10/24/17

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

SHIP DATE: 23OCT17  
ACTWGT: 30.0 LB MAN  
CAD: 0014176/CAFE2916

BILL SENDER

KEITH GREENE  
LOS ALAMOS NATL LAB.  
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

CAD: 0014176/CAFE2916

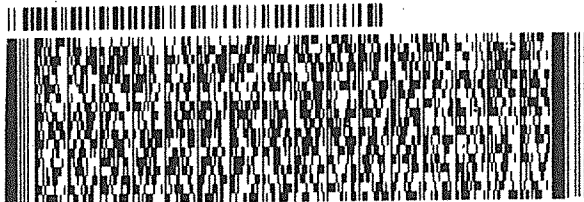
BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWS0



FedEx  
Express



TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWS0



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0276  
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1 of 3  
TRK# 5908 1783 0243  
0201

## MASTER ##

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RT 257  
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SC-US

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TRK# 5908 1783 027  
0201

X7 RBWA

RT 257  
ST F1

24 OCT 10

PRIORITY OVERNIGHT

29

SC-US

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: 23OCT17  
ACTWGT: 34.0 LB MAN  
CAD: 0014176/CAFE2916

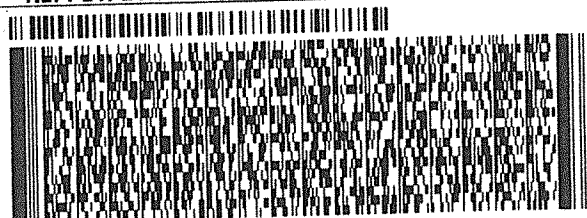
BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWS0



FedEx  
Express



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: 23OCT17  
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CAD: 0014176/CAFE2916

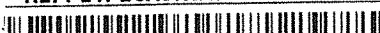
BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWS0



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Express



3 of 3  
MPS# 5908 1783 0265  
0263

Mstr# 5908 1783 0243

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PRIORITY OVERNIGHT

2 of 3  
MPS# 5908 1783 0254  
0263

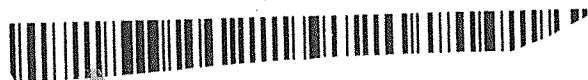
Mstr# 5908 1783 0243

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TUE - 24 OCT 10:30  
PRIORITY OVERNIGHT

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# **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 #: 2018-545  
Work Order #: 436027**

**Method/Analysis Information**

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

Analytical Method: SW-846:8260B

Analytical Batch Number: 1714932

**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>
436027004	CAPA-18-147598
436027006	CAPA-18-147622
436027008	CAPA-18-147599
436027010	CAPA-18-147623
1203909912	Method Blank (MB)
1203909913	Laboratory Control Sample (LCS)
1203909914	Laboratory Control Sample (LCS)
1203909915	436322007(CAPA-18-147578) Post Spike (PS)
1203909916	436322007(CAPA-18-147578) Post Spike (PS)
1203909917	436322007(CAPA-18-147578) Post Spike Duplicate (PSD)
1203909918	436322007(CAPA-18-147578) Post Spike Duplicate (PSD)
1203910784	Method Blank (MB)
1203910785	Laboratory Control Sample (LCS)
1203910786	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 spike recoveries met the acceptance limits.

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

Sample 436322007 (CAPA-18-147578) was designated for spike analysis.

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

The spike and/or spike duplicate 1203909917 (CAPA-18-147578PSD) recoveries were not all within the acceptance limits.

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

The RPDs between the matrix spike pair met the acceptance limits.

##### **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:

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>
VOA9.I	Agilent 6890/5973 GC/MS w/ OI Eclipse/Archon Autosampler	HP6890/HP5973	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10
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: 2018-545 GEL Work Order: 436027

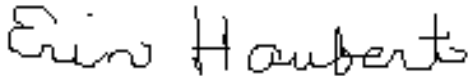
#### The Qualifiers in this report are defined as follows:

- \* 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: Erin Haubert

Date: 15 NOV 2017

Title: Data Validator

# **Sample Data Summary**

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

Page 1 of 3

SDG Number: 2018-545

Lab Sample ID: 436027004

Date Collected: 10/20/2017 10:36

Date Received: 10/24/2017 08:55

Matrix: W

Client ID: CAPA-18-147598

Batch ID: 1714932

Run Date: 11/01/2017 18:18

Prep Date: 11/01/2017 18:18

Data File: 110117V9\9Q317.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

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**

Page 2 of 3

SDG Number: 2018-545

Lab Sample ID: 436027004

Date Collected: 10/20/2017 10:36

Date Received: 10/24/2017 08:55

Matrix: W

Client ID: CAPA-18-147598

Batch ID: 1714932

Run Date: 11/01/2017 18:18

Prep Date: 11/01/2017 18:18

Data File: 110117V9\9Q317.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

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
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	J	1.10	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**

Page 3 of 3

**SDG Number:** 2018-545  
**Lab Sample ID:** 436027004

**Date Collected:** 10/20/2017 10:36

**Matrix:** W

**Date Received:** 10/24/2017 08:55

**Client:** ARSL004

**Project:** ESHL00114

**Method:** SW-846:8260B

**SOP Ref:** GL-OA-E-038

**Batch ID:** 1714932

**Inst:** VOA9.I

**Dilution:** 1

**Run Date:** 11/01/2017 18:18

**Analyst:** RXY1

**Purge Vol:** 5 mL

**Prep Date:** 11/01/2017 18:18

**Data File:** 110117V9\9Q317.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	54.0	50.0	ug/L 108	(71%-134%)
Bromofluorobenzene	49.8	50.0	ug/L 100	(70%-131%)
Toluene-d8	50.2	50.0	ug/L 100	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	12.291	5.97	ug/L	0	J
	unknown siloxane	14.651	12.5	ug/L	0	J

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

Page 1 of 3

SDG Number: 2018-545

Lab Sample ID: 436027006

Date Collected: 10/20/2017 10:36

Date Received: 10/24/2017 08:55

Matrix: W

Client ID: CAPA-18-147622

Batch ID: 1714932

Run Date: 11/01/2017 15:03

Prep Date: 11/01/2017 15:03

Data File: 110117V9\9Q310.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

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**

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SDG Number: 2018-545

Lab Sample ID: 436027006

Date Collected: 10/20/2017 10:36

Date Received: 10/24/2017 08:55

Matrix: W

Client ID: CAPA-18-147622

Batch ID: 1714932

Run Date: 11/01/2017 15:03

Prep Date: 11/01/2017 15:03

Data File: 110117V9\9Q310.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

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
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:** 2018-545  
**Lab Sample ID:** 436027006

**Date Collected:** 10/20/2017 10:36

**Matrix:** W

**Date Received:** 10/24/2017 08:55

**Client:** ARSL004

**Project:** ESHL00114

**Method:** SW-846:8260B

**SOP Ref:** GL-OA-E-038

**Batch ID:** 1714932

**Inst:** VOA9.I

**Dilution:** 1

**Run Date:** 11/01/2017 15:03

**Analyst:** RXY1

**Purge Vol:** 5 mL

**Prep Date:** 11/01/2017 15:03

**Data File:** 110117V9\9Q310.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	50.2	50.0	ug/L 100	(71%-134%)
Bromofluorobenzene	49.2	50.0	ug/L 98	(70%-131%)
Toluene-d8	50.5	50.0	ug/L 101	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	14.651	5.03	ug/L	0	J

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

Page 1 of 3

SDG Number: 2018-545

Lab Sample ID: 436027008

Date Collected: 10/20/2017 12:12

Date Received: 10/24/2017 08:55

Matrix: W

Client ID: CAPA-18-147599

Batch ID: 1714932

Run Date: 11/01/2017 18:46

Prep Date: 11/01/2017 18:46

Data File: 110117V9\9Q318.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

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**

Page 2 of 3

SDG Number: 2018-545

Lab Sample ID: 436027008

Date Collected: 10/20/2017 12:12

Date Received: 10/24/2017 08:55

Matrix: W

Client ID: CAPA-18-147599

Batch ID: 1714932

Run Date: 11/01/2017 18:46

Prep Date: 11/01/2017 18:46

Data File: 110117V9\9Q318.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

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
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	J	1.15	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:** 2018-545  
**Lab Sample ID:** 436027008

**Date Collected:** 10/20/2017 12:12  
**Date Received:** 10/24/2017 08:55

**Matrix:** W

**Client ID:** CAPA-18-147599

**Client:** ARSL004

**Project:** ESHL00114

**Batch ID:** 1714932

**Method:** SW-846:8260B

**SOP Ref:** GL-OA-E-038

**Run Date:** 11/01/2017 18:46

**Inst:** VOA9.I

**Dilution:** 1

**Prep Date:** 11/01/2017 18:46

**Analyst:** RXY1

**Purge Vol:** 5 mL

**Data File:** 110117V9\9Q318.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	54.4	50.0	ug/L 109	(71%-134%)
Bromofluorobenzene	49.7	50.0	ug/L 99	(70%-131%)
Toluene-d8	50.8	50.0	ug/L 102	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	14.651	8.96	ug/L	0	J

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

Page 1 of 3

SDG Number: 2018-545

Lab Sample ID: 436027010

Date Collected: 10/20/2017 12:12

Date Received: 10/24/2017 08:55

Matrix: W

Client ID: CAPA-18-147623

Batch ID: 1714932

Run Date: 11/01/2017 15:31

Prep Date: 11/01/2017 15:31

Data File: 110117V9\9Q311.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

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**

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**SDG Number:** 2018-545  
**Lab Sample ID:** 436027010

**Date Collected:** 10/20/2017 12:12  
**Date Received:** 10/24/2017 08:55

**Matrix:** W

**Client ID:** CAPA-18-147623  
**Batch ID:** 1714932  
**Run Date:** 11/01/2017 15:31  
**Prep Date:** 11/01/2017 15:31  
**Data File:** 110117V9\9Q311.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA9.I  
**Analyst:** RXY1

**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
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:** 2018-545  
**Lab Sample ID:** 436027010

**Date Collected:** 10/20/2017 12:12  
**Date Received:** 10/24/2017 08:55

**Matrix:** W

**Client ID:** CAPA-18-147623

**Client:** ARSL004

**Project:** ESHL00114

**Batch ID:** 1714932

**Method:** SW-846:8260B

**SOP Ref:** GL-OA-E-038

**Run Date:** 11/01/2017 15:31

**Inst:** VOA9.I

**Dilution:** 1

**Prep Date:** 11/01/2017 15:31

**Analyst:** RXY1

**Purge Vol:** 5 mL

**Data File:** 110117V9\9Q311.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	49.6	50.0	ug/L 99	(71%-134%)
Bromofluorobenzene	50.5	50.0	ug/L 101	(70%-131%)
Toluene-d8	49.2	50.0	ug/L 98	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	14.651	7.85	ug/L	0	J

# **Quality Control Summary**

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

Page 1 of 1

**SDG Number: 2018-545****Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203909913	LCS for batch 1714932	97	101	98
1203909914	LCS for batch 1714932	96	100	96
1203909912	MB for batch 1714932	99	99	101
436027006	CAPA-18-147622	100	101	98
436027010	CAPA-18-147623	99	98	101
436027004	CAPA-18-147598	108	100	100
436027008	CAPA-18-147599	109	102	99
1203910785	LCS for batch 1714932	101	106	100
1203910786	LCS for batch 1714932	107	105	98
1203910784	MB for batch 1714932	109	108	101
1203909915	CAPA-18-147578PS	119	109	104
1203909917	CAPA-18-147578PSD	118	104	103
1203909916	CAPA-18-147578PS	110	108	98
1203909918	CAPA-18-147578PSD	112	107	96

**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: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203909913

Instrument: VOA9.I

Analysis Date: 11/01/2017 12:44

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	108	108	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1030	83	61-125
67-64-1	LCS Acetone	250	0.0	308	123	48-157
74-88-4	LCS Iodomethane	250	0.0	245	98	72-128
75-15-0	LCS Carbon disulfide	250	0.0	245	98	69-138
108-05-4	LCS Vinyl acetate	250	0.0	249	100	67-125
78-93-3	LCS 2-Butanone	250	0.0	300	120	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	268	107	66-124
591-78-6	LCS 2-Hexanone	250	0.0	313	125	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	56.9	114	40-160
74-87-3	LCS Chloromethane	50.0	0.0	52.5	105	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	54.6	109	65-137
74-83-9	LCS Bromomethane	50.0	0.0	50.1	100	63-137
75-00-3	LCS Chloroethane	50.0	0.0	50.6	101	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	53.2	106	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	49.8	100	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	52.2	104	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	46.9	94	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	49.1	98	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	52.5	105	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	51.1	102	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	50.5	101	75-123

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203909913

Instrument: VOA9.I

Analysis Date: 11/01/2017 12:44

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	56.9	114	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	50.0	100	76-125
67-66-3	LCS Chloroform	50.0	0.0	49.4	99	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	51.9	104	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	54.3	109	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	47.1	94	74-122
71-43-2	LCS Benzene	50.0	0.0	50.6	101	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	53.6	107	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	48.0	96	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	49.2	98	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	53.5	107	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	52.9	106	78-131
108-88-3	LCS Toluene	50.0	0.0	50.9	102	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	55.1	110	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	49.8	100	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	46.1	92	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	54.3	109	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	57.8	116	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	51.8	104	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	50.3	101	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	50.0	100	73-125

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203909913

Instrument: VOA9.I

Analysis Date: 11/01/2017 12:44

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	52.0	104	74-126
100-42-5	LCS Styrene	50.0	0.0	53.1	106	72-130
75-25-2	LCS Bromoform	50.0	0.0	58.6	117	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	52.3	105	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	48.3	97	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	48.3	97	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	48.4	97	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	50.0	100	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	52.2	104	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	51.1	102	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	49.1	98	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	55.3	111	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	50.9	102	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	52.4	105	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	53.5	107	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	48.5	97	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	49.2	98	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	51.7	103	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	47.8	96	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	55.8	112	72-136
91-20-3	LCS Naphthalene	50.0	0.0	51.9	104	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	53.9	108	70-130

## Volatile

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Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203909913

Instrument: VOA9.I

Analysis Date: 11/01/2017 12:44

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	56.2	112	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	55.9	112	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	47.5	95	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	4540	91	63-138

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203909914

Instrument: VOA9.I

Analysis Date: 11/01/2017 13:11

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	250	100	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	216	86	61-148
107-05-1	LCS	Allyl chloride	250	0.0	213	85	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	230	92	65-122
107-12-0	LCS	Propionitrile	250	0.0	227	91	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	221	88	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	232	93	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	223	89	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2160	86	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	43.1	86	66-147

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-545

Sample Type: Post Spike

Client ID: CAPA-18-147578PS

Matrix: W

Lab Sample ID 1203909915

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:02

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	92.4	92	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1550	124	56-131
67-64-1	PS Acetone	250	0.00 U	129	52	25-155
74-88-4	PS Iodomethane	250	0.00 U	208	83	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	223	89	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	295	118	48-133
78-93-3	PS 2-Butanone	250	0.00 U	187	75	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	262	105	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	219	87	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	61.8	124	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	61.3	123	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	51.7	103	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	50.3	101	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	54.2	108	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	49.0	98	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	55.1	110	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	52.2	104	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	43.2	86	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	45.0	90	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	54.3	109	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	52.7	105	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	45.5	91	69-127

Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-545

Sample Type: Post Spike

Client ID: CAPA-18-147578PS

Matrix: W

Lab Sample ID 1203909915

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:02

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	47.7	95	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	46.4	93	71-130
67-66-3	PS Chloroform	50.0	0.00 U	46.7	93	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	46.4	93	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	44.5	89	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	46.3	93	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	52.4	105	69-130
71-43-2	PS Benzene	50.0	0.00 U	44.2	88	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	46.2	92	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	52.4	105	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	46.9	94	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	48.5	97	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	46.9	94	70-134
108-88-3	PS Toluene	50.0	0.00 U	48.0	96	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	52.4	105	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	52.1	104	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	49.5	99	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	46.9	94	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	49.1	98	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	51.2	102	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	47.1	94	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	47.6	95	61-130

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Post Spike

Client ID: CAPA-18-147578PS

Matrix: W

Lab Sample ID 1203909915

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:02

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	PS o-Xylene	50.0	0.00 U	46.7	93	62-131
100-42-5	PS Styrene	50.0	0.00 U	46.1	92	59-135
75-25-2	PS Bromoform	50.0	0.00 U	50.7	101	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	48.0	96	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	51.3	103	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	50.5	101	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	46.6	93	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	49.2	98	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	49.1	98	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	47.0	94	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	49.2	98	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	46.2	92	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	49.1	98	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	50.0	100	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	48.3	97	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	43.9	88	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	46.9	94	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	49.7	99	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	49.5	99	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	49.0	98	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	48.1	96	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	47.2	94	52-135

## Volatile

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Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-545

Sample Type: Post Spike

Client ID: CAPA-18-147578PS

Matrix: W

Lab Sample ID 1203909915

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:02

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	PS	1,2,4-Trichlorobenzene	50.0	0.00	U	47.1	94	50-133
630-20-6	PS	1,1,1,2-Tetrachloroethane	50.0	0.00	U	49.1	98	71-133
95-50-1	PS	1,2-Dichlorobenzene	50.0	0.00	U	46.5	93	60-125
71-36-3	PS	n-Butyl alcohol	5000	0.00	U	5700	114	60-140

## Volatile

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Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-545

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147578PSD

Matrix: W

Lab Sample ID 1203909917

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:31

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	97.1	97	59-132	5	0-20
75-05-8	PSD Acetonitrile	1250	0.00 U	1680	134 *	56-131	8	0-20
67-64-1	PSD Acetone	250	0.00 U	138	55	25-155	7	0-20
74-88-4	PSD Iodomethane	250	0.00 U	221	88	66-133	6	0-20
75-15-0	PSD Carbon disulfide	250	0.00 U	239	96	61-141	7	0-20
108-05-4	PSD Vinyl acetate	250	0.00 U	317	127	48-133	7	0-20
78-93-3	PSD 2-Butanone	250	0.00 U	204	81	25-143	9	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00 U	279	112	61-127	6	0-20
591-78-6	PSD 2-Hexanone	250	0.00 U	232	93	33-138	6	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00 U	65.9	132	33-164	6	0-20
74-87-3	PSD Chloromethane	50.0	0.00 U	68.1	136	53-139	10	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00 U	56.3	113	58-140	9	0-20
74-83-9	PSD Bromomethane	50.0	0.00 U	55.5	111	59-146	10	0-20
75-00-3	PSD Chloroethane	50.0	0.00 U	57.6	115	65-129	6	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00 U	53.0	106	65-141	8	0-20
60-29-7	PSD Ethyl ether	50.0	0.00 U	60.4	121	69-127	9	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00 U	56.4	113	59-130	8	0-20
75-09-2	PSD Methylene chloride	50.0	0.00 U	45.9	92	62-123	6	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00 U	49.6	99	69-132	10	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00 U	57.8	116	65-127	6	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00 U	55.6	111	67-127	5	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00 U	48.5	97	69-127	6	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147578PSD

Matrix: W

Lab Sample ID 1203909917

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:31

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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 50.0	100	66-137	5	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00	U 51.0	102	71-130	9	0-20
67-66-3	PSD Chloroform	50.0	0.00	U 49.9	100	71-129	7	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00	U 50.6	101	69-139	9	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00	U 47.5	95	67-130	6	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00	U 49.8	100	66-143	7	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00	U 56.3	113	69-130	7	0-20
71-43-2	PSD Benzene	50.0	0.00	U 47.5	95	66-125	7	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00	U 49.1	98	65-131	6	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00	U 55.2	110	67-127	5	0-20
74-95-3	PSD Dibromomethane	50.0	0.00	U 50.9	102	72-129	8	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00	U 51.6	103	70-138	6	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00	U 50.2	100	70-134	7	0-20
108-88-3	PSD Toluene	50.0	0.00	U 49.3	99	60-126	3	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00	U 53.4	107	69-135	2	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00	U 52.2	104	66-125	0	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00	U 52.4	105	67-124	6	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00	U 47.4	95	60-130	1	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00	U 51.8	104	68-143	5	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00	U 53.2	106	71-127	4	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00	U 49.1	98	64-124	4	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00	U 50.6	101	61-130	6	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147578PSD

Matrix: W

Lab Sample ID 1203909917

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:31

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
95-47-6	PSD o-Xylene	50.0	0.00	U 49.2	98	62-131	5	0-20
100-42-5	PSD Styrene	50.0	0.00	U 49.3	99	59-135	7	0-20
75-25-2	PSD Bromoform	50.0	0.00	U 54.2	108	64-138	7	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00	U 50.7	101	55-133	6	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00	U 56.0	112	62-129	9	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00	U 52.5	105	70-124	4	0-20
108-86-1	PSD Bromobenzene	50.0	0.00	U 49.7	99	62-124	7	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00	U 50.8	102	50-133	3	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00	U 51.5	103	53-135	5	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00	U 48.5	97	56-128	3	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00	U 51.9	104	53-130	5	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00	U 49.3	99	55-135	6	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00	U 51.5	103	53-132	5	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00	U 52.7	105	50-138	5	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00	U 50.4	101	49-138	4	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00	U 45.7	91	56-126	4	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00	U 49.2	98	55-125	5	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00	U 52.3	105	43-142	5	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00	U 55.8	112	62-141	12	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00	U 52.8	106	40-147	7	0-20
91-20-3	PSD Naphthalene	50.0	0.00	U 54.6	109	62-134	13	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00	U 51.8	104	52-135	9	0-20

## Volatile

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Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-545

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147578PSD

Matrix: W

Lab Sample ID 1203909917

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:31

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
120-82-1	PSD 1,2,4-Trichlorobenzene	50.0	0.00 U	51.9	104	50-133	10	0-20
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00 U	52.5	105	71-133	7	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00 U	50.4	101	60-125	8	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00 U	6220	124	60-140	9	0-20

## Volatile

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Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-545

Sample Type: Post Spike

Client ID: CAPA-18-147578PS

Matrix: W

Lab Sample ID 1203909916

Instrument: VOA4.I

Analysis Date: 11/07/2017 14:01

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	263	105	49-141
76-13-1	PS Trichlorotrifluoroethane	250	0.00	U	208	83	57-149
107-05-1	PS Allyl chloride	250	0.00	U	261	104	54-128
107-13-1	PS Acrylonitrile	250	0.00	U	270	108	59-129
107-12-0	PS Propionitrile	250	0.00	U	252	101	58-131
126-98-7	PS Methacrylonitrile	250	0.00	U	262	105	59-134
80-62-6	PS Methyl methacrylate	250	0.00	U	200	80	62-135
97-63-2	PS Ethyl methacrylate	250	0.00	U	214	86	60-136
78-83-1	PS Isobutyl alcohol	2500	0.00	U	2650	106	60-143
126-99-8	PS 2-Chloro-1,3-butadiene	50.0	0.00	U	44.5	89	63-146

## Volatile

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Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-545

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147578PSD

Matrix: W

Lab Sample ID 1203909918

Instrument: VOA4.I

Analysis Date: 11/07/2017 14:30

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	299	120	49-141	13	0-20
76-13-1	PSD Trichlorotrifluoroethane	250	0.00	U	228	91	57-149	9	0-20
107-05-1	PSD Allyl chloride	250	0.00	U	282	113	54-128	8	0-20
107-13-1	PSD Acrylonitrile	250	0.00	U	304	121	59-129	12	0-20
107-12-0	PSD Propionitrile	250	0.00	U	278	111	58-131	10	0-20
126-98-7	PSD Methacrylonitrile	250	0.00	U	291	116	59-134	10	0-20
80-62-6	PSD Methyl methacrylate	250	0.00	U	218	87	62-135	8	0-20
97-63-2	PSD Ethyl methacrylate	250	0.00	U	224	90	60-136	4	0-20
78-83-1	PSD Isobutyl alcohol	2500	0.00	U	2830	113	60-143	7	0-20
126-99-8	PSD 2-Chloro-1,3-butadiene	50.0	0.00	U	46.7	93	63-146	5	0-20

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203910785

Instrument: VOA4.I

Analysis Date: 11/07/2017 09:38

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	92.3	92	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1230	99	61-125
67-64-1	LCS Acetone	250	0.0	244	98	48-157
74-88-4	LCS Iodomethane	250	0.0	199	80	72-128
75-15-0	LCS Carbon disulfide	250	0.0	211	84	69-138
108-05-4	LCS Vinyl acetate	250	0.0	277	111	67-125
78-93-3	LCS 2-Butanone	250	0.0	274	110	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	253	101	66-124
591-78-6	LCS 2-Hexanone	250	0.0	299	120	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	62.4	125	40-160
74-87-3	LCS Chloromethane	50.0	0.0	65.1	130	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	55.8	112	65-137
74-83-9	LCS Bromomethane	50.0	0.0	49.9	100	63-137
75-00-3	LCS Chloroethane	50.0	0.0	54.8	110	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	47.7	95	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	55.5	111	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	47.0	94	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	40.1	80	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	42.1	84	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	51.1	102	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	50.2	100	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	44.1	88	75-123

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203910785

Instrument: VOA4.I

Analysis Date: 11/07/2017 09:38

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	45.4	91	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	43.4	87	76-125
67-66-3	LCS Chloroform	50.0	0.0	43.7	87	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	43.6	87	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	43.1	86	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	43.2	86	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	46.2	92	74-122
71-43-2	LCS Benzene	50.0	0.0	43.5	87	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	45.0	90	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	49.4	99	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	43.3	87	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	44.6	89	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	45.4	91	78-131
108-88-3	LCS Toluene	50.0	0.0	47.9	96	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	47.8	96	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	46.7	93	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	45.8	92	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	45.1	90	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	47.5	95	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	46.9	94	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	47.0	94	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	47.7	95	73-125

Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203910785

Instrument: VOA4.I

Analysis Date: 11/07/2017 09:38

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	45.2	90	74-126
100-42-5	LCS Styrene	50.0	0.0	46.8	94	72-130
75-25-2	LCS Bromoform	50.0	0.0	47.8	96	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	47.2	94	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	48.2	96	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	44.3	89	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	45.7	91	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	48.1	96	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	47.7	95	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	45.7	91	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	48.5	97	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	46.9	94	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	47.7	95	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	48.5	97	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	46.8	94	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	42.3	85	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	46.5	93	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	48.2	96	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	43.4	87	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	47.4	95	72-136
91-20-3	LCS Naphthalene	50.0	0.0	46.1	92	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	46.1	92	70-130

## Volatile

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Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203910785

Instrument: VOA4.I

Analysis Date: 11/07/2017 09:38

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	47.7	95	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	49.2	98	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	46.1	92	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	4770	95	63-138

## Volatile

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Quality Control Summary  
Spike Recovery Report

SDG Number: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203910786

Instrument: VOA4.I

Analysis Date: 11/07/2017 10:36

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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	296	118	60-140
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	228	91	61-148
107-05-1	LCS Allyl chloride	250	0.0	280	112	59-125
107-13-1	LCS Acrylonitrile	250	0.0	295	118	65-122
107-12-0	LCS Propionitrile	250	0.0	273	109	64-124
126-98-7	LCS Methacrylonitrile	250	0.0	272	109	64-126
80-62-6	LCS Methyl methacrylate	250	0.0	215	86	69-127
97-63-2	LCS Ethyl methacrylate	250	0.0	220	88	66-130
78-83-1	LCS Isobutyl alcohol	2500	0.0	2720	109	65-135
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	47.6	95	66-147

## Method Blank Summary

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SDG Number:	2018-545	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1714932	Instrument ID:	VOA9.I	Data File:	110117V9\9Q307B1.D
Lab Sample ID:	1203909912	Prep Date:	11/01/2017 13:39	Analyzed:	11/01/17 13:39
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 1714932	1203909913	110117V9\9Q305L1.D	11/01/17	1244
02 LCS for batch 1714932	1203909914	110117V9\9Q306L1.D	11/01/17	1311
03 CAPA-18-147622	436027006	110117V9\9Q310.D	11/01/17	1503
04 CAPA-18-147623	436027010	110117V9\9Q311.D	11/01/17	1531
05 CAPA-18-147598	436027004	110117V9\9Q317.D	11/01/17	1818
06 CAPA-18-147599	436027008	110117V9\9Q318.D	11/01/17	1846

## Method Blank Summary

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SDG Number:	2018-545	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1714932	Instrument ID:	VOA4.I	Data File:	110717V4\4H206B.D
Lab Sample ID:	1203910784	Prep Date:	11/07/2017 11:05	Analyzed:	11/07/17 11:05
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 1714932	1203910785	110717V4\4H203L.D	11/07/17	0938
09 LCS for batch 1714932	1203910786	110717V4\4H205L.D	11/07/17	1036
10 CAPA-18-147578PS	1203909915	110717V4\4H210.D	11/07/17	1302
11 CAPA-18-147578PSD	1203909917	110717V4\4H211.D	11/07/17	1331
12 CAPA-18-147578PS	1203909916	110717V4\4H212.D	11/07/17	1401
13 CAPA-18-147578PSD	1203909918	110717V4\4H213.D	11/07/17	1430

# Quality Control Data

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

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SDG Number: 2018-545

Lab Sample ID: 1203909912

Client Sample: QC for batch 1714932

Client ID: MB for batch 1714932

Batch ID: 1714932

Run Date: 11/01/2017 13:39

Prep Date: 11/01/2017 13:39

Data File: 110117V9\9Q307B1.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

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**

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**SDG Number:** 2018-545  
**Lab Sample ID:** 1203909912  
**Client Sample:** QC for batch 1714932  
**Client ID:** MB for batch 1714932  
**Batch ID:** 1714932  
**Run Date:** 11/01/2017 13:39  
**Prep Date:** 11/01/2017 13:39  
**Data File:** 110117V9\9Q307B1.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA9.I  
**Analyst:** RXY1  
  
**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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<b>SDG Number:</b> 2018-545	<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 1203909912	
<b>Client Sample:</b> QC for batch 1714932	<b>Client:</b> ARSL004
<b>Client ID:</b> MB for batch 1714932	<b>Method:</b> SW-846:8260B
<b>Batch ID:</b> 1714932	<b>Project:</b> QC
<b>Run Date:</b> 11/01/2017 13:39	<b>SOP Ref:</b> GL-OA-E-038
<b>Prep Date:</b> 11/01/2017 13:39	<b>Dilution:</b> 1
<b>Data File:</b> 110117V9\9Q307B1.D	<b>Purge Vol:</b> 5 mL
	<b>Column:</b> 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	49.6	50.0	ug/L 99	(71%-134%)
Bromofluorobenzene	50.5	50.0	ug/L 101	(70%-131%)
Toluene-d8	49.5	50.0	ug/L 99	(74%-124%)

**Tentatively Identified Compound Summary**

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

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

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**SDG Number:** 2018-545  
**Lab Sample ID:** 1203909913  
**Client Sample:** QC for batch 1714932  
**Client ID:** LCS for batch 1714932  
**Batch ID:** 1714932  
**Run Date:** 11/01/2017 12:44  
**Prep Date:** 11/01/2017 12:44  
**Data File:** 110117V9\9Q305L1.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA9.I  
**Analyst:** RXY1  
  
**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		55.9	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		51.9	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		48.3	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		49.8	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		51.1	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		52.2	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		53.9	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		48.3	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		56.2	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		50.9	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		47.8	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		51.8	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		47.5	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		47.1	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		48.0	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		52.2	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		48.5	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		46.1	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		49.2	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		56.9	ug/L	0.300	1.00
78-93-3	2-Butanone		300	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		51.1	ug/L	0.300	1.00
591-78-6	2-Hexanone		313	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		49.1	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		53.5	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		268	ug/L	1.50	5.00
67-64-1	Acetone		308	ug/L	1.50	10.0
75-05-8	Acetonitrile		1030	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		50.6	ug/L	0.300	1.00
108-86-1	Bromobenzene		48.4	ug/L	0.300	1.00
74-97-5	Bromochloromethane		50.0	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		53.5	ug/L	0.300	1.00
75-25-2	Bromoform		58.6	ug/L	0.300	1.00

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

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**SDG Number:** 2018-545  
**Lab Sample ID:** 1203909913  
**Client Sample:** QC for batch 1714932  
**Client ID:** LCS for batch 1714932  
**Batch ID:** 1714932  
**Run Date:** 11/01/2017 12:44  
**Prep Date:** 11/01/2017 12:44  
**Data File:** 110117V9\9Q305L1.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA9.I  
**Analyst:** RXY1  
  
**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		50.1	ug/L	0.300	1.00
75-15-0	Carbon disulfide		245	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		54.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		50.3	ug/L	0.300	1.00
75-00-3	Chloroethane		50.6	ug/L	0.300	1.00
67-66-3	Chloroform		49.4	ug/L	0.300	1.00
74-87-3	Chloromethane		52.5	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		57.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		49.2	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		56.9	ug/L	0.300	1.00
60-29-7	Ethyl ether		49.8	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		50.0	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		55.8	ug/L	0.300	1.00
74-88-4	Iodomethane		245	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		52.3	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		46.9	ug/L	1.00	10.0
91-20-3	Naphthalene		51.9	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		53.1	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		54.3	ug/L	0.300	1.00
108-88-3	Toluene		50.9	ug/L	0.300	1.00
79-01-6	Trichloroethylene		53.6	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		53.2	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		249	ug/L	1.50	5.00
75-01-4	Vinyl chloride		54.6	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		50.5	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		52.9	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		108	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4540	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		51.7	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		50.0	ug/L	0.300	1.00
95-47-6	o-Xylene		52.0	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		52.4	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2018-545  
**Lab Sample ID:** 1203909913  
**Client Sample:** QC for batch 1714932  
**Client ID:** LCS for batch 1714932  
**Batch ID:** 1714932  
**Run Date:** 11/01/2017 12:44  
**Prep Date:** 11/01/2017 12:44  
**Data File:** 110117V9\9Q305L1.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA9.I  
**Analyst:** RXY1  
  
**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		49.1	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		55.3	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		52.5	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		55.1	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	48.6	50.0	ug/L	97	(71%-134%)
Bromofluorobenzene	48.9	50.0	ug/L	98	(70%-131%)
Toluene-d8	50.5	50.0	ug/L	101	(74%-124%)

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

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**SDG Number:** 2018-545  
**Lab Sample ID:** 1203909914  
**Client Sample:** QC for batch 1714932  
**Client ID:** LCS for batch 1714932  
**Batch ID:** 1714932  
**Run Date:** 11/01/2017 13:11  
**Prep Date:** 11/01/2017 13:11  
**Data File:** 110117V9\9Q306L1.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA9.I  
**Analyst:** RXY1  
  
**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		43.1	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		250	ug/L	1.50	5.00
107-13-1	Acrylonitrile		230	ug/L	1.50	5.00
107-05-1	Allyl chloride		213	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**

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**SDG Number:** 2018-545  
**Lab Sample ID:** 1203909914  
**Client Sample:** QC for batch 1714932  
**Client ID:** LCS for batch 1714932  
**Batch ID:** 1714932  
**Run Date:** 11/01/2017 13:11  
**Prep Date:** 11/01/2017 13:11  
**Data File:** 110117V9\9Q306L1.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA9.I  
**Analyst:** RXY1  
  
**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		223	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		2160	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		221	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		232	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		227	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		216	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**

<b>SDG Number:</b>	<b>2018-545</b>	<b>Matrix:</b>	<b>WATER</b>
<b>Lab Sample ID:</b>	<b>1203909914</b>		
<b>Client Sample:</b>	<b>QC for batch 1714932</b>	<b>Client:</b>	<b>ARSL004</b>
<b>Client ID:</b>	<b>LCS for batch 1714932</b>	<b>Method:</b>	<b>SW-846:8260B</b>
<b>Batch ID:</b>	<b>1714932</b>	<b>Inst:</b>	<b>VOA9.I</b>
<b>Run Date:</b>	<b>11/01/2017 13:11</b>	<b>Analyst:</b>	<b>RXY1</b>
<b>Prep Date:</b>	<b>11/01/2017 13:11</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Data File:</b>	<b>110117V9\9Q306L1.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	48.1	50.0	ug/L 96	(71%-134%)
Bromofluorobenzene	48.0	50.0	ug/L 96	(70%-131%)
Toluene-d8	50.2	50.0	ug/L 100	(74%-124%)

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

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**SDG Number:** 2018-545  
**Lab Sample ID:** 1203909915  
**Client Sample:** QC for batch 1714932  
**Client ID:** CAPA-18-147578PS  
**Batch ID:** 1714932  
**Run Date:** 11/07/2017 13:02  
**Prep Date:** 11/07/2017 13:02  
**Data File:** 110717V4\4H210.D

**Date Collected:** 10/24/2017 12:56  
**Date Received:** 10/26/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** VXY1  
  
**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		49.1	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		46.4	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		51.3	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		52.1	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		52.7	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		52.2	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		44.5	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		47.2	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		50.5	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		47.1	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		49.1	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		49.5	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		51.2	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		46.5	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		52.4	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		52.4	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		49.1	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		43.9	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		49.5	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		46.9	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		47.7	ug/L	0.300	1.00
78-93-3	2-Butanone		187	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		47.0	ug/L	0.300	1.00
591-78-6	2-Hexanone		219	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		49.2	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		48.3	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		262	ug/L	1.50	5.00
67-64-1	Acetone		129	ug/L	1.50	10.0
75-05-8	Acetonitrile		1550	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		44.2	ug/L	0.300	1.00
108-86-1	Bromobenzene		46.6	ug/L	0.300	1.00
74-97-5	Bromochloromethane		46.4	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		48.5	ug/L	0.300	1.00
75-25-2	Bromoform		50.7	ug/L	0.300	1.00

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

<b>SDG Number:</b> 2018-545	<b>Date Collected:</b> 10/24/2017 12:56	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203909915	<b>Date Received:</b> 10/26/2017 08:55	
<b>Client Sample:</b> QC for batch 1714932	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAPA-18-147578PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1714932	<b>Inst:</b> VOA4.I	<b>Dilution:</b> 1
<b>Run Date:</b> 11/07/2017 13:02	<b>Analyst:</b> VXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 11/07/2017 13:02		
<b>Data File:</b> 110717V4\4H210.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		50.3	ug/L	0.300	1.00
75-15-0	Carbon disulfide		223	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		46.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		47.1	ug/L	0.300	1.00
75-00-3	Chloroethane		54.2	ug/L	0.300	1.00
67-66-3	Chloroform		46.7	ug/L	0.300	1.00
74-87-3	Chloromethane		61.3	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		49.1	ug/L	0.300	1.00
74-95-3	Dibromomethane		46.9	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		61.8	ug/L	0.300	1.00
60-29-7	Ethyl ether		55.1	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		47.6	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		49.0	ug/L	0.300	1.00
74-88-4	Iodomethane		208	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		48.0	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		43.2	ug/L	1.00	10.0
91-20-3	Naphthalene		48.1	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		46.1	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		46.9	ug/L	0.300	1.00
108-88-3	Toluene		48.0	ug/L	0.300	1.00
79-01-6	Trichloroethylene		46.2	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		49.0	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		295	ug/L	1.50	5.00
75-01-4	Vinyl chloride		51.7	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		45.5	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		46.9	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		92.4	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5700	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		49.7	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		49.2	ug/L	0.300	1.00
95-47-6	o-Xylene		46.7	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		50.0	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b>	<b>2018-545</b>	<b>Date Collected:</b>	<b>10/24/2017 12:56</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203909915</b>	<b>Date Received:</b>	<b>10/26/2017 08:55</b>		
<b>Client Sample:</b>	<b>QC for batch 1714932</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAPA-18-147578PS</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1714932</b>	<b>Inst:</b>	<b>VOA4.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>11/07/2017 13:02</b>	<b>Analyst:</b>	<b>VXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>11/07/2017 13:02</b>				
<b>Data File:</b>	<b>110717V4\4H210.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		45.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		46.2	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		54.3	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		52.4	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	59.6	50.0	ug/L	119	(71%-134%)
Bromofluorobenzene	51.8	50.0	ug/L	104	(70%-131%)
Toluene-d8	54.7	50.0	ug/L	109	(74%-124%)

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

**SDG Number:** 2018-545  
**Lab Sample ID:** 1203909916  
**Client Sample:** QC for batch 1714932  
**Client ID:** CAPA-18-147578PS  
**Batch ID:** 1714932  
**Run Date:** 11/07/2017 14:01  
**Prep Date:** 11/07/2017 14:01  
**Data File:** 110717V4\4H212.D

**Date Collected:** 10/24/2017 12:56  
**Date Received:** 10/26/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** VXY1  
  
**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	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		44.5	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		263	ug/L	1.50	5.00
107-13-1	Acrylonitrile		270	ug/L	1.50	5.00
107-05-1	Allyl chloride		261	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> 2018-545	<b>Date Collected:</b> 10/24/2017 12:56	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203909916	<b>Date Received:</b> 10/26/2017 08:55	
<b>Client Sample:</b> QC for batch 1714932	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAPA-18-147578PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1714932	<b>Inst:</b> VOA4.I	<b>Dilution:</b> 1
<b>Run Date:</b> 11/07/2017 14:01	<b>Analyst:</b> VXY1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 11/07/2017 14:01		
<b>Data File:</b> 110717V4\4H212.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		214	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		2650	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		262	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		200	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		208	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**

<b>SDG Number:</b>	<b>2018-545</b>	<b>Date Collected:</b>	<b>10/24/2017 12:56</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203909916</b>	<b>Date Received:</b>	<b>10/26/2017 08:55</b>		
<b>Client Sample:</b>	<b>QC for batch 1714932</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAPA-18-147578PS</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1714932</b>	<b>Inst:</b>	<b>VOA4.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>11/07/2017 14:01</b>	<b>Analyst:</b>	<b>VXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>11/07/2017 14:01</b>				
<b>Data File:</b>	<b>110717V4\4H212.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	55.0	50.0	ug/L 110	(71%-134%)
Bromofluorobenzene	48.9	50.0	ug/L 98	(70%-131%)
Toluene-d8	54.2	50.0	ug/L 108	(74%-124%)

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

Page 1 of 3

**SDG Number:** 2018-545  
**Lab Sample ID:** 1203909917  
**Client Sample:** QC for batch 1714932  
**Client ID:** CAPA-18-147578PSD  
**Batch ID:** 1714932  
**Run Date:** 11/07/2017 13:31  
**Prep Date:** 11/07/2017 13:31  
**Data File:** 110717V4\4H211.D

**Date Collected:** 10/24/2017 12:56  
**Date Received:** 10/26/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** VXY1  
  
**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		52.5	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		50.6	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		56.0	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		52.2	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		55.6	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		56.4	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		47.5	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		51.8	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		52.5	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		51.9	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		51.5	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		55.8	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		53.2	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		50.4	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		56.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		55.2	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		51.5	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		45.7	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		52.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		49.2	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		50.0	ug/L	0.300	1.00
78-93-3	2-Butanone		204	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		48.5	ug/L	0.300	1.00
591-78-6	2-Hexanone		232	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		51.9	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		50.4	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		279	ug/L	1.50	5.00
67-64-1	Acetone		138	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		47.5	ug/L	0.300	1.00
108-86-1	Bromobenzene		49.7	ug/L	0.300	1.00
74-97-5	Bromochloromethane		51.0	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		51.6	ug/L	0.300	1.00
75-25-2	Bromoform		54.2	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b>	<b>2018-545</b>	<b>Date Collected:</b>	<b>10/24/2017 12:56</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203909917</b>	<b>Date Received:</b>	<b>10/26/2017 08:55</b>		
<b>Client Sample:</b>	<b>QC for batch 1714932</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAPA-18-147578PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1714932</b>	<b>Inst:</b>	<b>VOA4.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>11/07/2017 13:31</b>	<b>Analyst:</b>	<b>VXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>11/07/2017 13:31</b>				
<b>Data File:</b>	<b>110717V4\4H211.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		55.5	ug/L	0.300	1.00
75-15-0	Carbon disulfide		239	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		49.8	ug/L	0.300	1.00
108-90-7	Chlorobenzene		49.1	ug/L	0.300	1.00
75-00-3	Chloroethane		57.6	ug/L	0.300	1.00
67-66-3	Chloroform		49.9	ug/L	0.300	1.00
74-87-3	Chloromethane		68.1	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		51.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		50.9	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		65.9	ug/L	0.300	1.00
60-29-7	Ethyl ether		60.4	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		50.6	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		52.8	ug/L	0.300	1.00
74-88-4	Iodomethane		221	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		50.7	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		45.9	ug/L	1.00	10.0
91-20-3	Naphthalene		54.6	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		49.3	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		47.4	ug/L	0.300	1.00
108-88-3	Toluene		49.3	ug/L	0.300	1.00
79-01-6	Trichloroethylene		49.1	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		53.0	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		317	ug/L	1.50	5.00
75-01-4	Vinyl chloride		56.3	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		48.5	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		50.2	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		97.1	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		6220	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		52.3	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		50.8	ug/L	0.300	1.00
95-47-6	o-Xylene		49.2	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		52.7	ug/L	0.300	1.00

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

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<b>SDG Number:</b>	<b>2018-545</b>	<b>Date Collected:</b>	<b>10/24/2017 12:56</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203909917</b>	<b>Date Received:</b>	<b>10/26/2017 08:55</b>		
<b>Client Sample:</b>	<b>QC for batch 1714932</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAPA-18-147578PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1714932</b>	<b>Inst:</b>	<b>VOA4.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>11/07/2017 13:31</b>	<b>Analyst:</b>	<b>VXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>11/07/2017 13:31</b>				
<b>Data File:</b>	<b>110717V4\4H211.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		49.6	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		49.3	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		57.8	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		53.4	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	59.0	50.0	ug/L	118	(71%-134%)
Bromofluorobenzene	51.5	50.0	ug/L	103	(70%-131%)
Toluene-d8	52.0	50.0	ug/L	104	(74%-124%)

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

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**SDG Number:** 2018-545  
**Lab Sample ID:** 1203909918  
**Client Sample:** QC for batch 1714932  
**Client ID:** CAPA-18-147578PSD  
**Batch ID:** 1714932  
**Run Date:** 11/07/2017 14:30  
**Prep Date:** 11/07/2017 14:30  
**Data File:** 110717V4\4H213.D

**Date Collected:** 10/24/2017 12:56  
**Date Received:** 10/26/2017 08:55  
**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** VXY1  
  
**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	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		46.7	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		299	ug/L	1.50	5.00
107-13-1	Acrylonitrile		304	ug/L	1.50	5.00
107-05-1	Allyl chloride		282	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>2018-545</b>	<b>Date Collected:</b>	<b>10/24/2017 12:56</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203909918</b>	<b>Date Received:</b>	<b>10/26/2017 08:55</b>		
<b>Client Sample:</b>	<b>QC for batch 1714932</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAPA-18-147578PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1714932</b>	<b>Inst:</b>	<b>VOA4.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>11/07/2017 14:30</b>	<b>Analyst:</b>	<b>VXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>11/07/2017 14:30</b>				
<b>Data File:</b>	<b>110717V4\4H213.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		224	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		2830	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		291	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		218	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		278	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		228	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>2018-545</b>	<b>Date Collected:</b>	<b>10/24/2017 12:56</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203909918</b>	<b>Date Received:</b>	<b>10/26/2017 08:55</b>		
<b>Client Sample:</b>	<b>QC for batch 1714932</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAPA-18-147578PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1714932</b>	<b>Inst:</b>	<b>VOA4.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>11/07/2017 14:30</b>	<b>Analyst:</b>	<b>VXY1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>11/07/2017 14:30</b>				
<b>Data File:</b>	<b>110717V4\4H213.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	55.8	50.0	ug/L	112	(71%-134%)
Bromofluorobenzene	48.2	50.0	ug/L	96	(70%-131%)
Toluene-d8	53.4	50.0	ug/L	107	(74%-124%)

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

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SDG Number: 2018-545

Lab Sample ID: 1203910784

Client Sample: QC for batch 1714932

Client ID: MB for batch 1714932

Batch ID: 1714932

Run Date: 11/07/2017 11:05

Prep Date: 11/07/2017 11:05

Data File: 110717V4\4H206B.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: VXY1

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**

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**SDG Number:** 2018-545  
**Lab Sample ID:** 1203910784  
**Client Sample:** QC for batch 1714932  
**Client ID:** MB for batch 1714932  
**Batch ID:** 1714932  
**Run Date:** 11/07/2017 11:05  
**Prep Date:** 11/07/2017 11:05  
**Data File:** 110717V4\4H206B.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** VXY1  
  
**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**

<b>SDG Number:</b> 2018-545	<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 1203910784	
<b>Client Sample:</b> QC for batch 1714932	<b>Client:</b> ARSL004
<b>Client ID:</b> MB for batch 1714932	<b>Method:</b> SW-846:8260B
<b>Batch ID:</b> 1714932	<b>Project:</b> QC
<b>Run Date:</b> 11/07/2017 11:05	<b>SOP Ref:</b> GL-OA-E-038
<b>Prep Date:</b> 11/07/2017 11:05	<b>Dilution:</b> 1
<b>Data File:</b> 110717V4\4H206B.D	<b>Purge Vol:</b> 5 mL
	<b>Column:</b> 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	54.6	50.0	ug/L 109	(71%-134%)
Bromofluorobenzene	50.7	50.0	ug/L 101	(70%-131%)
Toluene-d8	53.8	50.0	ug/L 108	(74%-124%)

**Tentatively Identified Compound Summary**

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

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

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SDG Number: 2018-545

Lab Sample ID: 1203910785

Client Sample: QC for batch 1714932

Client ID: LCS for batch 1714932

Batch ID: 1714932

Run Date: 11/07/2017 09:38

Prep Date: 11/07/2017 09:38

Data File: 110717V4\4H203L.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: VXY1

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		49.2	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		43.6	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		48.2	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		46.7	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		50.2	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		47.0	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		43.1	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		46.1	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		44.3	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		47.7	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		47.7	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		43.4	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		46.9	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		46.1	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		46.2	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		49.4	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		47.7	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		42.3	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		45.8	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		46.5	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		45.4	ug/L	0.300	1.00
78-93-3	2-Butanone		274	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		45.7	ug/L	0.300	1.00
591-78-6	2-Hexanone		299	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		48.5	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		46.8	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		253	ug/L	1.50	5.00
67-64-1	Acetone		244	ug/L	1.50	10.0
75-05-8	Acetonitrile		1230	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		43.5	ug/L	0.300	1.00
108-86-1	Bromobenzene		45.7	ug/L	0.300	1.00
74-97-5	Bromochloromethane		43.4	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		44.6	ug/L	0.300	1.00
75-25-2	Bromoform		47.8	ug/L	0.300	1.00

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

Page 2 of 3

SDG Number: 2018-545

Matrix: WATER

Lab Sample ID: 1203910785

Client Sample: QC for batch 1714932

Client: ARSL004

Project: QC

Client ID: LCS for batch 1714932

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714932

Inst: VOA4.I

Dilution: 1

Run Date: 11/07/2017 09:38

Analyst: VXY1

Purge Vol: 5 mL

Prep Date: 11/07/2017 09:38

Column: DB-624

Data File: 110717V4\4H203L.D

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		49.9	ug/L	0.300	1.00
75-15-0	Carbon disulfide		211	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		43.2	ug/L	0.300	1.00
108-90-7	Chlorobenzene		47.0	ug/L	0.300	1.00
75-00-3	Chloroethane		54.8	ug/L	0.300	1.00
67-66-3	Chloroform		43.7	ug/L	0.300	1.00
74-87-3	Chloromethane		65.1	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		47.5	ug/L	0.300	1.00
74-95-3	Dibromomethane		43.3	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		62.4	ug/L	0.300	1.00
60-29-7	Ethyl ether		55.5	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		47.7	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		47.4	ug/L	0.300	1.00
74-88-4	Iodomethane		199	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		47.2	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		40.1	ug/L	1.00	10.0
91-20-3	Naphthalene		46.1	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		46.8	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		45.1	ug/L	0.300	1.00
108-88-3	Toluene		47.9	ug/L	0.300	1.00
79-01-6	Trichloroethylene		45.0	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		47.7	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		277	ug/L	1.50	5.00
75-01-4	Vinyl chloride		55.8	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		44.1	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		45.4	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		92.3	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4770	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		48.2	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		48.1	ug/L	0.300	1.00
95-47-6	o-Xylene		45.2	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		48.5	ug/L	0.300	1.00

**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2018-545  
**Lab Sample ID:** 1203910785  
**Client Sample:** QC for batch 1714932  
**Client ID:** LCS for batch 1714932  
**Batch ID:** 1714932  
**Run Date:** 11/07/2017 09:38  
**Prep Date:** 11/07/2017 09:38  
**Data File:** 110717V4\4H203L.D

**Client:** ARSL004  
**Method:** SW-846:8260B  
**Inst:** VOA4.I  
**Analyst:** VXY1  
  
**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		42.1	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		46.9	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		51.1	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		47.8	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.4	50.0	ug/L	101	(71%-134%)
Bromofluorobenzene	49.8	50.0	ug/L	100	(70%-131%)
Toluene-d8	53.0	50.0	ug/L	106	(74%-124%)

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

Page 1 of 3

SDG Number: 2018-545

Lab Sample ID: 1203910786

Client Sample: QC for batch 1714932

Client ID: LCS for batch 1714932

Batch ID: 1714932

Run Date: 11/07/2017 10:36

Prep Date: 11/07/2017 10:36

Data File: 110717V4\4H205LD

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: VXY1

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		47.6	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		296	ug/L	1.50	5.00
107-13-1	Acrylonitrile		295	ug/L	1.50	5.00
107-05-1	Allyl chloride		280	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: 2018-545

Lab Sample ID: 1203910786

Client Sample: QC for batch 1714932

Client ID: LCS for batch 1714932

Batch ID: 1714932

Run Date: 11/07/2017 10:36

Prep Date: 11/07/2017 10:36

Data File: 110717V4\4H205L.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: VXY1

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		220	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		2720	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		272	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		215	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		273	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		228	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**

<b>SDG Number:</b>	<b>2018-545</b>	<b>Matrix:</b>	<b>WATER</b>
<b>Lab Sample ID:</b>	<b>1203910786</b>		
<b>Client Sample:</b>	<b>QC for batch 1714932</b>	<b>Client:</b>	<b>ARSL004</b>
<b>Client ID:</b>	<b>LCS for batch 1714932</b>	<b>Method:</b>	<b>SW-846:8260B</b>
<b>Batch ID:</b>	<b>1714932</b>	<b>Inst:</b>	<b>VOA4.I</b>
<b>Run Date:</b>	<b>11/07/2017 10:36</b>	<b>Analyst:</b>	<b>VXY1</b>
<b>Prep Date:</b>	<b>11/07/2017 10:36</b>		
<b>Data File:</b>	<b>110717V4\4H205L.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	53.5	50.0	ug/L	107	(71%-134%)
Bromofluorobenzene	48.9	50.0	ug/L	98	(70%-131%)
Toluene-d8	52.4	50.0	ug/L	105	(74%-124%)

# **Semi-Volatile Analysis**

# Case Narrative

**GC/MS Semivolatile  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-545  
Work Order #: 436027**

**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:	1712677
Prep Batch Number:	1712676

**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>
436027004	CAPA-18-147598
436027008	CAPA-18-147599
1203904116	Method Blank (MB)
1203904117	Laboratory Control Sample (LCS)
1203904118	435722005(WST15-17-148254) Matrix Spike (MS)
1203904119	435722005(WST15-17-148254) 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 samples 436027004 (CAPA-18-147598) and 436027008 (CAPA-18-147599) 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 435722005 (WST15-17-148254) 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 RPD values between the MS and MSD met the acceptance limits.

##### **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 samples 436027004 (CAPA-18-147598) and 436027008 (CAPA-18-147599) 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>
MSD1.I	Agilent 6890N/5973 GC/MS w/ 7683 Autosampler	HP6890/HP5973	DB-5MS	25m x 0.2mm, 0.33um (5% Polysilarylene-95% Polydimethylsiloxane)

**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: 2018-545 GEL Work Order: 436027

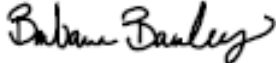
#### The Qualifiers in this report are defined as follows:

- \* 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: 08 NOV 2017

Title: Data Validator

# **Sample Data Summary**

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

Page 1 of 3

**SDG Number:** 2018-545  
**Lab Sample ID:** 436027004

**Date Collected:** 10/20/2017 10:36  
**Date Received:** 10/24/2017 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSD1.I  
**Analyst:** JLD1  
**Aliquot:** 960 mL  
**Column:** 25x.20x.33

**Matrix:** W  
**Project:** ESHL00114  
**SOP Ref:** GL-OA-E-009  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

**Client ID:** CAPA-18-147598  
**Batch ID:** 1712677  
**Run Date:** 10/27/2017 20:38  
**Prep Date:** 10/26/2017 17:40  
**Data File:** s102717a.B\s1j2728.D

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.13	ug/L	3.13	10.4
120-82-1	1,2,4-Trichlorobenzene	U	3.13	ug/L	3.13	10.4
95-50-1	1,2-Dichlorobenzene	U	3.13	ug/L	3.13	10.4
122-66-7	Azobenzene	U	3.13	ug/L	3.13	10.4
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.13	ug/L	3.13	10.4
106-46-7	1,4-Dichlorobenzene	U	3.13	ug/L	3.13	10.4
123-91-1	1,4-Dioxane	U	3.13	ug/L	3.13	10.4
90-12-0	1-Methylnaphthalene	U	0.313	ug/L	0.313	1.04
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.13	ug/L	3.13	10.4
95-95-4	2,4,5-Trichlorophenol	U	3.13	ug/L	3.13	10.4
88-06-2	2,4,6-Trichlorophenol	U	3.13	ug/L	3.13	10.4
120-83-2	2,4-Dichlorophenol	U	3.13	ug/L	3.13	10.4
105-67-9	2,4-Dimethylphenol	U	3.13	ug/L	3.13	10.4
51-28-5	2,4-Dinitrophenol	U	5.21	ug/L	5.21	20.8
121-14-2	2,4-Dinitrotoluene	U	3.13	ug/L	3.13	10.4
606-20-2	2,6-Dinitrotoluene	U	3.13	ug/L	3.13	10.4
91-58-7	2-Chloronaphthalene	U	0.427	ug/L	0.427	1.04
95-57-8	2-Chlorophenol	U	3.13	ug/L	3.13	10.4
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.13	ug/L	3.13	10.4
91-57-6	2-Methylnaphthalene	U	0.313	ug/L	0.313	1.04
88-75-5	2-Nitrophenol	U	3.13	ug/L	3.13	10.4
91-94-1	3,3'-Dichlorobenzidine	U	3.13	ug/L	3.13	10.4
101-55-3	4-Bromophenylphenylether	U	3.13	ug/L	3.13	10.4
59-50-7	Parachlorometa cresol	U	3.13	ug/L	3.13	10.4
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.44	ug/L	3.44	10.4
7005-72-3	4-Chlorophenylphenylether	U	3.13	ug/L	3.13	10.4
100-02-7	4-Nitrophenol	U	3.13	ug/L	3.13	10.4
83-32-9	Acenaphthene	U	0.313	ug/L	0.313	1.04
208-96-8	Acenaphthylene	U	0.313	ug/L	0.313	1.04
62-53-3	Aniline	U	4.38	ug/L	4.38	10.4
120-12-7	Anthracene	U	0.313	ug/L	0.313	1.04
1912-24-9	Atrazine	U	3.13	ug/L	3.13	10.4
92-87-5	Benzidine	U	4.06	ug/L	4.06	10.4
56-55-3	Benzo(a)anthracene	U	0.313	ug/L	0.313	1.04
50-32-8	Benzo(a)pyrene	U	0.313	ug/L	0.313	1.04
205-99-2	Benzo(b)fluoranthene	U	0.313	ug/L	0.313	1.04
191-24-2	Benzo(ghi)perylene	U	0.313	ug/L	0.313	1.04

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

SDG Number: 2018-545

Lab Sample ID: 436027004

Date Collected: 10/20/2017 10:36

Date Received: 10/24/2017 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1712677

Inst: MSD1.I

Dilution: 1

Run Date: 10/27/2017 20:38

Analyst: JLD1

Inj. Vol: 1 uL

Prep Date: 10/26/2017 17:40

Aliquot: 960 mL

Final Volume: 1 mL

Data File: s102717a.B\s1j2728.D

Column: 25x.20x.33

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.313	ug/L	0.313	1.04
65-85-0	Benzoic acid	U	6.25	ug/L	6.25	20.8
100-51-6	Benzyl alcohol	U	3.13	ug/L	3.13	10.4
85-68-7	Butylbenzylphthalate	U	3.13	ug/L	3.13	10.4
218-01-9	Chrysene	U	0.313	ug/L	0.313	1.04
84-74-2	Di-n-butylphthalate	U	3.13	ug/L	3.13	10.4
117-84-0	Di-n-octylphthalate	U	3.13	ug/L	3.13	10.4
53-70-3	Dibenzo(a,h)anthracene	U	0.313	ug/L	0.313	1.04
132-64-9	Dibenzofuran	U	3.13	ug/L	3.13	10.4
84-66-2	Diethylphthalate	U	3.13	ug/L	3.13	10.4
131-11-3	Dimethylphthalate	U	3.13	ug/L	3.13	10.4
88-85-7	Dinoseb	U	3.13	ug/L	3.13	10.4
122-39-4	Diphenylamine	U	3.13	ug/L	3.13	10.4
206-44-0	Fluoranthene	U	0.313	ug/L	0.313	1.04
86-73-7	Fluorene	U	0.313	ug/L	0.313	1.04
118-74-1	Hexachlorobenzene	U	3.13	ug/L	3.13	10.4
87-68-3	Hexachlorobutadiene	U	3.13	ug/L	3.13	10.4
77-47-4	Hexachlorocyclopentadiene	U	3.13	ug/L	3.13	10.4
67-72-1	Hexachloroethane	U	3.13	ug/L	3.13	10.4
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.313	ug/L	0.313	1.04
78-59-1	Isophorone	U	3.65	ug/L	3.65	10.4
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.13	ug/L	3.13	10.4
924-16-3	N-Nitrosodi-n-butylamine	U	3.13	ug/L	3.13	10.4
55-18-5	N-Nitrosodiethylamine	U	3.13	ug/L	3.13	10.4
621-64-7	N-Nitrosodi--n-propylamine	U	3.13	ug/L	3.13	10.4
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.13	ug/L	3.13	10.4
91-20-3	Naphthalene	U	0.313	ug/L	0.313	1.04
98-95-3	Nitrobenzene	U	3.13	ug/L	3.13	10.4
608-93-5	Pentachlorobenzene	U	3.13	ug/L	3.13	10.4
87-86-5	Pentachlorophenol	U	3.13	ug/L	3.13	10.4
85-01-8	Phenanthrene	U	0.313	ug/L	0.313	1.04
108-95-2	Phenol	U	3.13	ug/L	3.13	10.4
129-00-0	Pyrene	U	0.313	ug/L	0.313	1.04
110-86-1	Pyridine	U	3.13	ug/L	3.13	10.4
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.13	ug/L	3.13	10.4
111-91-1	bis(2-Chloroethoxy)methane	U	3.13	ug/L	3.13	10.4
111-44-4	bis(2-Chloroethyl) ether	U	3.13	ug/L	3.13	10.4
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.13	ug/L	3.13	10.4

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

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**SDG Number:** 2018-545  
**Lab Sample ID:** 436027004

**Date Collected:** 10/20/2017 10:36  
**Date Received:** 10/24/2017 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSD1.I  
**Analyst:** JLD1  
**Aliquot:** 960 mL  
**Column:** 25x.20x.33

**Matrix:** W  
**Project:** ESHL00114  
**SOP Ref:** GL-OA-E-009  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

**Client ID:** CAPA-18-147598  
**Batch ID:** 1712677  
**Run Date:** 10/27/2017 20:38  
**Prep Date:** 10/26/2017 17:40  
**Data File:** s102717a.B\s1j2728.D

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	3.85	ug/L	3.85	10.4
99-09-2	3-Nitroaniline	U	3.13	ug/L	3.13	10.4
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol	U	3.13	ug/L	3.13	10.4
88-74-4	2-Nitroaniline	U	3.13	ug/L	3.13	10.4
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline	U	3.13	ug/L	3.13	10.4
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	53.7	104	ug/L	52 (32%-124%)
2-Fluorobiphenyl	29.2	52.1	ug/L	56 (32%-112%)
2-Fluorophenol	44.1	104	ug/L	42 (15%-88%)
Nitrobenzene-d5	31.0	52.1	ug/L	60 (36%-115%)
Phenol-d5	30.4	104	ug/L	29 (15%-91%)
p-Terphenyl-d14	35.6	52.1	ug/L	68 (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  
Certificate of Analysis  
Sample Summary**

Page 1 of 3

**SDG Number:** 2018-545  
**Lab Sample ID:** 436027008

**Date Collected:** 10/20/2017 12:12  
**Date Received:** 10/24/2017 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSD1.I  
**Analyst:** JLD1  
**Aliquot:** 950 mL  
**Column:** 25x.20x.33

**Matrix:** W  
**Project:** ESHL00114  
**SOP Ref:** GL-OA-E-009  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

**Client ID:** CAPA-18-147599  
**Batch ID:** 1712677  
**Run Date:** 10/27/2017 21:08  
**Prep Date:** 10/26/2017 17:40  
**Data File:** s102717a.B\s1j2729.D

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.16	ug/L	3.16	10.5
120-82-1	1,2,4-Trichlorobenzene	U	3.16	ug/L	3.16	10.5
95-50-1	1,2-Dichlorobenzene	U	3.16	ug/L	3.16	10.5
122-66-7	Azobenzene	U	3.16	ug/L	3.16	10.5
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.16	ug/L	3.16	10.5
106-46-7	1,4-Dichlorobenzene	U	3.16	ug/L	3.16	10.5
123-91-1	1,4-Dioxane	U	3.16	ug/L	3.16	10.5
90-12-0	1-Methylnaphthalene	U	0.316	ug/L	0.316	1.05
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.16	ug/L	3.16	10.5
95-95-4	2,4,5-Trichlorophenol	U	3.16	ug/L	3.16	10.5
88-06-2	2,4,6-Trichlorophenol	U	3.16	ug/L	3.16	10.5
120-83-2	2,4-Dichlorophenol	U	3.16	ug/L	3.16	10.5
105-67-9	2,4-Dimethylphenol	U	3.16	ug/L	3.16	10.5
51-28-5	2,4-Dinitrophenol	U	5.26	ug/L	5.26	21.1
121-14-2	2,4-Dinitrotoluene	U	3.16	ug/L	3.16	10.5
606-20-2	2,6-Dinitrotoluene	U	3.16	ug/L	3.16	10.5
91-58-7	2-Chloronaphthalene	U	0.432	ug/L	0.432	1.05
95-57-8	2-Chlorophenol	U	3.16	ug/L	3.16	10.5
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.16	ug/L	3.16	10.5
91-57-6	2-Methylnaphthalene	U	0.316	ug/L	0.316	1.05
88-75-5	2-Nitrophenol	U	3.16	ug/L	3.16	10.5
91-94-1	3,3'-Dichlorobenzidine	U	3.16	ug/L	3.16	10.5
101-55-3	4-Bromophenylphenylether	U	3.16	ug/L	3.16	10.5
59-50-7	Parachlorometa cresol	U	3.16	ug/L	3.16	10.5
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.47	ug/L	3.47	10.5
7005-72-3	4-Chlorophenylphenylether	U	3.16	ug/L	3.16	10.5
100-02-7	4-Nitrophenol	U	3.16	ug/L	3.16	10.5
83-32-9	Acenaphthene	U	0.316	ug/L	0.316	1.05
208-96-8	Acenaphthylene	U	0.316	ug/L	0.316	1.05
62-53-3	Aniline	U	4.42	ug/L	4.42	10.5
120-12-7	Anthracene	U	0.316	ug/L	0.316	1.05
1912-24-9	Atrazine	U	3.16	ug/L	3.16	10.5
92-87-5	Benzidine	U	4.11	ug/L	4.11	10.5
56-55-3	Benzo(a)anthracene	U	0.316	ug/L	0.316	1.05
50-32-8	Benzo(a)pyrene	U	0.316	ug/L	0.316	1.05
205-99-2	Benzo(b)fluoranthene	U	0.316	ug/L	0.316	1.05
191-24-2	Benzo(ghi)perylene	U	0.316	ug/L	0.316	1.05

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

SDG Number: 2018-545

Lab Sample ID: 436027008

Date Collected: 10/20/2017 12:12

Date Received: 10/24/2017 08:55

Matrix: W

Client ID: CAPA-18-147599

Batch ID: 1712677

Run Date: 10/27/2017 21:08

Prep Date: 10/26/2017 17:40

Data File: s102717a.B\s1j2729.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD1.I

Analyst: JLD1

Aliquot: 950 mL

Column: 25x.20x.33

Project: ESHL00114

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	0.316	ug/L	0.316	1.05
65-85-0	Benzoic acid	U	6.32	ug/L	6.32	21.1
100-51-6	Benzyl alcohol	U	3.16	ug/L	3.16	10.5
85-68-7	Butylbenzylphthalate	U	3.16	ug/L	3.16	10.5
218-01-9	Chrysene	U	0.316	ug/L	0.316	1.05
84-74-2	Di-n-butylphthalate	U	3.16	ug/L	3.16	10.5
117-84-0	Di-n-octylphthalate	U	3.16	ug/L	3.16	10.5
53-70-3	Dibenzo(a,h)anthracene	U	0.316	ug/L	0.316	1.05
132-64-9	Dibenzofuran	U	3.16	ug/L	3.16	10.5
84-66-2	Diethylphthalate	U	3.16	ug/L	3.16	10.5
131-11-3	Dimethylphthalate	U	3.16	ug/L	3.16	10.5
88-85-7	Dinoseb	U	3.16	ug/L	3.16	10.5
122-39-4	Diphenylamine	U	3.16	ug/L	3.16	10.5
206-44-0	Fluoranthene	U	0.316	ug/L	0.316	1.05
86-73-7	Fluorene	U	0.316	ug/L	0.316	1.05
118-74-1	Hexachlorobenzene	U	3.16	ug/L	3.16	10.5
87-68-3	Hexachlorobutadiene	U	3.16	ug/L	3.16	10.5
77-47-4	Hexachlorocyclopentadiene	U	3.16	ug/L	3.16	10.5
67-72-1	Hexachloroethane	U	3.16	ug/L	3.16	10.5
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.316	ug/L	0.316	1.05
78-59-1	Isophorone	U	3.68	ug/L	3.68	10.5
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.16	ug/L	3.16	10.5
924-16-3	N-Nitrosodi-n-butylamine	U	3.16	ug/L	3.16	10.5
55-18-5	N-Nitrosodiethylamine	U	3.16	ug/L	3.16	10.5
621-64-7	N-Nitrosodi--n-propylamine	U	3.16	ug/L	3.16	10.5
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.16	ug/L	3.16	10.5
91-20-3	Naphthalene	U	0.316	ug/L	0.316	1.05
98-95-3	Nitrobenzene	U	3.16	ug/L	3.16	10.5
608-93-5	Pentachlorobenzene	U	3.16	ug/L	3.16	10.5
87-86-5	Pentachlorophenol	U	3.16	ug/L	3.16	10.5
85-01-8	Phenanthrene	U	0.316	ug/L	0.316	1.05
108-95-2	Phenol	U	3.16	ug/L	3.16	10.5
129-00-0	Pyrene	U	0.316	ug/L	0.316	1.05
110-86-1	Pyridine	U	3.16	ug/L	3.16	10.5
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.16	ug/L	3.16	10.5
111-91-1	bis(2-Chloroethoxy)methane	U	3.16	ug/L	3.16	10.5
111-44-4	bis(2-Chloroethyl) ether	U	3.16	ug/L	3.16	10.5
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.16	ug/L	3.16	10.5

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

Page 3 of 3

**SDG Number:** 2018-545  
**Lab Sample ID:** 436027008

**Date Collected:** 10/20/2017 12:12  
**Date Received:** 10/24/2017 08:55

**Matrix:** W

**Client ID:** CAPA-18-147599

**Client:** ARSL004

**Project:** ESHL00114

**Batch ID:** 1712677

**Method:** SW846 3510C/8270D

**SOP Ref:** GL-OA-E-009

**Run Date:** 10/27/2017 21:08

**Inst:** MSD1.I

**Dilution:** 1

**Prep Date:** 10/26/2017 17:40

**Analyst:** JLD1

**Inj. Vol:** 1 uL

**Data File:** s102717a.B\s1j2729.D

**Aliquot:** 950 mL

**Final Volume:** 1 mL

**Column:** 25x.20x.33

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	3.89	ug/L	3.89	10.5
99-09-2	3-Nitroaniline	U	3.16	ug/L	3.16	10.5
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol	U	3.16	ug/L	3.16	10.5
88-74-4	2-Nitroaniline	U	3.16	ug/L	3.16	10.5
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline	U	3.16	ug/L	3.16	10.5
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	75.7	105	ug/L	72 (32%-124%)
2-Fluorobiphenyl	43.4	52.6	ug/L	83 (32%-112%)
2-Fluorophenol	50.4	105	ug/L	48 (15%-88%)
Nitrobenzene-d5	45.0	52.6	ug/L	86 (36%-115%)
Phenol-d5	34.2	105	ug/L	33 (15%-91%)
p-Terphenyl-d14	43.7	52.6	ug/L	83 (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**

Semi-Volatile  
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-545

Matrix Type: LIQUID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203904116	MB for batch 1712676	60	40	104	93	79	97
1203904117	LCS for batch 1712676	60	39	94	84	81	96
1203904118	WST15-17-148254MS	44	31	83	75	75	80
1203904119	WST15-17-148254MSD	47	33	88	78	79	86
436027004	CAPA-18-147598	42	29	60	56	52	68
436027008	CAPA-18-147599	48	33	86	83	72	83

## 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: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712676

Matrix: WATER

Lab Sample ID 1203904117

Instrument: MSD1.I

Analysis Date: 10/27/2017 15:29

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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-nitrosomethylam	50.0	0.0	32.7	65	30-88
110-86-1	LCS Pyridine	50.0	0.0	29.5	59	27-89
62-53-3	LCS Aniline	50.0	0.0	44.0	88	49-112
108-95-2	LCS Phenol	50.0	0.0	21.0	42	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	50.7	101	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	42.2	84	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	37.0	74	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	36.9	74	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	38.2	76	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)et	50.0	0.0	61.6	123	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	42.7	85	44-102
95-48-7	LCS o-Cresol	50.0	0.0	42.4	85	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	41.6	83	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	46.1	92	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	35.2	70	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	50.0	100	53-115
78-59-1	LCS Isophorone	50.0	0.0	45.7	91	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	46.1	92	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	37.6	75	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	48.2	96	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	43.7	87	53-109
65-85-0	LCS Benzoic acid	100	0.0	46.7	47	21-74

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712676

Matrix: WATER

Lab Sample ID 1203904117

Instrument: MSD1.I

Analysis Date: 10/27/2017 15:29

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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	48.3	97	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	32.0	64	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	46.3	93	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	40.3	81	42-103
91-20-3	LCS Naphthalene	50.0	0.0	40.7	81	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	41.8	84	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	28.9	58	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	43.7	87	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	42.0	84	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	39.1	78	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	51.4	103	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	52.2	104	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	47.5	95	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	47.0	94	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	45.4	91	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	44.8	90	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	45.0	90	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	46.4	93	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	44.0	88	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	45.6	91	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	17.0	34	15-137

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712676

Matrix: WATER

Lab Sample ID 1203904117

Instrument: MSD1.I

Analysis Date: 10/27/2017 15:29

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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	41.9	84	52-114
7005-72-3	LCS 4-Chlorophenylphenylether	50.0	0.0	42.3	85	52-121
100-01-6	LCS 4-Nitroaniline <i>p-Nitroaniline</i>	50.0	0.0	43.0	86	44-137
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	51.6	103	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	40.9	82	55-113
122-66-7	LCS Azobenzene <i>1,2-Diphenylhydrazine</i>	50.0	0.0	51.2	102	53-115
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	45.5	91	54-116
118-74-1	LCS Hexachlorobenzene	50.0	0.0	43.4	87	54-115
87-86-5	LCS Pentachlorophenol	50.0	0.0	50.7	101	41-116
85-01-8	LCS Phenanthrene	50.0	0.0	43.7	87	55-110
120-12-7	LCS Anthracene	50.0	0.0	42.8	86	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	47.5	95	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	47.4	95	54-118
129-00-0	LCS Pyrene	50.0	0.0	47.9	96	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	48.8	98	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	42.0	84	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	46.3	93	57-112
218-01-9	LCS Chrysene	50.0	0.0	45.1	90	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	37.6	75	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	46.2	92	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	46.3	93	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	44.3	89	40-118

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1712676

Matrix: WATER

Lab Sample ID 1203904117

Instrument: MSD1.I

Analysis Date: 10/27/2017 15:29

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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	47.2	94	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	44.6	89	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	50.6	101	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	32.9	66	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	46.2	92	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	40.2	80	44-102
1912-24-9	LCS Atrazine	50.0	0.0	48.0	96	60-131
92-87-5	LCS Benzidine	100	0.0	46.7	47	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	48.0	96	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	37.8	76	39-99

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Matrix Spike

Client ID: WST15-17-148254MS

Matrix: W

Lab Sample ID 1203904118

Instrument: MSD1.I

Analysis Date: 10/27/2017 16:31

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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-nitrosomethylam	100	0.00 U	57.3	57	25-106
110-86-1	MS Pyridine	100	0.00 U	59.3	59	24-93
62-53-3	MS Aniline	100	0.00 U	84.8	85	37-113
108-95-2	MS Phenol	100	0.00 U	33.0	33	23-82
111-44-4	MS bis(2-Chloroethyl) ether	100	0.00 U	89.5	89	39-114
95-57-8	MS 2-Chlorophenol	100	0.00 U	74.1	74	37-108
541-73-1	MS 1,3-Dichlorobenzene	100	0.00 U	62.3	62	27-97
106-46-7	MS 1,4-Dichlorobenzene	100	0.00 U	62.1	62	28-97
95-50-1	MS 1,2-Dichlorobenzene	100	0.00 U	64.8	65	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)et	100	0.00 U	108	108	32-127
100-51-6	MS Benzyl alcohol	100	0.00 U	75.5	75	37-116
95-48-7	MS o-Cresol	100	0.00 U	73.1	73	34-109
65794-96-9	MS m,p-Cresols	100	0.00 U	71.4	71	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	100	0.00 U	84.6	85	42-118
67-72-1	MS Hexachloroethane	100	0.00 U	60.1	60	29-94
98-95-3	MS Nitrobenzene	100	0.00 U	88.3	88	38-123
78-59-1	MS Isophorone	100	0.00 U	83.9	84	43-120
88-75-5	MS 2-Nitrophenol	100	0.00 U	82.9	83	39-115
105-67-9	MS 2,4-Dimethylphenol	100	0.00 U	69.0	69	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	100	0.00 U	89.2	89	42-118
120-83-2	MS 2,4-Dichlorophenol	100	0.00 U	79.0	79	40-111
65-85-0	MS Benzoic acid	200	0.00 U	85.3	43	17-95

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Matrix Spike

Client ID: WST15-17-148254MS

Matrix: W

Lab Sample ID 1203904118

Instrument: MSD1.I

Analysis Date: 10/27/2017 16:31

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS	4-Chloroaniline	100	0.00	U	93.9	94	44-138
87-68-3	MS	Hexachlorobutadiene	100	0.00	U	54.6	55	26-98
59-50-7	MS	Parachlorometa cresol 4-Chloro-3-methylphenol	100	0.00	U	86.5	87	41-122
91-57-6	MS	2-Methylnaphthalene	100	0.00	U	68.5	69	29-109
91-20-3	MS	Naphthalene	100	0.00	U	69.7	70	31-108
90-12-0	MS	1-Methylnaphthalene	100	0.00	U	69.7	70	33-112
77-47-4	MS	Hexachlorocyclopentadiene	100	0.00	U	50.0	50	26-79
88-06-2	MS	2,4,6-Trichlorophenol	100	0.00	U	80.3	80	39-124
95-95-4	MS	2,4,5-Trichlorophenol	100	0.00	U	80.7	81	42-120
91-58-7	MS	2-Chloronaphthalene	100	0.00	U	67.2	67	29-113
88-74-4	MS	2-Nitroaniline o-Nitroaniline	100	0.00	U	97.9	98	41-121
99-09-2	MS	3-Nitroaniline m-Nitroaniline	100	0.00	U	102	102	42-144
131-11-3	MS	Dimethylphthalate	100	0.00	U	89.3	89	45-128
606-20-2	MS	2,6-Dinitrotoluene	100	0.00	U	87.4	87	46-124
121-14-2	MS	2,4-Dinitrotoluene	100	0.00	U	84.9	85	45-125
208-96-8	MS	Acenaphthylene	100	0.00	U	80.2	80	35-120
83-32-9	MS	Acenaphthene	100	0.00	U	80.1	80	35-117
51-28-5	MS	2,4-Dinitrophenol	100	0.00	U	93.1	93	27-122
132-64-9	MS	Dibenzofuran	100	0.00	U	79.1	79	38-113
58-90-2	MS	2,3,4,6-Tetrachlorophenol	100	0.00	U	86.8	87	40-128
84-66-2	MS	Diethylphthalate	100	0.00	U	85.1	85	43-127
100-02-7	MS	4-Nitrophenol	100	0.00	U	27.6	28	17-85

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Matrix Spike

Client ID: WST15-17-148254MS

Matrix: W

Lab Sample ID 1203904118

Instrument: MSD1.I

Analysis Date: 10/27/2017 16:31

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS	Fluorene	100	0.00	U	78.8	79	39-117
7005-72-3	MS	4-Chlorophenylphenylether	100	0.00	U	78.3	78	39-121
100-01-6	MS	4-Nitroaniline <i>p-Nitroaniline</i>	100	0.00	U	82.0	82	30-133
534-52-1	MS	2-Methyl-4,6-dinitrophenol	100	0.00	U	96.4	96	32-126
122-39-4	MS	Diphenylamine	100	0.00	U	74.4	74	37-118
122-66-7	MS	Azobenzene <i>1,2-Diphenylhydrazine</i>	100	0.00	U	93.6	94	38-120
101-55-3	MS	4-Bromophenylphenylether	100	0.00	U	83.0	83	39-121
118-74-1	MS	Hexachlorobenzene	100	0.00	U	81.4	81	40-118
87-86-5	MS	Pentachlorophenol	100	0.00	U	95.1	95	35-121
85-01-8	MS	Phenanthrene	100	0.00	U	80.5	81	40-115
120-12-7	MS	Anthracene	100	0.00	U	79.1	79	38-120
84-74-2	MS	Di-n-butylphthalate	100	0.00	U	88.3	88	41-128
206-44-0	MS	Fluoranthene	100	0.00	U	88.8	89	41-119
129-00-0	MS	Pyrene	100	0.00	U	86.4	86	35-128
85-68-7	MS	Butylbenzylphthalate	100	0.00	U	87.6	88	40-129
117-81-7	MS	bis(2-Ethylhexyl)phthalate	100	0.00	U	76.4	76	38-131
56-55-3	MS	Benzo(a)anthracene	100	0.00	U	85.4	85	39-120
218-01-9	MS	Chrysene	100	0.00	U	82.1	82	41-124
117-84-0	MS	Di-n-octylphthalate	100	0.00	U	69.2	69	37-134
205-99-2	MS	Benzo(b)fluoranthene	100	0.00	U	87.6	88	31-122
207-08-9	MS	Benzo(k)fluoranthene	100	0.00	U	87.6	88	33-123
50-32-8	MS	Benzo(a)pyrene	100	0.00	U	83.4	83	32-118

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Matrix Spike

Client ID: WST15-17-148254MS

Matrix: W

Lab Sample ID 1203904118

Instrument: MSD1.I

Analysis Date: 10/27/2017 16:31

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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	100	0.00 U	82.9	83	27-121
53-70-3	MS Dibenzo(a,h)anthracene	100	0.00 U	77.7	78	30-125
191-24-2	MS Benzo(ghi)perylene	100	0.00 U	88.0	88	24-126
123-91-1	MS 1,4-Dioxane	100	0.00 U	58.6	59	24-110
930-55-2	MS N-Nitrosopyrrolidine	100	0.00 U	85.1	85	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	100	0.00 U	67.5	68	32-101
1912-24-9	MS Atrazine	100	0.00 U	86.9	87	42-129
92-87-5	MS Benzidine	200	0.00 U	76.6	38	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	100	0.00 U	85.3	85	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	100	0.00 U	64.1	64	26-102

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Matrix Spike Duplicate

Client ID: WST15-17-148254MSD

Matrix: W

Lab Sample ID 1203904119

Instrument: MSD1.I

Analysis Date: 10/27/2017 17:02

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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-nitrosomethylam	100	0.00	U	60.8		61	25-106	6	0-30
110-86-1	MSD Pyridine	100	0.00	U	64.1		64	24-93	8	0-30
62-53-3	MSD Aniline	100	0.00	U	87.6		88	37-113	3	0-30
108-95-2	MSD Phenol	100	0.00	U	35.2		35	23-82	6	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	100	0.00	U	96.5		97	39-114	8	0-30
95-57-8	MSD 2-Chlorophenol	100	0.00	U	79.4		79	37-108	7	0-30
541-73-1	MSD 1,3-Dichlorobenzene	100	0.00	U	67.5		68	27-97	8	0-30
106-46-7	MSD 1,4-Dichlorobenzene	100	0.00	U	66.0		66	28-97	6	0-30
95-50-1	MSD 1,2-Dichlorobenzene	100	0.00	U	69.8		70	28-99	7	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)et	100	0.00	U	117		117	32-127	8	0-30
100-51-6	MSD Benzyl alcohol	100	0.00	U	80.0		80	37-116	6	0-30
95-48-7	MSD o-Cresol	100	0.00	U	76.8		77	34-109	5	0-30
65794-96-9	MSD m,p-Cresols	100	0.00	U	76.8		77	36-120	7	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine N-Nitrosodipropylamine	100	0.00	U	89.0		89	42-118	5	0-30
67-72-1	MSD Hexachloroethane	100	0.00	U	65.5		65	29-94	8	0-30
98-95-3	MSD Nitrobenzene	100	0.00	U	93.1		93	38-123	5	0-30
78-59-1	MSD Isophorone	100	0.00	U	88.7		89	43-120	6	0-30
88-75-5	MSD 2-Nitrophenol	100	0.00	U	89.4		89	39-115	7	0-30
105-67-9	MSD 2,4-Dimethylphenol	100	0.00	U	73.2		73	39-107	6	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	100	0.00	U	93.0		93	42-118	4	0-30
120-83-2	MSD 2,4-Dichlorophenol	100	0.00	U	83.8		84	40-111	6	0-30
65-85-0	MSD Benzoic acid	200	0.00	U	89.0		45	17-95	4	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Matrix Spike Duplicate

Client ID: WST15-17-148254MSD

Matrix: W

Lab Sample ID 1203904119

Instrument: MSD1.I

Analysis Date: 10/27/2017 17:02

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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	100	0.00 U	96.7	97	44-138	3	0-30
87-68-3	MSD Hexachlorobutadiene	100	0.00 U	57.3	57	26-98	5	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	100	0.00 U	90.9	91	41-122	5	0-30
91-57-6	MSD 2-Methylnaphthalene	100	0.00 U	71.9	72	29-109	5	0-30
91-20-3	MSD Naphthalene	100	0.00 U	73.2	73	31-108	5	0-30
90-12-0	MSD 1-Methylnaphthalene	100	0.00 U	72.9	73	33-112	5	0-30
77-47-4	MSD Hexachlorocyclopentadiene	100	0.00 U	54.0	54	26-79	8	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	100	0.00 U	84.7	85	39-124	5	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	100	0.00 U	87.3	87	42-120	8	0-30
91-58-7	MSD 2-Chloronaphthalene	100	0.00 U	71.0	71	29-113	5	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	100	0.00 U	104	104	41-121	6	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	100	0.00 U	107	107	42-144	4	0-30
131-11-3	MSD Dimethylphthalate	100	0.00 U	92.6	93	45-128	4	0-30
606-20-2	MSD 2,6-Dinitrotoluene	100	0.00 U	91.9	92	46-124	5	0-30
121-14-2	MSD 2,4-Dinitrotoluene	100	0.00 U	91.1	91	45-125	7	0-30
208-96-8	MSD Acenaphthylene	100	0.00 U	83.2	83	35-120	4	0-30
83-32-9	MSD Acenaphthene	100	0.00 U	84.9	85	35-117	6	0-30
51-28-5	MSD 2,4-Dinitrophenol	100	0.00 U	97.3	97	27-122	4	0-30
132-64-9	MSD Dibenzofuran	100	0.00 U	83.4	83	38-113	5	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	100	0.00 U	90.4	90	40-128	4	0-30
84-66-2	MSD Diethylphthalate	100	0.00 U	90.2	90	43-127	6	0-30
100-02-7	MSD 4-Nitrophenol	100	0.00 U	29.4	29	17-85	6	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Matrix Spike Duplicate

Client ID: WST15-17-148254MSD

Matrix: W

Lab Sample ID 1203904119

Instrument: MSD1.I

Analysis Date: 10/27/2017 17:02

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

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	100	0.00 U	81.0	81	39-117	3	0-30
7005-72-3	MSD 4-Chlorophenylphenylether	100	0.00 U	82.8	83	39-121	6	0-30
100-01-6	MSD 4-Nitroaniline <i>p</i> -Nitroaniline	100	0.00 U	85.8	86	30-133	5	0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	100	0.00 U	104	104	32-126	7	0-30
122-39-4	MSD Diphenylamine	100	0.00 U	79.7	80	37-118	7	0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	100	0.00 U	99.5	100	38-120	6	0-30
101-55-3	MSD 4-Bromophenylphenylether	100	0.00 U	89.1	89	39-121	7	0-30
118-74-1	MSD Hexachlorobenzene	100	0.00 U	88.1	88	40-118	8	0-30
87-86-5	MSD Pentachlorophenol	100	0.00 U	102	102	35-121	7	0-30
85-01-8	MSD Phenanthrene	100	0.00 U	86.5	87	40-115	7	0-30
120-12-7	MSD Anthracene	100	0.00 U	84.8	85	38-120	7	0-30
84-74-2	MSD Di-n-butylphthalate	100	0.00 U	95.5	95	41-128	8	0-30
206-44-0	MSD Fluoranthene	100	0.00 U	95.6	96	41-119	7	0-30
129-00-0	MSD Pyrene	100	0.00 U	92.8	93	35-128	7	0-30
85-68-7	MSD Butylbenzylphthalate	100	0.00 U	97.1	97	40-129	10	0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	100	0.00 U	83.5	84	38-131	9	0-30
56-55-3	MSD Benzo(a)anthracene	100	0.00 U	92.7	93	39-120	8	0-30
218-01-9	MSD Chrysene	100	0.00 U	89.0	89	41-124	8	0-30
117-84-0	MSD Di-n-octylphthalate	100	0.00 U	77.9	78	37-134	12	0-30
205-99-2	MSD Benzo(b)fluoranthene	100	0.00 U	94.1	94	31-122	7	0-30
207-08-9	MSD Benzo(k)fluoranthene	100	0.00 U	91.3	91	33-123	4	0-30
50-32-8	MSD Benzo(a)pyrene	100	0.00 U	89.0	89	32-118	6	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-545

Sample Type: Matrix Spike Duplicate

Client ID: WST15-17-148254MSD

Matrix: W

Lab Sample ID 1203904119

Instrument: MSD1.I

Analysis Date: 10/27/2017 17:02

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1712676

Inj. Vol: 1 uL

Batch ID: 1712677

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
193-39-5	MSD Indeno(1,2,3-cd)pyrene	100	0.00	U	90.0	90	27-121	8 0-30
53-70-3	MSD Dibenzo(a,h)anthracene	100	0.00	U	84.6	85	30-125	9 0-30
191-24-2	MSD Benzo(ghi)perylene	100	0.00	U	93.5	93	24-126	6 0-30
123-91-1	MSD 1,4-Dioxane	100	0.00	U	62.7	63	24-110	7 0-30
930-55-2	MSD N-Nitrosopyrrolidine	100	0.00	U	88.9	89	47-119	4 0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	100	0.00	U	72.3	72	32-101	7 0-30
1912-24-9	MSD Atrazine	100	0.00	U	94.3	94	42-129	8 0-30
92-87-5	MSD Benzidine	200	0.00	U	98.9	49	15-130	25 0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	100	0.00	U	95.5	96	34-124	11 0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	100	0.00	U	67.9	68	26-102	6 0-30

## Method Blank Summary

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SDG Number:	2018-545	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1712676	Instrument ID:	MSD1.I	Data File:	s102717a.B\s1j2717.D
Lab Sample ID:	1203904116	Prep Date:	10/26/2017 17:40	Analyzed:	10/27/17 14:58
Column:	25x.20x.33				

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 1712676	1203904117	s102717a.B\s1j2718.D	10/27/17	1529
02 WST15-17-148254MS	1203904118	s102717a.B\s1j2720.D	10/27/17	1631
03 WST15-17-148254MSD	1203904119	s102717a.B\s1j2721.D	10/27/17	1702
04 CAPA-18-147598	436027004	s102717a.B\s1j2728.D	10/27/17	2038
05 CAPA-18-147599	436027008	s102717a.B\s1j2729.D	10/27/17	2108

# Quality Control Data

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

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SDG Number: 2018-545

Lab Sample ID: 1203904116

Client Sample: QC for batch 1712676

Client ID: MB for batch 1712676

Batch ID: 1712677

Run Date: 10/27/2017 14:58

Prep Date: 10/26/2017 17:40

Data File: s102717a.B\s1j2717.D

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

Client: ARSL004  
Method: SW846 3510C/8270D  
Inst: MSD1.I  
Analyst: JLD1  
Aliquot: 1000 mL  
Column: 25x.20x.33

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  
Certificate of Analysis  
Sample Summary**

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SDG Number: 2018-545

Lab Sample ID: 1203904116

Client Sample: QC for batch 1712676

Client ID: MB for batch 1712676

Batch ID: 1712677

Run Date: 10/27/2017 14:58

Prep Date: 10/26/2017 17:40

Data File: s102717a.B\s1j2717.D

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

Client: ARSL004  
Method: SW846 3510C/8270D  
Inst: MSD1.I  
Analyst: JLD1  
Aliquot: 1000 mL  
Column: 25x.20x.33

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  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> 2018-545	<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 1203904116	
<b>Client Sample:</b> QC for batch 1712676	<b>Client:</b> ARSL004
<b>Client ID:</b> MB for batch 1712676	<b>Method:</b> SW846 3510C/8270D
<b>Batch ID:</b> 1712677	<b>Inst:</b> MSD1.I
<b>Run Date:</b> 10/27/2017 14:58	<b>Analyst:</b> JLD1
<b>Prep Date:</b> 10/26/2017 17:40	<b>Aliquot:</b> 1000 mL
<b>Data File:</b> s102717a.B\s1j2717.D	<b>Column:</b> 25x.20x.33
	<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	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	79.2	100	ug/L	79	(32%-124%)
2-Fluorobiphenyl	46.6	50.0	ug/L	93	(32%-112%)
2-Fluorophenol	59.6	100	ug/L	60	(15%-88%)
Nitrobenzene-d5	51.9	50.0	ug/L	104	(36%-115%)
Phenol-d5	39.8	100	ug/L	40	(15%-91%)
p-Terphenyl-d14	48.5	50.0	ug/L	97	(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  
Certificate of Analysis  
Sample Summary**

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SDG Number: 2018-545

Lab Sample ID: 1203904117

Client Sample: QC for batch 1712676

Client ID: LCS for batch 1712676

Batch ID: 1712677

Run Date: 10/27/2017 15:29

Prep Date: 10/26/2017 17:40

Data File: s102717a.B\s1j2718.D

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

Client: ARSL004  
Method: SW846 3510C/8270D  
Inst: MSD1.I  
Analyst: JLD1  
Aliquot: 1000 mL  
Column: 25x.20x.33

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		40.2	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		37.8	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		38.2	ug/L	3.00	10.0
122-66-7	Azobenzene		51.2	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		37.0	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		36.9	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		32.9	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		41.8	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		42.0	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		43.7	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		43.7	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		37.6	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		46.4	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		45.4	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		47.0	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		39.1	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		42.2	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		51.6	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		40.3	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		46.1	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		48.0	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		45.5	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		46.3	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		48.3	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		42.3	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		17.0	ug/L	3.00	10.0
83-32-9	Acenaphthene		45.0	ug/L	0.300	1.00
208-96-8	Acenaphthylene		44.8	ug/L	0.300	1.00
62-53-3	Aniline		44.0	ug/L	4.20	10.0
120-12-7	Anthracene		42.8	ug/L	0.300	1.00
1912-24-9	Atrazine		48.0	ug/L	3.00	10.0
92-87-5	Benzidine		46.7	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		46.3	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		44.3	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		46.2	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		50.6	ug/L	0.300	1.00

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SDG Number: 2018-545

Lab Sample ID: 1203904117

Client Sample: QC for batch 1712676

Client ID: LCS for batch 1712676

Batch ID: 1712677

Run Date: 10/27/2017 15:29

Prep Date: 10/26/2017 17:40

Data File: s102717a.B\s1j2718.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD1.I

Analyst: JLD1

Aliquot: 1000 mL

Column: 25x.20x.33

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		46.3	ug/L	0.300	1.00
65-85-0	Benzoic acid		46.7	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		42.7	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		48.8	ug/L	3.00	10.0
218-01-9	Chrysene		45.1	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		47.5	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		37.6	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		44.6	ug/L	0.300	1.00
132-64-9	Dibenzofuran		44.0	ug/L	3.00	10.0
84-66-2	Diethylphthalate		45.6	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		47.5	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		40.9	ug/L	3.00	10.0
206-44-0	Fluoranthene		47.4	ug/L	0.300	1.00
86-73-7	Fluorene		41.9	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		43.4	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		32.0	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		28.9	ug/L	3.00	10.0
67-72-1	Hexachloroethane		35.2	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		47.2	ug/L	0.300	1.00
78-59-1	Isophorone		45.7	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		32.7	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		46.1	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		46.2	ug/L	3.00	10.0
91-20-3	Naphthalene		40.7	ug/L	0.300	1.00
98-95-3	Nitrobenzene		50.0	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		50.7	ug/L	3.00	10.0
85-01-8	Phenanthrene		43.7	ug/L	0.300	1.00
108-95-2	Phenol		21.0	ug/L	3.00	10.0
129-00-0	Pyrene		47.9	ug/L	0.300	1.00
110-86-1	Pyridine		29.5	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		61.6	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		48.2	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		50.7	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		42.0	ug/L	3.00	10.0

**Semi-Volatile  
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<b>SDG Number:</b> 2018-545		<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 1203904117		
<b>Client Sample:</b> QC for batch 1712676	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> LCS for batch 1712676	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Batch ID:</b> 1712677	<b>Inst:</b> MSD1.I	<b>Dilution:</b> 1
<b>Run Date:</b> 10/27/2017 15:29	<b>Analyst:</b> JLD1	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 10/26/2017 17:40	<b>Aliquot:</b> 1000 mL	<b>Final Volume:</b> 1 mL
<b>Data File:</b> s102717a.B\s1j2718.D	<b>Column:</b> 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		41.6	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		52.2	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		42.4	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		51.4	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		43.0	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	81.4	100	ug/L	81	(32%-124%)
2-Fluorobiphenyl	42.0	50.0	ug/L	84	(32%-112%)
2-Fluorophenol	59.9	100	ug/L	60	(15%-88%)
Nitrobenzene-d5	47.0	50.0	ug/L	94	(36%-115%)
Phenol-d5	39.4	100	ug/L	39	(15%-91%)
p-Terphenyl-d14	47.8	50.0	ug/L	96	(36%-121%)

**Semi-Volatile  
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Sample Summary**

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**SDG Number:** 2018-545  
**Lab Sample ID:** 1203904118  
**Client Sample:** QC for batch 1712676  
**Client ID:** WST15-17-148254MS  
**Batch ID:** 1712677  
**Run Date:** 10/27/2017 16:31  
**Prep Date:** 10/26/2017 17:40  
**Data File:** s102717a.B\s1j2720.D

**Date Collected:** 10/19/2017 09:20  
**Date Received:** 10/21/2017 08:45  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSD1.I  
**Analyst:** JLD1  
**Aliquot:** 500 mL  
**Column:** 25x.20x.33

**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		67.5	ug/L	6.00	20.0
120-82-1	1,2,4-Trichlorobenzene		64.1	ug/L	6.00	20.0
95-50-1	1,2-Dichlorobenzene		64.8	ug/L	6.00	20.0
122-66-7	Azobenzene		93.6	ug/L	6.00	20.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		62.3	ug/L	6.00	20.0
106-46-7	1,4-Dichlorobenzene		62.1	ug/L	6.00	20.0
123-91-1	1,4-Dioxane		58.6	ug/L	6.00	20.0
90-12-0	1-Methylnaphthalene		69.7	ug/L	0.600	2.00
58-90-2	2,3,4,6-Tetrachlorophenol		86.8	ug/L	6.00	20.0
95-95-4	2,4,5-Trichlorophenol		80.7	ug/L	6.00	20.0
88-06-2	2,4,6-Trichlorophenol		80.3	ug/L	6.00	20.0
120-83-2	2,4-Dichlorophenol		79.0	ug/L	6.00	20.0
105-67-9	2,4-Dimethylphenol		69.0	ug/L	6.00	20.0
51-28-5	2,4-Dinitrophenol		93.1	ug/L	10.0	40.0
121-14-2	2,4-Dinitrotoluene		84.9	ug/L	6.00	20.0
606-20-2	2,6-Dinitrotoluene		87.4	ug/L	6.00	20.0
91-58-7	2-Chloronaphthalene		67.2	ug/L	0.820	2.00
95-57-8	2-Chlorophenol		74.1	ug/L	6.00	20.0
534-52-1	2-Methyl-4,6-dinitrophenol		96.4	ug/L	6.00	20.0
91-57-6	2-Methylnaphthalene		68.5	ug/L	0.600	2.00
88-75-5	2-Nitrophenol		82.9	ug/L	6.00	20.0
91-94-1	3,3'-Dichlorobenzidine		85.3	ug/L	6.00	20.0
101-55-3	4-Bromophenylphenylether		83.0	ug/L	6.00	20.0
59-50-7	Parachlorometa cresol		86.5	ug/L	6.00	20.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		93.9	ug/L	6.60	20.0
7005-72-3	4-Chlorophenylphenylether		78.3	ug/L	6.00	20.0
100-02-7	4-Nitrophenol		27.6	ug/L	6.00	20.0
83-32-9	Acenaphthene		80.1	ug/L	0.600	2.00
208-96-8	Acenaphthylene		80.2	ug/L	0.600	2.00
62-53-3	Aniline		84.8	ug/L	8.40	20.0
120-12-7	Anthracene		79.1	ug/L	0.600	2.00
1912-24-9	Atrazine		86.9	ug/L	6.00	20.0
92-87-5	Benzidine		76.6	ug/L	7.80	20.0
56-55-3	Benzo(a)anthracene		85.4	ug/L	0.600	2.00
50-32-8	Benzo(a)pyrene		83.4	ug/L	0.600	2.00
205-99-2	Benzo(b)fluoranthene		87.6	ug/L	0.600	2.00
191-24-2	Benzo(ghi)perylene		88.0	ug/L	0.600	2.00

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<b>SDG Number:</b> 2018-545	<b>Date Collected:</b> 10/19/2017 09:20	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203904118	<b>Date Received:</b> 10/21/2017 08:45	
<b>Client Sample:</b> QC for batch 1712676	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> WST15-17-148254MS	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Batch ID:</b> 1712677	<b>Inst:</b> MSD1.I	<b>Dilution:</b> 1
<b>Run Date:</b> 10/27/2017 16:31	<b>Analyst:</b> JLD1	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 10/26/2017 17:40	<b>Aliquot:</b> 500 mL	<b>Final Volume:</b> 1 mL
<b>Data File:</b> s102717a.B\s1j2720.D	<b>Column:</b> 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		87.6	ug/L	0.600	2.00
65-85-0	Benzoic acid		85.3	ug/L	12.0	40.0
100-51-6	Benzyl alcohol		75.5	ug/L	6.00	20.0
85-68-7	Butylbenzylphthalate		87.6	ug/L	6.00	20.0
218-01-9	Chrysene		82.1	ug/L	0.600	2.00
84-74-2	Di-n-butylphthalate		88.3	ug/L	6.00	20.0
117-84-0	Di-n-octylphthalate		69.2	ug/L	6.00	20.0
53-70-3	Dibenzo(a,h)anthracene		77.7	ug/L	0.600	2.00
132-64-9	Dibenzofuran		79.1	ug/L	6.00	20.0
84-66-2	Diethylphthalate		85.1	ug/L	6.00	20.0
131-11-3	Dimethylphthalate		89.3	ug/L	6.00	20.0
88-85-7	Dinoseb	U	6.00	ug/L	6.00	20.0
122-39-4	Diphenylamine		74.4	ug/L	6.00	20.0
206-44-0	Fluoranthene		88.8	ug/L	0.600	2.00
86-73-7	Fluorene		78.8	ug/L	0.600	2.00
118-74-1	Hexachlorobenzene		81.4	ug/L	6.00	20.0
87-68-3	Hexachlorobutadiene		54.6	ug/L	6.00	20.0
77-47-4	Hexachlorocyclopentadiene		50.0	ug/L	6.00	20.0
67-72-1	Hexachloroethane		60.1	ug/L	6.00	20.0
193-39-5	Indeno(1,2,3-cd)pyrene		82.9	ug/L	0.600	2.00
78-59-1	Isophorone		83.9	ug/L	7.00	20.0
62-75-9	N-Methyl-N-nitrosomethylamine		57.3	ug/L	6.00	20.0
924-16-3	N-Nitrosodi-n-butylamine	U	6.00	ug/L	6.00	20.0
55-18-5	N-Nitrosodiethylamine	U	6.00	ug/L	6.00	20.0
621-64-7	N-Nitrosodi--n-propylamine		84.6	ug/L	6.00	20.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		85.1	ug/L	6.00	20.0
91-20-3	Naphthalene		69.7	ug/L	0.600	2.00
98-95-3	Nitrobenzene		88.3	ug/L	6.00	20.0
608-93-5	Pentachlorobenzene	U	6.00	ug/L	6.00	20.0
87-86-5	Pentachlorophenol		95.1	ug/L	6.00	20.0
85-01-8	Phenanthrene		80.5	ug/L	0.600	2.00
108-95-2	Phenol		33.0	ug/L	6.00	20.0
129-00-0	Pyrene		86.4	ug/L	0.600	2.00
110-86-1	Pyridine		59.3	ug/L	6.00	20.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		108	ug/L	6.00	20.0
111-91-1	bis(2-Chloroethoxy)methane		89.2	ug/L	6.00	20.0
111-44-4	bis(2-Chloroethyl) ether		89.5	ug/L	6.00	20.0
117-81-7	bis(2-Ethylhexyl)phthalate		76.4	ug/L	6.00	20.0

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<b>SDG Number:</b> 2018-545	<b>Date Collected:</b> 10/19/2017 09:20	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203904118	<b>Date Received:</b> 10/21/2017 08:45	
<b>Client Sample:</b> QC for batch 1712676	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> WST15-17-148254MS	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Batch ID:</b> 1712677	<b>Inst:</b> MSD1.I	<b>Dilution:</b> 1
<b>Run Date:</b> 10/27/2017 16:31	<b>Analyst:</b> JLD1	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 10/26/2017 17:40	<b>Aliquot:</b> 500 mL	<b>Final Volume:</b> 1 mL
<b>Data File:</b> s102717a.B\s1j2720.D	<b>Column:</b> 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		71.4	ug/L	7.40	20.0
99-09-2	3-Nitroaniline		102	ug/L	6.00	20.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		73.1	ug/L	6.00	20.0
88-74-4	2-Nitroaniline		97.9	ug/L	6.00	20.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		82.0	ug/L	6.00	20.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	150	200	ug/L	75	(32%-124%)
2-Fluorobiphenyl	75.5	100	ug/L	75	(32%-112%)
2-Fluorophenol	88.2	200	ug/L	44	(15%-88%)
Nitrobenzene-d5	82.7	100	ug/L	83	(36%-115%)
Phenol-d5	61.6	200	ug/L	31	(15%-91%)
p-Terphenyl-d14	79.8	100	ug/L	80	(36%-121%)

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<b>SDG Number:</b> 2018-545	<b>Date Collected:</b> 10/19/2017 09:20	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203904119	<b>Date Received:</b> 10/21/2017 08:45	
<b>Client Sample:</b> QC for batch 1712676	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> WST15-17-148254MSD	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Batch ID:</b> 1712677	<b>Inst:</b> MSD1.I	<b>Dilution:</b> 1
<b>Run Date:</b> 10/27/2017 17:02	<b>Analyst:</b> JLD1	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 10/26/2017 17:40	<b>Aliquot:</b> 500 mL	<b>Final Volume:</b> 1 mL
<b>Data File:</b> s102717a.B\s1j2721.D	<b>Column:</b> 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		72.3	ug/L	6.00	20.0
120-82-1	1,2,4-Trichlorobenzene		67.9	ug/L	6.00	20.0
95-50-1	1,2-Dichlorobenzene		69.8	ug/L	6.00	20.0
122-66-7	Azobenzene		99.5	ug/L	6.00	20.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		67.5	ug/L	6.00	20.0
106-46-7	1,4-Dichlorobenzene		66.0	ug/L	6.00	20.0
123-91-1	1,4-Dioxane		62.7	ug/L	6.00	20.0
90-12-0	1-Methylnaphthalene		72.9	ug/L	0.600	2.00
58-90-2	2,3,4,6-Tetrachlorophenol		90.4	ug/L	6.00	20.0
95-95-4	2,4,5-Trichlorophenol		87.3	ug/L	6.00	20.0
88-06-2	2,4,6-Trichlorophenol		84.7	ug/L	6.00	20.0
120-83-2	2,4-Dichlorophenol		83.8	ug/L	6.00	20.0
105-67-9	2,4-Dimethylphenol		73.2	ug/L	6.00	20.0
51-28-5	2,4-Dinitrophenol		97.3	ug/L	10.0	40.0
121-14-2	2,4-Dinitrotoluene		91.1	ug/L	6.00	20.0
606-20-2	2,6-Dinitrotoluene		91.9	ug/L	6.00	20.0
91-58-7	2-Chloronaphthalene		71.0	ug/L	0.820	2.00
95-57-8	2-Chlorophenol		79.4	ug/L	6.00	20.0
534-52-1	2-Methyl-4,6-dinitrophenol		104	ug/L	6.00	20.0
91-57-6	2-Methylnaphthalene		71.9	ug/L	0.600	2.00
88-75-5	2-Nitrophenol		89.4	ug/L	6.00	20.0
91-94-1	3,3'-Dichlorobenzidine		95.5	ug/L	6.00	20.0
101-55-3	4-Bromophenylphenylether		89.1	ug/L	6.00	20.0
59-50-7	Parachlorometa cresol		90.9	ug/L	6.00	20.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		96.7	ug/L	6.60	20.0
7005-72-3	4-Chlorophenylphenylether		82.8	ug/L	6.00	20.0
100-02-7	4-Nitrophenol		29.4	ug/L	6.00	20.0
83-32-9	Acenaphthene		84.9	ug/L	0.600	2.00
208-96-8	Acenaphthylene		83.2	ug/L	0.600	2.00
62-53-3	Aniline		87.6	ug/L	8.40	20.0
120-12-7	Anthracene		84.8	ug/L	0.600	2.00
1912-24-9	Atrazine		94.3	ug/L	6.00	20.0
92-87-5	Benzidine		98.9	ug/L	7.80	20.0
56-55-3	Benzo(a)anthracene		92.7	ug/L	0.600	2.00
50-32-8	Benzo(a)pyrene		89.0	ug/L	0.600	2.00
205-99-2	Benzo(b)fluoranthene		94.1	ug/L	0.600	2.00
191-24-2	Benzo(ghi)perylene		93.5	ug/L	0.600	2.00

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

<b>SDG Number:</b> 2018-545	<b>Date Collected:</b> 10/19/2017 09:20	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203904119	<b>Date Received:</b> 10/21/2017 08:45	
<b>Client Sample:</b> QC for batch 1712676	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> WST15-17-148254MSD	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Batch ID:</b> 1712677	<b>Inst:</b> MSD1.I	<b>Dilution:</b> 1
<b>Run Date:</b> 10/27/2017 17:02	<b>Analyst:</b> JLD1	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 10/26/2017 17:40	<b>Aliquot:</b> 500 mL	<b>Final Volume:</b> 1 mL
<b>Data File:</b> s102717a.B\s1j2721.D	<b>Column:</b> 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		91.3	ug/L	0.600	2.00
65-85-0	Benzoic acid		89.0	ug/L	12.0	40.0
100-51-6	Benzyl alcohol		80.0	ug/L	6.00	20.0
85-68-7	Butylbenzylphthalate		97.1	ug/L	6.00	20.0
218-01-9	Chrysene		89.0	ug/L	0.600	2.00
84-74-2	Di-n-butylphthalate		95.5	ug/L	6.00	20.0
117-84-0	Di-n-octylphthalate		77.9	ug/L	6.00	20.0
53-70-3	Dibenzo(a,h)anthracene		84.6	ug/L	0.600	2.00
132-64-9	Dibenzofuran		83.4	ug/L	6.00	20.0
84-66-2	Diethylphthalate		90.2	ug/L	6.00	20.0
131-11-3	Dimethylphthalate		92.6	ug/L	6.00	20.0
88-85-7	Dinoseb	U	6.00	ug/L	6.00	20.0
122-39-4	Diphenylamine		79.7	ug/L	6.00	20.0
206-44-0	Fluoranthene		95.6	ug/L	0.600	2.00
86-73-7	Fluorene		81.0	ug/L	0.600	2.00
118-74-1	Hexachlorobenzene		88.1	ug/L	6.00	20.0
87-68-3	Hexachlorobutadiene		57.3	ug/L	6.00	20.0
77-47-4	Hexachlorocyclopentadiene		54.0	ug/L	6.00	20.0
67-72-1	Hexachloroethane		65.5	ug/L	6.00	20.0
193-39-5	Indeno(1,2,3-cd)pyrene		90.0	ug/L	0.600	2.00
78-59-1	Isophorone		88.7	ug/L	7.00	20.0
62-75-9	N-Methyl-N-nitrosomethylamine		60.8	ug/L	6.00	20.0
924-16-3	N-Nitrosodi-n-butylamine	U	6.00	ug/L	6.00	20.0
55-18-5	N-Nitrosodiethylamine	U	6.00	ug/L	6.00	20.0
621-64-7	N-Nitrosodi--n-propylamine		89.0	ug/L	6.00	20.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		88.9	ug/L	6.00	20.0
91-20-3	Naphthalene		73.2	ug/L	0.600	2.00
98-95-3	Nitrobenzene		93.1	ug/L	6.00	20.0
608-93-5	Pentachlorobenzene	U	6.00	ug/L	6.00	20.0
87-86-5	Pentachlorophenol		102	ug/L	6.00	20.0
85-01-8	Phenanthrene		86.5	ug/L	0.600	2.00
108-95-2	Phenol		35.2	ug/L	6.00	20.0
129-00-0	Pyrene		92.8	ug/L	0.600	2.00
110-86-1	Pyridine		64.1	ug/L	6.00	20.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		117	ug/L	6.00	20.0
111-91-1	bis(2-Chloroethoxy)methane		93.0	ug/L	6.00	20.0
111-44-4	bis(2-Chloroethyl) ether		96.5	ug/L	6.00	20.0
117-81-7	bis(2-Ethylhexyl)phthalate		83.5	ug/L	6.00	20.0

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

Page 3 of 3

<b>SDG Number:</b> 2018-545	<b>Date Collected:</b> 10/19/2017 09:20	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203904119	<b>Date Received:</b> 10/21/2017 08:45	
<b>Client Sample:</b> QC for batch 1712676	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> WST15-17-148254MSD	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Batch ID:</b> 1712677	<b>Inst:</b> MSD1.I	<b>Dilution:</b> 1
<b>Run Date:</b> 10/27/2017 17:02	<b>Analyst:</b> JLD1	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 10/26/2017 17:40	<b>Aliquot:</b> 500 mL	<b>Final Volume:</b> 1 mL
<b>Data File:</b> s102717a.B\s1j2721.D	<b>Column:</b> 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		76.8	ug/L	7.40	20.0
99-09-2	3-Nitroaniline		107	ug/L	6.00	20.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		76.8	ug/L	6.00	20.0
88-74-4	2-Nitroaniline		104	ug/L	6.00	20.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		85.8	ug/L	6.00	20.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	157	200	ug/L	79	(32%-124%)
2-Fluorobiphenyl	78.1	100	ug/L	78	(32%-112%)
2-Fluorophenol	94.2	200	ug/L	47	(15%-88%)
Nitrobenzene-d5	87.8	100	ug/L	88	(36%-115%)
Phenol-d5	65.4	200	ug/L	33	(15%-91%)
p-Terphenyl-d14	85.5	100	ug/L	86	(36%-121%)

# **Perchlorates by LCMSMS Analysis**

# Case Narrative

**Perchlorates by LCMSMS  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-545  
Work Order #: 436027**

**Method/Analysis Information**

<b>Procedure:</b>	<b>Definitive Low Level Perchlorate Analysis Utilizing Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS) by EPA Method 6850 Modified (6850M)</b>
Analytical Method:	SW-846:6850
Prep Method:	SW-846:6850
Analytical Batch Number:	1713226
Prep Batch Number:	1713223

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
436027001	436027001 (CAPA-18-147558)
436027003	436027003 (CAPA-18-147572)
436027007	436027007 (CAPA-18-147573)
1203905528	Interference Check Sample (ICS)
1203905524	Method Blank (MB)
1203905525	Laboratory Control Sample (LCS)
1203905526	435630001(CAPA-18-147560) Matrix Spike (MS)
1203905527	435630001(CAPA-18-147560) 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 435630001 (CAPA-18-147560) was chosen for matrix spike and matrix spike duplicate analysis.

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

The MS recoveries were within the established acceptance limits.

### **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: 2018-545 GEL Work Order: 436027

#### 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: Michael Penny

Date: 06 NOV 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147558Date Received: 24-OCT-17GEL Job No (SDG): 2018-545GEL Sample ID: 436027001Date Filtered: 26-OCT-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	26-OCT-17 22:44	per1026040a
	Perchlorate Isotope Ratio						1	26-OCT-17 22:44	per1026040a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	26-OCT-17 22:44	per1026040a
	Perchlorate-O(18)			0.472	ug/L		1	26-OCT-17 22:44	per1026040a

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147572Date Received: 24-OCT-17GEL Job No (SDG): 2018-545GEL Sample ID: 436027003Date Filtered: 26-OCT-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	0.334	ug/L		1	26-OCT-17 23:05	per1026042a
	Perchlorate Isotope Ratio			3.19			1	26-OCT-17 23:05	per1026042a
14797-73-0	Perchlorate-101	.05	.2	0.316	ug/L		1	26-OCT-17 23:05	per1026042a
	Perchlorate-O(18)			0.468	ug/L		1	26-OCT-17 23:05	per1026042a

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147573Date Received: 24-OCT-17GEL Job No (SDG): 2018-545GEL Sample ID: 436027007Date Filtered: 26-OCT-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	0.310	ug/L		1	26-OCT-17 23:15	per1026043a
	Perchlorate Isotope Ratio			2.83			1	26-OCT-17 23:15	per1026043a
14797-73-0	Perchlorate-101	.05	.2	0.331	ug/L		1	26-OCT-17 23:15	per1026043a
	Perchlorate-O(18)			0.476	ug/L		1	26-OCT-17 23:15	per1026043a

^ 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): 2018-545

Extract Batch Code: 1713223

Date Filtered: 26-OCT-17

Matrix: WATER

Sample ID: 1203905525

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.203	ug/L	102		85 - 115
Perchlorate Isotope Ratio		2.94				-
Perchlorate-101	0.200	.209	ug/L	104		85 - 115
Perchlorate-O(18)		.523	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):** 2018-545

**Extract Batch Code:** 1713223

**Date Extracted:** 26-OCT-17

**GEL MS/PS ID:** 1203905526

**Client ID:** CAPA-18-147560

**GEL MSD/PSD ID:** 1203905527

**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	0.340	ug/L	0.532	96	.506	83	5	30	75 - 125
Perchlorate Isotope Ratio	0	2.93		3.04		2.86		6		-
Perchlorate-101	0.200	0.350	ug/L	0.528	89	.535	93	1	30	75 - 125
Perchlorate-O(18)	0	0.491	ug/L	0.509		.471		8		-

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 26-OCT-17GEL Job No (SDG): 2018-545GEL Sample ID: 1203905524Date Filtered: 26-OCT-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	26-OCT-17 18:23	per1026015a
	Perchlorate Isotope Ratio						1	26-OCT-17 18:23	per1026015a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	26-OCT-17 18:23	per1026015a
	Perchlorate-O(18)			0.504	ug/L		1	26-OCT-17 18:23	per1026015a

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 26-OCT-17GEL Job No (SDG): 2018-545GEL Sample ID: 1203905525Date Filtered: 26-OCT-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	0.203	ug/L		1	26-OCT-17 18:33	per1026016a
	Perchlorate Isotope Ratio			2.94			1	26-OCT-17 18:33	per1026016a
14797-73-0	Perchlorate-101	.05	.2	0.209	ug/L		1	26-OCT-17 18:33	per1026016a
	Perchlorate-O(18)			0.523	ug/L		1	26-OCT-17 18:33	per1026016a

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2018-545GEL Sample ID: 1203905528Date Filtered: 26-OCT-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	0.241	ug/L		1	26-OCT-17 18:43	per1026017a
	Perchlorate Isotope Ratio			3.22			1	26-OCT-17 18:43	per1026017a
14797-73-0	Perchlorate-101	.05	.2	0.226	ug/L		1	26-OCT-17 18:43	per1026017a
	Perchlorate-O(18)			0.524	ug/L		1	26-OCT-17 18:43	per1026017a

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147560MSDate Received: 20-OCT-17GEL Job No (SDG): 2018-545GEL Sample ID: 1203905526Date Filtered: 26-OCT-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	0.532	ug/L		1	26-OCT-17 19:04	per1026019a
	Perchlorate Isotope Ratio			3.04			1	26-OCT-17 19:04	per1026019a
14797-73-0	Perchlorate-101	.05	.2	0.528	ug/L		1	26-OCT-17 19:04	per1026019a
	Perchlorate-O(18)			0.509	ug/L		1	26-OCT-17 19:04	per1026019a

^ 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: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147560MSDDate Received: 20-OCT-17GEL Job No (SDG): 2018-545GEL Sample ID: 1203905527Date Filtered: 26-OCT-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	0.506	ug/L		1	26-OCT-17 19:15	per1026020a
	Perchlorate Isotope Ratio			2.86			1	26-OCT-17 19:15	per1026020a
14797-73-0	Perchlorate-101	.05	.2	0.535	ug/L		1	26-OCT-17 19:15	per1026020a
	Perchlorate-O(18)			0.471	ug/L		1	26-OCT-17 19:15	per1026020a

^ 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 =

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

# PCB Analysis

# Case Narrative

**GC Semivolatile PCB  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-545  
Work Order #: 436027**

**Method/Analysis Information**

<b>Procedure:</b>	<b>Analysis of The Analysis of Polychlorinated Biphenyls by GC/ECD by ECD</b>
Analytical Method:	SW846 3535A/8082
Prep Method:	SW846 3535A
Analytical Batch Number:	1716000
Prep Batch Number:	1715999

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW846 3535A/8082:

<b>Sample ID</b>	<b>Client ID</b>
436027005	CAPA-18-147598
436027009	CAPA-18-147599
1203912460	Method Blank (MB)
1203912461	Laboratory Control Sample (LCS)
1203912462	435560007(CAPA-18-147686) Matrix Spike (MS)
1203912463	435560007(CAPA-18-147686) 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-040 REV# 24.

Raw data reports are processed and reviewed by the analyst using the Chemstation 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.

**Initial Calibration**

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

**Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standards (ICV or CCV) met the acceptance criteria. All analytes were within the established retention time windows for this method.

**Quality Control (QC) Information****Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Surrogate Recoveries**

The Method Blank (See Below) did not meet surrogate recovery acceptance criteria due to isolated extraction efficiency issue. All other QC samples met the acceptance criteria for the surrogate and spiked Aroclors.

Sample	Analyte	Value
1203912460 (MB)	4cmx	32* (33%-122%)

**Laboratory Control Sample (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS/LCSD) Recovery**

The LCS/LCSD spike recoveries met the acceptance limits.

**QC Sample Designation**

Sample 435560007 (CAPA-18-147686) was selected for the matrix spike and matrix spike duplicate analysis.

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

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

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

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

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

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 samples and QC in this batch were cleaned using alumina in order to remove oil and other high molecular weight interferences. All reported analyte detections in client and quality control samples were within the established retention time windows. Reported analyte concentrations were confirmed on dissimilar columns.

**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 for the samples in this SDG and reported in this batch.

## **Miscellaneous Information**

### **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. 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.

### **Manual integrations**

Manual integrations were not required for samples and QC samples associated with this SDG in this batch.

### **Additional Comments**

The column 1 has been chosen as the primary column. The data are reported from the column 1 for all samples in this batch.

### **System Configuration**

The Semi-Volatiles-PCB 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>
ECD9A.I_1	Agilent 7890A Gas Chromatograph/Dual ECD w/ 7693 Autosampler	7890A GC/ECD	Restek Rtx-CLPest 1	30m x 0.25mm, 0.25um
ECD9A.I_2	Agilent 7890A Gas Chromatograph/Dual ECD w/ 7693 Autosampler	7890A GC/ECD	Restek Rtx-CLPest 2	30m x 0.25mm, 0.20um

### **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: 2018-545 GEL Work Order: 436027

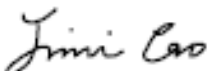
#### The Qualifiers in this report are defined as follows:

- \* 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: Jimin Cao

Date: 09 NOV 2017

Title: Data Validator

# **Sample Data Summary**

**PCB**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 1

**SDG Number:** 2018-545  
**Lab Sample ID:** 436027005  
**Client Sample:** PCB  
**Client ID:** CAPA-18-147598  
**Batch ID:** 1716000  
**Run Date:** 11/07/2017 18:04  
**Prep Date:** 11/07/2017 05:00  
**Data File:** 110717.S\E9k0759.D  
 110717.S\E9k0759.D

**Date Collected:** 10/20/2017 10:36  
**Date Received:** 10/24/2017 08:55  
**Client:** ARSL004  
**Method:** SW846 3535A/8082  
**Inst:** ECD9A.I  
**Analyst:** YS1  
**Aliquot:** 980 mL  
**Column:** 1 RTX-CLPEST 1  
 2 RTX-CLPEST 2

**Matrix:** W  
**Project:** ESHL00114  
**SOP Ref:** GL-OA-E-040  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016	U	0.034	ug/L	0.034	0.102	1
11104-28-2	Aroclor-1221	U	0.034	ug/L	0.034	0.102	1
11141-16-5	Aroclor-1232	U	0.034	ug/L	0.034	0.102	1
53469-21-9	Aroclor-1242	U	0.034	ug/L	0.034	0.102	1
12672-29-6	Aroclor-1248	U	0.034	ug/L	0.034	0.102	1
11097-69-1	Aroclor-1254	U	0.034	ug/L	0.034	0.102	1
11096-82-5	Aroclor-1260	U	0.034	ug/L	0.034	0.102	1
37324-23-5	Aroclor-1262	U	0.034	ug/L	0.034	0.102	1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
4cmx	0.132	0.204	ug/L 65	(33%-122%)
Decachlorobiphenyl	0.170	0.204	ug/L 83	(35%-138%)

**PCB**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 1

**SDG Number:** 2018-545  
**Lab Sample ID:** 436027009  
**Client Sample:** PCB  
**Client ID:** CAPA-18-147599  
**Batch ID:** 1716000  
**Run Date:** 11/07/2017 18:43  
**Prep Date:** 11/07/2017 05:00  
**Data File:** 110717.S\E9k0762.D  
 110717.S\E9k0762.D

**Date Collected:** 10/20/2017 12:12  
**Date Received:** 10/24/2017 08:55  
**Client:** ARSL004  
**Method:** SW846 3535A/8082  
**Inst:** ECD9A.I  
**Analyst:** YS1  
**Aliquot:** 900 mL  
**Column:** 1 RTX-CLPEST 1  
 2 RTX-CLPEST 2

**Matrix:** W  
**Project:** ESHL00114  
**SOP Ref:** GL-OA-E-040  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016	U	0.037	ug/L	0.037	0.111	1
11104-28-2	Aroclor-1221	U	0.037	ug/L	0.037	0.111	1
11141-16-5	Aroclor-1232	U	0.037	ug/L	0.037	0.111	1
53469-21-9	Aroclor-1242	U	0.037	ug/L	0.037	0.111	1
12672-29-6	Aroclor-1248	U	0.037	ug/L	0.037	0.111	1
11097-69-1	Aroclor-1254	U	0.037	ug/L	0.037	0.111	1
11096-82-5	Aroclor-1260	U	0.037	ug/L	0.037	0.111	1
37324-23-5	Aroclor-1262	U	0.037	ug/L	0.037	0.111	1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
4cmx	0.144	0.222	ug/L 65	(33%-122%)
Decachlorobiphenyl	0.185	0.222	ug/L 83	(35%-138%)

# **Quality Control Summary**

---

**PCB**  
**Surrogate Recovery Report**

Page 1 of 1

**SDG Number: 2018-545****Matrix Type: LIQUID**

---

Sample ID	Client ID	4CMX 1 %REC #	4CMX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #
1203912460	MB for batch 1715999	32 *	32 *	44	35
1203912461	LCS for batch 1715999	65	68	79	62
1203912462	CAPA-18-147686MS	48	50	68	54
1203912463	CAPA-18-147686MSD	58	60	76	61
436027005	CAPA-18-147598	65	65	83	68
436027009	CAPA-18-147599	65	67	83	66

---

**Surrogate****Acceptance Limits**

4CMX = 4cmx

(33%-122%)

DCB = Decachlorobiphenyl

(35%-138%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

**PCB**  
**Quality Control Summary**  
**Spike Recovery Report**

Page 1 of 1

SDG Number: 2018-545

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1715999

Matrix: WATER

Lab Sample ID 1203912461

Instrument: ECD9A.I

Analysis Date: 11/07/2017 15:59

Dilution: 1

Analyst: YS1

Prep Batch ID: 1715999

Inj. Vol: 1 uL

Batch ID: 1716000

CAS No			Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
12674-11-2	LCS	Aroclor-1016		1.00	0.0	0.736	74	45-101
11096-82-5	LCS	Aroclor-1260		1.00	0.0	0.769	77	52-113

**PCB**  
**Quality Control Summary**  
**Spike Recovery Report**

Page 1 of 2

SDG Number: 2018-545

Sample Type: Matrix Spike

Client ID: CAPA-18-147686MS

Matrix: W

Lab Sample ID 1203912462

Instrument: ECD9A.I

Analysis Date: 11/07/2017 16:27

Dilution: 1

Analyst: YS1

Prep Batch ID: 1715999

Inj. Vol: 1 uL

Batch ID: 1716000

CAS No			Parmname		Amount Added ug/L	Sample Conc. ug/L	U	Spike Conc. ug/L	Recovery %	Acceptance Limits
12674-11-2	MS	Aroclor-1016			1.00	0.00	U	0.554	55	26-110
11096-82-5	MS	Aroclor-1260			1.00	0.00	U	0.546	55	30-127

**PCB**  
**Quality Control Summary**  
**Spike Recovery Report**

Page 2 of 2

SDG Number: 2018-545

Sample Type: Matrix Spike Duplicate

Client ID: CAPA-18-147686MSD

Matrix: W

Lab Sample ID 1203912463

Instrument: ECD9A.I

Analysis Date: 11/07/2017 16:43

Dilution: 1

Analyst: YS1

Prep Batch ID: 1715999

Inj. Vol: 1 uL

Batch ID: 1716000

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
12674-11-2	MSD Aroclor-1016	1.00	0.00	U	0.657	66	26-110	17	0-27
11096-82-5	MSD Aroclor-1260	1.00	0.00	U	0.668	67	30-127	20	0-29

## Method Blank Summary

Page 1 of 1

SDG Number:	2018-545	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1715999	Instrument ID:	ECD9A.I_1	Data File:	110717.S\E9k0750.D
Lab Sample ID:	1203912460		ECD9A.I_2		110717.S\E9k0750.D
Column:	RTX-CLPEST 1	Prep Date:	11/07/2017 05:00	Analyzed:	11/07/17 15:48
	RTX-CLPEST 2				

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 1715999	1203912461	110717.S\E9k0751.D	11/07/17	1559
02 CAPA-18-147686MS	1203912462	110717.S\E9k0753.D	11/07/17	1627
03 CAPA-18-147686MSD	1203912463	110717.S\E9k0754.D	11/07/17	1643
04 CAPA-18-147598	436027005	110717.S\E9k0759.D	11/07/17	1804
05 CAPA-18-147599	436027009	110717.S\E9k0762.D	11/07/17	1843

# Quality Control Data

**PCB**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 1

**SDG Number:** 2018-545  
**Lab Sample ID:** 1203912460  
**Client Sample:** QC for batch 1715999  
**Client ID:** MB for batch 1715999  
**Batch ID:** 1716000  
**Run Date:** 11/07/2017 15:48  
**Prep Date:** 11/07/2017 05:00  
**Data File:** 110717.S\E9k0750.D  
110717.S\E9k0750.D

**Client:** ARSL004  
**Method:** SW846 3535A/8082  
**Inst:** ECD9A.I  
**Analyst:** YS1  
**Aliquot:** 1000 mL  
**Column:** 1 RTX-CLPEST 1  
2 RTX-CLPEST 2

**Matrix:** WATER  
**Project:** QC  
**SOP Ref:** GL-OA-E-040  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016	U	0.0333	ug/L	0.0333	0.100	1
11104-28-2	Aroclor-1221	U	0.0333	ug/L	0.0333	0.100	1
11141-16-5	Aroclor-1232	U	0.0333	ug/L	0.0333	0.100	1
53469-21-9	Aroclor-1242	U	0.0333	ug/L	0.0333	0.100	1
12672-29-6	Aroclor-1248	U	0.0333	ug/L	0.0333	0.100	1
11097-69-1	Aroclor-1254	U	0.0333	ug/L	0.0333	0.100	1
11096-82-5	Aroclor-1260	U	0.0333	ug/L	0.0333	0.100	1
37324-23-5	Aroclor-1262	U	0.0333	ug/L	0.0333	0.100	1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
4cmx	0.063	0.200	ug/L 32	* (33%-122%)
Decachlorobiphenyl	0.0876	0.200	ug/L 44	(35%-138%)

**PCB**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 1

**SDG Number:** 2018-545  
**Lab Sample ID:** 1203912461  
**Client Sample:** QC for batch 1715999  
**Client ID:** LCS for batch 1715999  
**Batch ID:** 1716000  
**Run Date:** 11/07/2017 15:59  
**Prep Date:** 11/07/2017 05:00  
**Data File:** 110717.S\E9k0751.D  
 110717.S\E9k0751.D

**Client:** ARSL004  
**Method:** SW846 3535A/8082  
**Inst:** ECD9A.I  
**Analyst:** YS1  
**Aliquot:** 1000 mL  
**Column:** 1 RTX-CLPEST 1  
 2 RTX-CLPEST 2

**Matrix:** WATER  
**Project:** QC  
**SOP Ref:** GL-OA-E-040  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016		0.736	ug/L	0.0333	0.100	1
11104-28-2	Aroclor-1221	U	0.0333	ug/L	0.0333	0.100	1
11141-16-5	Aroclor-1232	U	0.0333	ug/L	0.0333	0.100	1
53469-21-9	Aroclor-1242	U	0.0333	ug/L	0.0333	0.100	1
12672-29-6	Aroclor-1248	U	0.0333	ug/L	0.0333	0.100	1
11097-69-1	Aroclor-1254	U	0.0333	ug/L	0.0333	0.100	1
11096-82-5	Aroclor-1260		0.769	ug/L	0.0333	0.100	1
37324-23-5	Aroclor-1262	U	0.0333	ug/L	0.0333	0.100	1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
4cmx	0.130	0.200	ug/L 65	(33%-122%)
Decachlorobiphenyl	0.158	0.200	ug/L 79	(35%-138%)

**PCB**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 1

**SDG Number:** 2018-545  
**Lab Sample ID:** 1203912462  
**Client Sample:** QC for batch 1715999  
**Client ID:** CAPA-18-147686MS  
**Batch ID:** 1716000  
**Run Date:** 11/07/2017 16:27  
**Prep Date:** 11/07/2017 05:00  
**Data File:** 110717.S\E9k0753.D  
 110717.S\E9k0753.D

**Date Collected:** 10/17/2017 08:45  
**Date Received:** 10/19/2017 08:55  
**Client:** ARSL004  
**Method:** SW846 3535A/8082  
**Inst:** ECD9A.I  
**Analyst:** YS1  
**Aliquot:** 500 mL  
**Column:** 1 RTX-CLPEST 1  
 2 RTX-CLPEST 2

**Matrix:** W  
**Project:** QC  
**SOP Ref:** GL-OA-E-040  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** .5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016		0.554	ug/L	0.0333	0.100	1
11104-28-2	Aroclor-1221	U	0.0333	ug/L	0.0333	0.100	1
11141-16-5	Aroclor-1232	U	0.0333	ug/L	0.0333	0.100	1
53469-21-9	Aroclor-1242	U	0.0333	ug/L	0.0333	0.100	1
12672-29-6	Aroclor-1248	U	0.0333	ug/L	0.0333	0.100	1
11097-69-1	Aroclor-1254	U	0.0333	ug/L	0.0333	0.100	1
11096-82-5	Aroclor-1260		0.546	ug/L	0.0333	0.100	1
37324-23-5	Aroclor-1262	U	0.0333	ug/L	0.0333	0.100	1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
4cmx	0.0951	0.200	ug/L 48	(33%-122%)
Decachlorobiphenyl	0.137	0.200	ug/L 68	(35%-138%)

**PCB**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 1

**SDG Number:** 2018-545  
**Lab Sample ID:** 1203912463  
**Client Sample:** QC for batch 1715999  
**Client ID:** CAPA-18-147686MSD  
**Batch ID:** 1716000  
**Run Date:** 11/07/2017 16:43  
**Prep Date:** 11/07/2017 05:00  
**Data File:** 110717.S\E9k0754.D  
 110717.S\E9k0754.D

**Date Collected:** 10/17/2017 08:45  
**Date Received:** 10/19/2017 08:55  
**Client:** ARSL004  
**Method:** SW846 3535A/8082  
**Inst:** ECD9A.I  
**Analyst:** YS1  
**Aliquot:** 500 mL  
**Column:** 1 RTX-CLPEST 1  
 2 RTX-CLPEST 2

**Matrix:** W  
**Project:** QC  
**SOP Ref:** GL-OA-E-040  
**Dilution:** 1  
**Inj. Vol:** 1 uL  
**Final Volume:** .5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016		0.657	ug/L	0.0333	0.100	1
11104-28-2	Aroclor-1221	U	0.0333	ug/L	0.0333	0.100	1
11141-16-5	Aroclor-1232	U	0.0333	ug/L	0.0333	0.100	1
53469-21-9	Aroclor-1242	U	0.0333	ug/L	0.0333	0.100	1
12672-29-6	Aroclor-1248	U	0.0333	ug/L	0.0333	0.100	1
11097-69-1	Aroclor-1254	U	0.0333	ug/L	0.0333	0.100	1
11096-82-5	Aroclor-1260		0.668	ug/L	0.0333	0.100	1
37324-23-5	Aroclor-1262	U	0.0333	ug/L	0.0333	0.100	1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
4cmx	0.116	0.200	ug/L 58	(33%-122%)
Decachlorobiphenyl	0.152	0.200	ug/L 76	(35%-138%)

# **Metals Analysis**

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**ARS International, LLC (ARSL)**  
**SDG #: 2018-545**  
**Work Order #: 436027**

<b>Sample ID</b>	<b>Client ID</b>
436027001	CAPA-18-147558
436027002	CAPA-18-147584
436027003	CAPA-18-147572
436027004	CAPA-18-147598
436027007	CAPA-18-147573
436027008	CAPA-18-147599
1203903671	Method Blank (MB) <b>ICP</b>
1203903672	Laboratory Control Sample (LCS)
1203903675	436027001(CAPA-18-147558L) Serial Dilution (SD)
1203903673	436027001(CAPA-18-147558D) Sample Duplicate (DUP)
1203903674	436027001(CAPA-18-147558S) Matrix Spike (MS)
1203903755	Method Blank (MB) <b>ICP-MS</b>
1203903756	Laboratory Control Sample (LCS)
1203903759	436027001(CAPA-18-147558L) Serial Dilution (SD)
1203903757	436027001(CAPA-18-147558D) Sample Duplicate (DUP)
1203903758	436027001(CAPA-18-147558S) Matrix Spike (MS)
1203916128	Method Blank (MB) <b>CVAA</b>
1203916129	Laboratory Control Sample (LCS)
1203916134	436027001(CAPA-18-147558L) Serial Dilution (SD)
1203916130	436027001(CAPA-18-147558D) Sample Duplicate (DUP)
1203916132	436027001(CAPA-18-147558S) Matrix Spike (MS)

**Sample Analysis**

Samples 436027001,002,003,004,007 and 008 in this SDG were analyzed for metals and mercury on an "as received" basis.

**Method/Analysis Information**

<b>Analytical Batch:</b>	1712490, 1712520, 1717478 and 1719596
<b>Prep Batch :</b>	1712489, 1712519 and 1717476
<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-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 PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of calcium, sodium and zinc. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 436027001 (CAPA-18-147558), 436027003 (CAPA-18-147572) and 436027007 (CAPA-18-147573)-ICP.

#### **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: 436027001

(CAPA-18-147558)-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: 2018-545 GEL Work Order: 436027

#### **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: Nik-Cole Elmore**

**Date: 18 NOV 2017**

**Title: Data Validator**

# **Sample Data Summary**

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

**SDG No:** 2018-545**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 436027001**BASIS:** As Received**DATE COLLECTED** 20-OCT-17**CLIENT ID:** CAPA-18-147558**LEVEL:** Low**DATE RECEIVED** 24-OCT-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	MTM1	11/10/17 11:16	111017W1-5	1717478

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

SDG No: 2018-545

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 436027001

BASIS: As Received

DATE COLLECTED 20-OCT-17

CLIENT ID: CAPA-18-147558

LEVEL: Low

DATE RECEIVED 24-OCT-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	11/14/17 17:22	111417-1	1712490
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/29/17 00:27	171028-3	1712520
7440-38-2	Arsenic	2.45	ug/L	J	2	5	5	1	MS	BAJ	10/29/17 00:27	171028-3	1712520
7440-39-3	Barium	20.2	ug/L		1	5	5	1	P	HSC	11/14/17 17:22	111417-1	1712490
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/14/17 17:22	111417-1	1712490
7440-42-8	Boron	16.6	ug/L	J	15	50	50	1	P	HSC	11/14/17 17:22	111417-1	1712490
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/29/17 00:27	171028-3	1712520
7440-70-2	Calcium	19100	ug/L		50	200	200	1	P	HSC	11/15/17 16:36	111517-2	1712490
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/29/17 14:00	171029-4	1712520
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/14/17 17:22	111417-1	1712490
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/14/17 17:22	111417-1	1712490
7439-89-6	Iron	408	ug/L		30	100	100	1	P	HSC	11/14/17 17:22	111417-1	1712490
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/29/17 00:27	171028-3	1712520
7439-95-4	Magnesium	8990	ug/L		110	300	300	1	P	HSC	11/14/17 17:22	111417-1	1712490
7439-96-5	Manganese	213	ug/L		2	10	10	1	P	HSC	11/14/17 17:22	111417-1	1712490
7439-98-7	Molybdenum	14.8	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/29/17 00:27	171028-3	1712520
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/29/17 14:00	171029-4	1712520
7440-09-7	Potassium	2050	ug/L		50	150	150	1	P	HSC	11/15/17 16:36	111517-2	1712490
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/29/17 00:27	171028-3	1712520
7631-86-9	Silica	55300	ug/L		53	213	213	1	P	HSC	11/14/17 17:22	111417-1	1712490
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/29/17 00:27	171028-3	1712520
7440-23-5	Sodium	20200	ug/L		100	300	300	1	P	HSC	11/14/17 17:22	111417-1	1712490
7440-24-6	Strontium	94.9	ug/L		1	5	5	1	P	HSC	11/14/17 17:22	111417-1	1712490
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/29/17 00:27	171028-3	1712520
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	11/14/17 17:22	111417-1	1712490
7440-61-1	Uranium	0.292	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/29/17 00:27	171028-3	1712520
7440-62-2	Vanadium	1	ug/L	U	1	5	5	1	P	HSC	11/14/17 17:22	111417-1	1712490
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	11/14/17 17:22	111417-1	1712490

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

**SDG No:** 2018-545**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 436027001**BASIS:** As Received**DATE COLLECTED** 20-OCT-17**CLIENT ID:** CAPA-18-147558**LEVEL:** Low**DATE RECEIVED** 24-OCT-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	84.7	mg/L		0.453	1.24	1.24	1		TXT1	11/16/17 10:06		1719596

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1712490	1712489	SW846 3005A	50	mL	50	mL	10/25/17	SXW1
1712520	1712519	SW846 3005A	50	mL	50	mL	10/25/17	SXW1
1717478	1717476	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	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:** 2018-545**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 436027002**BASIS:** As Received**DATE COLLECTED** 20-OCT-17**CLIENT ID:** CAPA-18-147584**LEVEL:** Low**DATE RECEIVED** 24-OCT-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	MTM1	11/10/17 11:25	111017W1-5	1717478

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1717478	1717476	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	AXS5

**\*Analytical Methods:**

AV      EPA 245.2 1974

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

**SDG No:** 2018-545**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 436027003**BASIS:** As Received**DATE COLLECTED** 20-OCT-17**CLIENT ID:** CAPA-18-147572**LEVEL:** Low**DATE RECEIVED** 24-OCT-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	MTM1	11/10/17 11:26	111017W1-5	1717478

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

SDG No: 2018-545

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 436027003

BASIS: As Received

DATE COLLECTED 20-OCT-17

CLIENT ID: CAPA-18-147572

LEVEL: Low

DATE RECEIVED 24-OCT-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	11/14/17 17:34	111417-1	1712490
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/29/17 00:44	171028-3	1712520
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	10/29/17 00:44	171028-3	1712520
7440-39-3	Barium	14.9	ug/L		1	5	5	1	P	HSC	11/14/17 17:34	111417-1	1712490
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/14/17 17:34	111417-1	1712490
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	11/14/17 17:34	111417-1	1712490
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/29/17 00:44	171028-3	1712520
7440-70-2	Calcium	11900	ug/L		50	200	200	1	P	HSC	11/15/17 16:49	111517-2	1712490
7440-47-3	Chromium	3.23	ug/L	J	3	10	10	1	MS	BAJ	10/29/17 14:06	171029-4	1712520
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/14/17 17:34	111417-1	1712490
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/14/17 17:34	111417-1	1712490
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	11/14/17 17:34	111417-1	1712490
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/29/17 00:44	171028-3	1712520
7439-95-4	Magnesium	3290	ug/L		110	300	300	1	P	HSC	11/14/17 17:34	111417-1	1712490
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	11/14/17 17:34	111417-1	1712490
7439-98-7	Molybdenum	1.46	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/29/17 00:44	171028-3	1712520
7440-02-0	Nickel	0.984	ug/L	J	0.6	2	2	1	MS	BAJ	10/29/17 14:06	171029-4	1712520
7440-09-7	Potassium	1460	ug/L		50	150	150	1	P	HSC	11/15/17 16:49	111517-2	1712490
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/29/17 00:44	171028-3	1712520
7631-86-9	Silica	64300	ug/L		53	213	213	1	P	HSC	11/14/17 17:34	111417-1	1712490
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/29/17 00:44	171028-3	1712520
7440-23-5	Sodium	10400	ug/L		100	300	300	1	P	HSC	11/14/17 17:34	111417-1	1712490
7440-24-6	Strontium	55.6	ug/L		1	5	5	1	P	HSC	11/14/17 17:34	111417-1	1712490
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/29/17 00:44	171028-3	1712520
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	11/14/17 17:34	111417-1	1712490
7440-61-1	Uranium	0.284	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/29/17 00:44	171028-3	1712520
7440-62-2	Vanadium	4.35	ug/L	J	1	5	5	1	P	HSC	11/14/17 17:34	111417-1	1712490
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	11/14/17 17:34	111417-1	1712490

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

**SDG No:** 2018-545**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 436027003**BASIS:** As Received**DATE COLLECTED** 20-OCT-17**CLIENT ID:** CAPA-18-147572**LEVEL:** Low**DATE RECEIVED** 24-OCT-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	43.3	mg/L		0.453	1.24	1.24	1		TXT1	11/16/17 10:06		1719596

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1712490	1712489	SW846 3005A	50	mL	50	mL	10/25/17	SXW1
1712520	1712519	SW846 3005A	50	mL	50	mL	10/25/17	SXW1
1717478	1717476	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	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:** 2018-545**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 436027004**BASIS:** As Received**DATE COLLECTED** 20-OCT-17**CLIENT ID:** CAPA-18-147598**LEVEL:** Low**DATE RECEIVED** 24-OCT-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	MTM1	11/10/17 11:31	111017W1-5	1717478

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1717478	1717476	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	AXS5

**\*Analytical Methods:**

AV      EPA 245.2 1974

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

**SDG No:** 2018-545**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 436027007**BASIS:** As Received**DATE COLLECTED** 20-OCT-17**CLIENT ID:** CAPA-18-147573**LEVEL:** Low**DATE RECEIVED** 24-OCT-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	MTM1	11/10/17 11:33	111017W1-5	1717478

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

SDG No: 2018-545

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 436027007

BASIS: As Received

DATE COLLECTED 20-OCT-17

CLIENT ID: CAPA-18-147573

LEVEL: Low

DATE RECEIVED 24-OCT-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	11/14/17 17:37	111417-1	1712490
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/29/17 00:47	171028-3	1712520
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	10/29/17 00:47	171028-3	1712520
7440-39-3	Barium	16.6	ug/L		1	5	5	1	P	HSC	11/14/17 17:37	111417-1	1712490
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/14/17 17:37	111417-1	1712490
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	11/14/17 17:37	111417-1	1712490
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/29/17 00:47	171028-3	1712520
7440-70-2	Calcium	11600	ug/L		50	200	200	1	P	HSC	11/15/17 16:52	111517-2	1712490
7440-47-3	Chromium	3.22	ug/L	J	3	10	10	1	MS	BAJ	10/29/17 14:08	171029-4	1712520
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/14/17 17:37	111417-1	1712490
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/14/17 17:37	111417-1	1712490
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	11/14/17 17:37	111417-1	1712490
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/29/17 00:47	171028-3	1712520
7439-95-4	Magnesium	3190	ug/L		110	300	300	1	P	HSC	11/14/17 17:37	111417-1	1712490
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	11/14/17 17:37	111417-1	1712490
7439-98-7	Molybdenum	1.24	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/29/17 00:47	171028-3	1712520
7440-02-0	Nickel	4.51	ug/L		0.6	2	2	1	MS	BAJ	10/29/17 14:08	171029-4	1712520
7440-09-7	Potassium	1490	ug/L		50	150	150	1	P	HSC	11/15/17 16:52	111517-2	1712490
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/29/17 00:47	171028-3	1712520
7631-86-9	Silica	65300	ug/L		53	213	213	1	P	HSC	11/14/17 17:37	111417-1	1712490
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/29/17 00:47	171028-3	1712520
7440-23-5	Sodium	10400	ug/L		100	300	300	1	P	HSC	11/14/17 17:37	111417-1	1712490
7440-24-6	Strontium	56.2	ug/L		1	5	5	1	P	HSC	11/14/17 17:37	111417-1	1712490
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/29/17 00:47	171028-3	1712520
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	11/14/17 17:37	111417-1	1712490
7440-61-1	Uranium	0.293	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/29/17 00:47	171028-3	1712520
7440-62-2	Vanadium	4.61	ug/L	J	1	5	5	1	P	HSC	11/14/17 17:37	111417-1	1712490
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	11/14/17 17:37	111417-1	1712490

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

**SDG No:** 2018-545**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 436027007**BASIS:** As Received**DATE COLLECTED** 20-OCT-17**CLIENT ID:** CAPA-18-147573**LEVEL:** Low**DATE RECEIVED** 24-OCT-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	42.2	mg/L		0.453	1.24	1.24	1		TXT1	11/16/17 10:06		1719596

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1712490	1712489	SW846 3005A	50	mL	50	mL	10/25/17	SXW1
1712520	1712519	SW846 3005A	50	mL	50	mL	10/25/17	SXW1
1717478	1717476	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	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:** 2018-545**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 436027008**BASIS:** As Received**DATE COLLECTED** 20-OCT-17**CLIENT ID:** CAPA-18-147599**LEVEL:** Low**DATE RECEIVED** 24-OCT-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	MTM1	11/10/17 11:35	111017W1-5	1717478

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1717478	1717476	EPA 245.1/245.2 Prep	20	mL	20	mL	11/09/17	AXS5

**\*Analytical Methods:**

AV      EPA 245.2 1974

# **Quality Control Summary**

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

**SDG NO.** 2018-545  
**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>
1203903671	Aluminum	68	ug/L	+/-200	U	P	68	200
	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
	Potassium	50	ug/L	+/-150	U	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
1203903755	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
1203916128	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. 2018-545

Client ID: CAPA-18-147558S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 436027001

Spike ID: 1203903674

<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	4870		68	U	5000	97.4		P
Barium	ug/L	75-125	499		20.2		500	95.8		P
Beryllium	ug/L	75-125	487		1	U	500	97.5		P
Boron	ug/L	75-125	522		16.6	J	500	101		P
Calcium	ug/L	75-125	23800		19100		5000	94.3		P
Cobalt	ug/L	75-125	483		1	U	500	96.7		P
Copper	ug/L	75-125	487		3	U	500	97.4		P
Iron	ug/L	75-125	5280		408		5000	97.4		P
Magnesium	ug/L	75-125	13900		8990		5000	97.6		P
Manganese	ug/L	75-125	679		213		500	93.1		P
Potassium	ug/L	75-125	6840		2050		5000	95.8		P
Silica	ug/L		64500		55300		10700	86.1	N/A	P
Sodium	ug/L		24900		20200		5000	93.9	N/A	P
Strontium	ug/L	75-125	584		94.9		500	97.7		P
Tin	ug/L	75-125	483		2.5	U	500	96.2		P
Vanadium	ug/L	75-125	485		1	U	500	97		P
Zinc	ug/L	75-125	444		3.3	U	500	88.9		P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2018-545

Client ID: CAPA-18-147558S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 436027001

Spike ID: 1203903758

<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	49.1		1	U	50	98		MS
Arsenic	ug/L	75-125	51.2		2.45	J	50	97.4		MS
Cadmium	ug/L	75-125	51.2		0.3	U	50	102		MS
Chromium	ug/L	75-125	54.5		3	U	50	107		MS
Lead	ug/L	75-125	49		0.5	U	50	98		MS
Molybdenum	ug/L	75-125	67.5		14.8		50	105		MS
Nickel	ug/L	75-125	51.8		0.6	U	50	103		MS
Selenium	ug/L	75-125	50		2	U	50	100		MS
Silver	ug/L	75-125	52.2		0.3	U	50	104		MS
Thallium	ug/L	75-125	47		0.6	U	50	94		MS
Uranium	ug/L	75-125	48.5		0.292		50	96.4		MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-5a-

## Matrix Spike Summary

**SDG NO.** 2018-545 **Client ID:** CAPA-18-147558S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 436027001 **Spike ID:** 1203916132

<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	2.14		0.067	U	2	107		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

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

SDG No.: 2018-545

Lab Code: GEL

Contract: ESHL00114

Client ID: CAPA-18-147558D

Matrix: WATER

Level: Low

Sample ID: 436027001

Duplicate ID: 1203903673

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-5	20.2		19.7		2.56		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	16.6 J		16.5 J		.72		P
Calcium	ug/L	+/-20%	19100		18700		1.96		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L	+/-100	408		403		1.18		P
Magnesium	ug/L	+/-20%	8990		8770		2.48		P
Manganese	ug/L	+/-20%	213		209		1.81		P
Potassium	ug/L	+/-20%	2050		2040		.817		P
Silica	ug/L	+/-20%	55300		54300		1.82		P
Sodium	ug/L	+/-20%	20200		19700		2.13		P
Strontium	ug/L	+/-20%	94.9		91.7		3.38		P
Tin	ug/L		2.5 U		4.15 J		200		P
Vanadium	ug/L		1 U		1 U				P
Zinc	ug/L		3.3 U		3.3 U				P

\*Analytical Methods:

P SW846 3005A/6010C

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

SDG No.: 2018-545

Lab Code: GEL

Contract: ESHL00114

Client ID: CAPA-18-147558D

Matrix: WATER

Level: Low

Sample ID: 436027001

Duplicate ID: 1203903757

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	2.45 J		2.54 J		3.53		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L		3 U		3 U				MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/-20%	14.8		13.9		5.87		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	0.292		0.274		6.36		MS

\*Analytical Methods:

MS SW846 3005A/6020A

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

**SDG No.:** 2018-545**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAPA-18-147558D**Matrix:** WATER**Level:** Low**Sample ID:** 436027001**Duplicate ID:** 1203916130**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

-7-

## Laboratory Control Sample Summary

SDG NO. 2018-545

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>
1203903672								
	Aluminum	ug/L	5000	5010		100	80-120	P
	Barium	ug/L	500	491		98.2	80-120	P
	Beryllium	ug/L	500	490		98	80-120	P
	Boron	ug/L	500	501		100	80-120	P
	Calcium	ug/L	5000	4860		97.1	80-120	P
	Cobalt	ug/L	500	499		99.8	80-120	P
	Copper	ug/L	500	491		98.1	80-120	P
	Iron	ug/L	5000	4980		99.7	80-120	P
	Magnesium	ug/L	5000	5160		103	80-120	P
	Manganese	ug/L	500	490		98	80-120	P
	Potassium	ug/L	5000	4960		99.3	80-120	P
	Silica	ug/L	10700	10000		93.4	80-120	P
	Sodium	ug/L	5000	4990		99.8	80-120	P
	Strontium	ug/L	500	502		100	80-120	P
	Tin	ug/L	500	484		96.8	80-120	P
	Vanadium	ug/L	500	488		97.6	80-120	P
	Zinc	ug/L	500	452		90.5	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2018-545

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>
1203903756								
	Antimony	ug/L	50	48		95.9	80-120	MS
	Arsenic	ug/L	50	52.4		105	80-120	MS
	Cadmium	ug/L	50	51.8		104	80-120	MS
	Chromium	ug/L	50	56.6		113	80-120	MS
	Lead	ug/L	50	51		102	80-120	MS
	Molybdenum	ug/L	50	51		102	80-120	MS
	Nickel	ug/L	50	56		112	80-120	MS
	Selenium	ug/L	50	52.5		105	80-120	MS
	Silver	ug/L	50	51.6		103	80-120	MS
	Thallium	ug/L	50	49.4		98.7	80-120	MS
	Uranium	ug/L	50	48.1		96.2	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2018-545

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>
1203916129	Mercury	ug/L	2	2.19		109	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

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## Serial Dilution Sample Summary

SDG NO. 2018-545

Client ID: CAPA-18-147558L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 436027001

Serial Dilution ID: 1203903675

<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	20.2		21.4	J	6.217			P
Beryllium	1	U	5	U				P
Boron	16.6	J	75	U	9.983			P
Calcium	19100		18000		5.901		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	408		393	J	3.515			P
Magnesium	8990		8840		1.75		10	P
Manganese	213		218		2.227		10	P
Potassium	2050		1790		12.707			P
Silica	55300		54600		1.281		10	P
Sodium	20200		20900		3.517		10	P
Strontium	94.9		97.3		2.538		10	P
Tin	2.5	U	12.5	U				P
Vanadium	1	U	5	U				P
Zinc	3.3	U	33.6	J				P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

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## Serial Dilution Sample Summary

SDG NO. 2018-545

Client ID: CAPA-18-147558L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 436027001

Serial Dilution ID: 1203903759

<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	2.45	J	10	U	39.502			MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	14.8		13.6		7.754			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	.292		.335	U	7.877			MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-9-

## Serial Dilution Sample Summary

**SDG NO.** 2018-545 **Client ID:** CAPA-18-147558L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 436027001 **Serial Dilution ID:** 1203916134

<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 #: 2018-545  
Work Order #: 436027**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1711615

**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>
436027002	CAPA-18-147584
436027004	CAPA-18-147598
436027008	CAPA-18-147599
1203905559	Method Blank (MB)
1203905560	Laboratory Control Sample (LCS)
1203905562	436027004(CAPA-18-147598) Sample Duplicate (DUP)
1203905564	436027004(CAPA-18-147598) 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 436027004 (CAPA-18-147598) 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>	1712340	<b>Method:</b>	WSP-CN(T)
<b>Prep Batch :</b>	1712339	<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>
436027002	CAPA-18-147584
436027004	CAPA-18-147598
436027008	CAPA-18-147599
1203903406	Method Blank (MB)
1203903407	Laboratory Control Sample (LCS)
1203903408	435714001(NonSDG) Sample Duplicate (DUP)
1203903409	435714001(NonSDG) 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# 20.

### **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 435714001 (NonSDG) 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:

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### **Method/Analysis Information**

**Product:** Ion Chromatography

**Analytical Batch:** 1712549

**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>
436027001	CAPA-18-147558
436027003	CAPA-18-147572
436027007	CAPA-18-147573
1203903841	Method Blank (MB)
1203903842	Laboratory Control Sample (LCS)
1203903843	436027001(CAPA-18-147558) Sample Duplicate (DUP)
1203903844	436027001(CAPA-18-147558) 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-3000 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 436027001 (CAPA-18-147558) 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 1203903843 (CAPA-18-147558DUP), 1203903844 (CAPA-18-147558PS), 436027001 (CAPA-18-147558) and 436027003 (CAPA-18-147572) 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:

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### **Method/Analysis Information**

**Product:** Ammonia Nitrogen  
**Analytical Batch:** 1714362 **Method:** NH3  
**Prep Batch :** 1714361 **Method:** 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>
436027001	CAPA-18-147558
436027003	CAPA-18-147572
436027007	CAPA-18-147573
1203908495	Method Blank (MB)
1203908496	Laboratory Control Sample (LCS)
1203908497	436027001(CAPA-18-147558) Sample Duplicate (DUP)
1203908498	436027001(CAPA-18-147558) 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# 9.

### **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 436027001 (CAPA-18-147558) 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:

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### **Method/Analysis Information**

<b>Product:</b>	<b>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1714720	<b>Method:</b>	TKN
<b>Prep Batch :</b>	1714719	<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>
436027002	CAPA-18-147584
436027004	CAPA-18-147598
436027008	CAPA-18-147599
1203909428	Method Blank (MB)
1203909429	Laboratory Control Sample (LCS)
1203909430	435631005(CAPA-18-147589) Sample Duplicate (DUP)
1203909431	435631005(CAPA-18-147589) 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# 14.

### **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 435631005 (CAPA-18-147589) 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
Nitrogen, Total Kjeldahl	1203909431 (CAPA-18-147589MS)	111* (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**

Sample1203909429 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are 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:

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:** Nitrate Nitrite by Cadmium Reduction

**Analytical Batch:** 1713174

**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>
436027001	CAPA-18-147558
436027003	CAPA-18-147572
436027007	CAPA-18-147573
1203905376	Method Blank (MB)
1203905377	Laboratory Control Sample (LCS)
1203905379	435630001(CAPA-18-147560) Sample Duplicate (DUP)
1203905383	435630001(CAPA-18-147560) 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# 9.

### **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 435630001 (CAPA-18-147560) 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 following samples 1203905379 (CAPA-18-147560DUP), 1203905383 (CAPA-18-147560PS) and 436027003 (CAPA-18-147572) in this sample group were diluted due to matrix interference. 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.

Analyte	436027
	003
Nitrogen, Nitrate/Nitrite	5X

**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>	1713122	<b>Method:</b>	PO4
<b>Prep Batch :</b>	1713121	<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>
436027001	CAPA-18-147558
436027003	CAPA-18-147572
436027007	CAPA-18-147573
1203905249	Method Blank (MB)
1203905250	Laboratory Control Sample (LCS)
1203905251	435630001(CAPA-18-147560) Sample Duplicate (DUP)
1203905253	435630004(CAPA-18-147561) Sample Duplicate (DUP)
1203905252	435630001(CAPA-18-147560) Matrix Spike (MS)
1203905254	435630004(CAPA-18-147561) 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# 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.

### **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 435630001 (CAPA-18-147560) and 435630004 (CAPA-18-147561) 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 samples in this SDG did not require dilutions.

**Sample Re-analysis**

Sample1203905249 (MB) was re-analyzed due to instrument failure. The results from the reanalysis are 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:

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:** 1713394

**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>
436027001	CAPA-18-147558
436027003	CAPA-18-147572
436027007	CAPA-18-147573
1203905961	Method Blank (MB)
1203905962	Laboratory Control Sample (LCS)
1203905963	436027007(CAPA-18-147573) 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 436027007 (CAPA-18-147573) was selected for QC analysis.

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

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample:

Analyte	Sample	Value
Total Dissolved Solids	1203905963 (CAPA-18-147573DUP)	14.2* (0%-5%)

**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:** 1714428

**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>
436027001	CAPA-18-147558
436027003	CAPA-18-147572
436027007	CAPA-18-147573
1203908702	Laboratory Control Sample (LCS)
1203908703	436027001(CAPA-18-147558) 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 436027001 (CAPA-18-147558) 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:** 1714456 **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>
436027001	CAPA-18-147558
436027003	CAPA-18-147572
436027007	CAPA-18-147573
1203908780	Laboratory Control Sample (LCS)
1203908781	435718001(CAPA-18-147549) Sample Duplicate (DUP)
1203908841	436156001(CAPA-18-147569) 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**

Samples 435718001 (CAPA-18-147549) and 436156001 (CAPA-18-147569) were 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
1203908781 (CAPA-18-147549DUP)	pH	Received 21-OCT-17, out of holding 19-OCT-17
1203908841 (CAPA-18-147569DUP)	pH	Received 25-OCT-17, out of holding 23-OCT-17
436027001 (CAPA-18-147558)	pH	Received 24-OCT-17, out of holding 20-OCT-17
436027003 (CAPA-18-147572)	pH	Received 24-OCT-17, out of holding 20-OCT-17
436027007 (CAPA-18-147573)	pH	Received 24-OCT-17, out of holding 20-OCT-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:

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### **Method/Analysis Information**

**Product:** Alkalinity

**Analytical Batch:** 1714454      **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>
436027001	CAPA-18-147558
436027003	CAPA-18-147572
436027007	CAPA-18-147573
1203908765	Laboratory Control Sample (LCS)
1203908768	435718001(CAPA-18-147549) Sample Duplicate (DUP)
1203908770	435718001(CAPA-18-147549) 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 435718001 (CAPA-18-147549) 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:

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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: 2018-545 GEL Work Order: 436027

#### 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: 15 NOV 2017

Title: Team Leader

# **Sample Data Summary**

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 15, 2017

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: 2018-545

Client Sample ID: CAPA-18-147558  
Sample ID: 436027001  
Matrix: W  
Collect Date: 20-OCT-17 12:50  
Receive Date: 24-OCT-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	10/24/17	2050	1712549	1
Chloride		2.52	0.067	0.200	mg/L		1					
Fluoride		0.269	0.033	0.100	mg/L		1					
Sulfate		15.3	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.138	0.017	0.050	mg/L	1.00	1	KLP1	11/01/17	1334	1714362	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite	U	ND	0.017	0.050	mg/L		1	KLP1	10/26/17	1345	1713174	3
PO4 "As Received"												
Phosphorus, Total as P		0.0961	0.020	0.050	mg/L	1.00	1	KLP1	10/26/17	1419	1713122	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		184	3.40	14.3	mg/L			KLP1	10/27/17	1111	1713394	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		111	1.45	4.00	mg/L			RXB5	11/02/17	1737	1714454	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		307	1.00	1.00	umhos/cm		1	VH1	11/08/17	1028	1714428	7
PH "As Received"												
pH at Temp 13.4C	H	7.80	0.010	0.100	SU		1	RXB5	11/02/17	1735	1714456	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	11/01/17	0940	1714361
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	10/26/17	1300	1713121

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 15, 2017

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: 2018-545

Client Sample ID: CAPA-18-147558  
Sample ID: 436027001

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

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 15, 2017

Company : Los Alamos National Laboratory  
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2018-545

Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147584

Project: ESHL00114

Sample ID: 436027002

Client ID: ARSL004

Matrix: W

Collect Date: 20-OCT-17 12:50

Receive Date: 24-OCT-17

Collector: Client

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		5.32	0.330	1.00	mg/L		1	TSM	11/02/17	0234	1711615	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	10/25/17	0848	1712340	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	J	0.0577	0.033	0.100	mg/L	1.00	1	KLP1	11/02/17	0905	1714720	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	10/25/17	0738	1712339
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	11/01/17	1600	1714719

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW-846:9060	
2	EPA 335.4 1993	
3	EPA:351.2	

### 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

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## Certificate of Analysis

Report Date: November 15, 2017

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: 2018-545

Client Sample ID: CAPA-18-147572  
Sample ID: 436027003  
Matrix: W  
Collect Date: 20-OCT-17 10:36  
Receive Date: 24-OCT-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	10/24/17	2217	1712549	1
Chloride		2.33	0.067	0.200	mg/L		1					
Fluoride		0.248	0.033	0.100	mg/L		1					
Sulfate		2.96	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.065	0.017	0.050	mg/L	1.00	1	KLP1	11/01/17	1336	1714362	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.650	0.085	0.250	mg/L		5	KLP1	10/26/17	1346	1713174	3
PO4 "As Received"												
Phosphorus, Total as P		0.0724	0.020	0.050	mg/L	1.00	1	KLP1	10/26/17	1420	1713122	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		106	3.40	14.3	mg/L			KLP1	10/27/17	1111	1713394	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		63.3	1.45	4.00	mg/L			RXB5	11/02/17	1740	1714454	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		466	1.00	1.00	umhos/cm		1	VH1	11/08/17	1029	1714428	7
PH "As Received"												
pH at Temp 14.7C	H	8.05	0.010	0.100	SU		1	RXB5	11/02/17	1737	1714456	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	11/01/17	0940	1714361
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	10/26/17	1300	1713121

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 15, 2017

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: 2018-545

Client Sample ID: CAPA-18-147572  
Sample ID: 436027003

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

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

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## Certificate of Analysis

Report Date: November 15, 2017

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: 2018-545

Client Sample ID: CAPA-18-147598  
Sample ID: 436027004  
Matrix: W  
Collect Date: 20-OCT-17 10:36  
Receive Date: 24-OCT-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	J	0.426	0.330	1.00	mg/L		1	TSM	11/02/17	0345	1711615	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	10/25/17	0849	1712340	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	11/02/17	0906	1714720	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	10/25/17	0738	1712339
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	11/01/17	1600	1714719

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW-846:9060	
2	EPA 335.4 1993	
3	EPA:351.2	

### 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

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## Certificate of Analysis

Report Date: November 15, 2017

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: 2018-545

Client Sample ID: CAPA-18-147573  
Sample ID: 436027007  
Matrix: W  
Collect Date: 20-OCT-17 12:12  
Receive Date: 24-OCT-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	10/24/17	2246	1712549	1
Chloride		2.20	0.067	0.200	mg/L		1					
Fluoride		0.227	0.033	0.100	mg/L		1					
Sulfate		2.60	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0402	0.017	0.050	mg/L	1.00	1	KLP1	11/01/17	1341	1714362	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.468	0.017	0.050	mg/L		1	KLP1	10/26/17	1347	1713174	3
PO4 "As Received"												
Phosphorus, Total as P		0.0716	0.020	0.050	mg/L	1.00	1	KLP1	10/26/17	1421	1713122	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		136	3.40	14.3	mg/L			KLP1	10/27/17	1111	1713394	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		62.7	1.45	4.00	mg/L			RXB5	11/02/17	1742	1714454	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		161	1.00	1.00	umhos/cm		1	VH1	11/08/17	1029	1714428	7
PH "As Received"												
pH at Temp 15.2C	H	8.05	0.010	0.100	SU		1	RXB5	11/02/17	1740	1714456	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	11/01/17	0940	1714361
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	10/26/17	1300	1713121

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## Certificate of Analysis

Report Date: November 15, 2017

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: 2018-545

Client Sample ID: CAPA-18-147573  
Sample ID: 436027007

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

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 15, 2017

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: 2018-545

Client Sample ID: CAPA-18-147599  
Sample ID: 436027008  
Matrix: W  
Collect Date: 20-OCT-17 12:12  
Receive Date: 24-OCT-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	11/02/17	0605	1711615	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	10/25/17	0850	1712340	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl		0.129	0.033	0.100	mg/L	1.00	1	KLP1	11/02/17	0907	1714720	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	10/25/17	0738	1712339
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	11/01/17	1600	1714719

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW-846:9060	
2	EPA 335.4 1993	
3	EPA:351.2	

### 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

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

## QC Summary

Report Date: November 15, 2017

Page 1 of 6

Los Alamos National Laboratory  
TA-00, SM1237, Rm104C  
Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 436027

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1711615										
QC1203905562	436027004	DUP									
Total Organic Carbon Average		J	0.426	J	0.368	mg/L	14.6	^	(+/-1.00)	TSM	11/02/17 04:31
QC1203905560	LCS										
Total Organic Carbon Average	10.0				10.3	mg/L			103	(80%-120%)	11/01/17 13:28
QC1203905559	MB										
Total Organic Carbon Average			U		ND	mg/L					11/01/17 13:16
QC1203905564	436027004	PS									
Total Organic Carbon Average	10.0	J	0.426		11.2	mg/L			108	(75%-125%)	11/02/17 05:18
<b>Flow Injection Analysis</b>											
Batch	1712340										
QC1203903408	435714001	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A			AXH3	10/25/17 08:45
QC1203903407	LCS										
Cyanide, Total	50.0				48.2	ug/L			96.4	(90%-110%)	10/25/17 08:41
QC1203903406	MB										
Cyanide, Total			U		ND	ug/L					10/25/17 08:40
QC1203903409	435714001	MS									
Cyanide, Total	100	U	ND		99.6	ug/L			99.6	(90%-110%)	10/25/17 08:46
<b>Ion Chromatography</b>											
Batch	1712549										
QC1203903843	436027001	DUP									
Bromide		U	ND	U	ND	mg/L	N/A			JXH5	10/24/17 21:19

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## QC Summary

Workorder: 436027

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1712549										
Chloride		2.52		2.51	mg/L	0.314		(0%-20%)	JXH5	10/24/17	21:19
Fluoride		0.269		0.278	mg/L	3.47	^	(+/-0.100)			
Sulfate		15.3		15.2	mg/L	0.822		(0%-20%)			
QC1203903842 LCS											
Bromide	1.25			1.22	mg/L		97.7	(80%-120%)		10/24/17	20:22
Chloride	5.00			5.00	mg/L		100	(80%-120%)			
Fluoride	2.50			2.62	mg/L		105	(80%-120%)			
Sulfate	10.0			10.2	mg/L		102	(80%-120%)			
QC1203903841 MB											
Bromide			U	ND	mg/L					10/24/17	19:53
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203903844 436027001 PS											
Bromide	1.25	U	ND	1.29	mg/L		98.9	(75%-125%)		10/24/17	21:48
Chloride	5.00		2.52	7.86	mg/L		107	(75%-125%)			
Fluoride	2.50		0.269	2.75	mg/L		99.3	(75%-125%)			
Sulfate	10.0		15.3	26.7	mg/L		113	(75%-125%)			

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## QC Summary

Workorder: 436027

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1713122										
QC1203905251	435630001	DUP									
Phosphorus, Total as P		0.0714		0.0658	mg/L	8.16	^	(+/-0.050)	KLP1	10/26/17	14:04
QC1203905253	435630004	DUP									
Phosphorus, Total as P		0.0827		0.0877	mg/L	5.87	^	(+/-0.050)		10/26/17	14:07
QC1203905250	LCS										
Phosphorus, Total as P	1.00			1.12	mg/L			112 (80%-124%)		10/26/17	14:03
QC1203905249	MB										
Phosphorus, Total as P			J	0.0361	mg/L					10/26/17	14:18
QC1203905252	435630001	MS									
Phosphorus, Total as P	1.00	0.0714		1.05	mg/L			97.9 (63%-139%)		10/26/17	14:05
QC1203905254	435630004	MS									
Phosphorus, Total as P	1.00	0.0827		1.16	mg/L			108 (63%-139%)		10/26/17	14:07
Batch	1713174										
QC1203905379	435630001	DUP									
Nitrogen, Nitrate/Nitrite		0.670		0.655	mg/L	2.26	^	(+/-0.250)	KLP1	10/26/17	13:26
QC1203905377	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.01	mg/L			101 (90%-110%)		10/26/17	13:13
QC1203905376	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					10/26/17	13:11
QC1203905383	435630001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.134		1.16	mg/L			103 (90%-110%)		10/26/17	13:27
Batch	1714362										
QC1203908497	436027001	DUP									
Nitrogen, Ammonia		0.138		0.142	mg/L	2.86	^	(+/-0.050)	KLP1	11/01/17	13:35

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## QC Summary

Workorder: 436027

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1714362										
QC1203908496	LCS										
Nitrogen, Ammonia	1.00			0.935	mg/L		93.5	(90%-110%)	KLP1	11/01/17	13:30
QC1203908495	MB										
Nitrogen, Ammonia			U	ND	mg/L					11/01/17	13:29
QC1203908498	436027001	MS									
Nitrogen, Ammonia	1.00	0.138		1.15	mg/L		101	(90%-110%)		11/01/17	13:35
Batch	1714720										
QC1203909430	435631005	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	11/02/17	09:04
QC1203909429	LCS										
Nitrogen, Total Kjeldahl	1.00			0.967	mg/L		96.7	(90%-110%)		11/02/17	09:51
QC1203909428	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					11/02/17	09:00
QC1203909431	435631005	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	1.11	mg/L		111 *	(90%-110%)		11/02/17	09:05
<b>Solids Analysis</b>											
Batch	1713394										
QC1203905963	436027007	DUP									
Total Dissolved Solids		136		121	mg/L	14.2*		(0%-5%)	KLP1	10/27/17	11:11
QC1203905962	LCS										
Total Dissolved Solids	300			290	mg/L		96.7	(95%-105%)		10/27/17	11:11
QC1203905961	MB										
Total Dissolved Solids			U	ND	mg/L					10/27/17	11:11

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## QC Summary

Workorder: 436027

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1714428										
QC1203908703	436027001	DUP									
Conductivity		307		306	umhos/cm	0.326		(0%-10%)	VH1	11/08/17	10:29
QC1203908702	LCS										
Conductivity	1410			1400	umhos/cm		98.7	(95%-105%)		11/08/17	10:27
Batch	1714454										
QC1203908768	435718001	DUP									
Alkalinity, Total as CaCO3		70.3		69.9	mg/L	0.57		(0%-20%)	RXB5	11/02/17	17:12
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203908765	LCS										
Alkalinity, Total as CaCO3	100			106	mg/L		106	(90%-110%)		11/02/17	16:55
QC1203908770	435718001	MS									
Alkalinity, Total as CaCO3	100	70.3		172	mg/L		102	(80%-120%)		11/02/17	17:14
Batch	1714456										
QC1203908781	435718001	DUP									
pH	H	8.02	H	8.03	SU	0.125		(0%-5%)	RXB5	11/02/17	17:11
QC1203908841	436156001	DUP									
pH	H	8.19	H	8.20	SU	0.122		(0%-5%)		11/02/17	17:48
QC1203908780	LCS										
pH	7.00			7.00	SU		100	(99%-101%)		11/02/17	17:09

- 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

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## QC Summary

Workorder: 436027

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
J	Value is estimated										
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.										
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 #: 2018-545  
Work Order #: 436027**

**Method/Analysis Information**

**Product:** Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Batch Number: 1713388

<b>Sample ID</b>	<b>Client ID</b>
436027004	CAPA-18-147598
436027008	CAPA-18-147599
1203905946	Method Blank (MB)
1203905948	Laboratory Control Sample (LCS)
1203905947	435630002(CAPA-18-147586) 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 Calibrations were performed in November 2017 and October 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 1203905946 (MB) and 1203905948 (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**

Sample, (See Below), did not meet the client tracer yield requirements, however it is less than 110 percent and does meet the GEL standard tracer yield requirements.

Sample	Analyte	Value
436027008 (CAPA-18-147599)	Americium-243 Tracer	107* (50%-105%)

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

The LCS spike recoveries met the acceptance limits.

#### **Designated QC**

The following sample was used for QC: 435630002 (CAPA-18-147586). The QC was from ARSL work order 435630.

#### **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**

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.

##### **Recounts**

Samples 1203905946 (MB) and 436027004 (CAPA-18-147598) were recounted due to a peak shift. The recounts are 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**

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:** 1713389

<b>Sample ID</b>	<b>Client ID</b>
436027004	CAPA-18-147598
436027008	CAPA-18-147599
1203905949	Method Blank (MB)
1203905951	Laboratory Control Sample (LCS)
1203905950	436322006(CAPA-18-147578) 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 October 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 1203905949 (MB) and 1203905951 (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**

Sample (see below) did not meet the client's yield requirement due to the matrix of the sample. The sample contains sediment. There are 400 tracer counts and GEL's standard tracer yield requirements are met.

Sample	Analyte	Value
436027004 (CAPA-18-147598)	Plutonium-242 Tracer	46.1* (50%-105%)

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Designated QC**

The following sample was used for QC: 436322006 (CAPA-18-147578). The QC was from ARSL work order 436322.

**Duplication Criteria between QC Sample and Duplicate Sample**

The QC Sample and Duplicate Sample (DUP) met the duplication acceptance criteria.

**RDL Met**

Samples (See Below) did not meet the detection limits due to the high standard deviation. When a blank population is performed the MDC is greater than the RDL due to the high standard deviation. The samples were counted the maximum count time of in order to achieve the lowest possible MDAs.

Sample	Analyte	Value
1203905950 (CAPA-18-147578DUP)	Plutonium-239/240	Result 0.00248 < MDA 0.0557 > RDL 0.05 pCi/L
436027008 (CAPA-18-147599)	Plutonium-238	Result -0.0429 < MDA 0.0572 > RDL 0.05 pCi/L
	Plutonium-239/240	Result -0.0297 < MDA 0.0742 > RDL 0.05 pCi/L

Sample (see below) did not meet the detection limits listed due to the lower tracer yield. The sample was counted the maximum count time in order to achieve the lowest possible MDC.

Sample	Analyte	Value
436027004 (CAPA-18-147598)	Plutonium-238	Result 0 < MDA 0.0664 > RDL 0.05 pCi/L
	Plutonium-239/240	Result -0.00383 < MDA 0.0861 > RDL 0.05 pCi/L

**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.

**Recounts**

Sample 436027004 (CAPA-18-147598) was recounted due to low carrier/tracer yield. The recount is reported.  
Sample 1203905950 (CAPA-18-147578DUP) was recounted due to detector error. 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**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>IsoU</b>
Analytical Method:	HASL-300:ISOU
Analytical Batch Number:	1713390

<b>Sample ID</b>	<b>Client ID</b>
436027004	CAPA-18-147598
436027008	CAPA-18-147599
1203905952	Method Blank (MB)
1203905954	Laboratory Control Sample (LCS)
1203905953	435630002(CAPA-18-147586) 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 Calibrations were

performed in November 2017 and October 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 1203905952 (MB) and 1203905954 (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
1203905952 (MB)	Uranium-233/234	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
1203905952 (MB)	Uranium-233/234	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: 435630002 (CAPA-18-147586). The QC was from ARSL work order 435630.

##### **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**

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.

**Recounts**

Sample 436027004 (CAPA-18-147598) 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**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:**                      **Gammasec**

Analytical Method:              EPA:901.1

Analytical Batch Number:      1711850

<b>Sample ID</b>	<b>Client ID</b>
436027004	CAPA-18-147598
436027008	CAPA-18-147599
1203902340	Method Blank (MB)
1203902342	Laboratory Control Sample (LCS)
1203902341	435410002(CAMO-18-147652) 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, March 2017, May 2017 and September 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 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: 435410002 (CAMO-18-147652). The QC was from ARSL work order 435410.

**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: 1714184

<b>Sample ID</b>	<b>Client ID</b>
436027004	CAPA-18-147598
436027008	CAPA-18-147599
1203907994	Method Blank (MB)
1203907997	Laboratory Control Sample (LCS)
1203907995	436149002(CAPA-18-147574) Sample Duplicate (DUP)
1203907996	436149002(CAPA-18-147574) 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 1203907994 (MB) and 1203907997 (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: 436149002 (CAPA-18-147574). The QC was from ARSL work order 436149.

**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**

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.

**Recounts**

Sample 1203907997 (LCS) was recounted due to high recovery. The recount 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, 1203907996 (CAPA-18-147574MS), aliquot was reduced to conserve sample volume.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:**

**WSP-GrossA/B**

Analytical Method: EPA 900.0/SW846 9310

Analytical Batch Number: 1716449

Sample ID	Client ID
436027004	CAPA-18-147598
436027008	CAPA-18-147599
1203913664	Method Blank (MB)
1203913668	Laboratory Control Sample (LCS)
1203913665	437078009(CAPA-18-147631) Sample Duplicate (DUP)
1203913666	437078009(CAPA-18-147631) Matrix Spike (MS)
1203913667	437078009(CAPA-18-147631) 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 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 1203913664 (MB) and 1203913668 (LCS) were changed to 1.0 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
1203913664 (MB)	ALPHA and BETA	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
1203913664 (MB)	ALPHA and BETA	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: 437078009 (CAPA-18-147631). The QC was from ARSL work order 437078.

#### **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 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**

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**

Sample 1203913666 (CAPA-18-147631MS) was recounted due to low recovery. The recount 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 and matrix spike duplicate, 1203913666 (CAPA-18-147631MS) and 1203913667 (CAPA-18-147631MSD), 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.

## 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: 2018-545 GEL Work Order: 436027

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

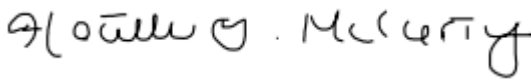
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

**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:** 16 NOV 2017

**Title:** Analyst II

# Sample Data Summary

# GEL LABORATORIES LLC

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

## 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: November 16, 2017

Client Sample ID: CAPA-18-147598  
Sample ID: 436027004  
Matrix: W  
Collect Date: 20-OCT-17  
Receive Date: 24-OCT-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
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### Rad Alpha Spec Analysis

*Alphaspec Am241 Liquid "As Received"*

Americium-241	U	-0.0121	+/-0.00852	0.0528	0.0223	+/-0.00852	0.050	pCi/L			JXR5	11/07/17	1400	1713388	1
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*ISOPU "As Received"*

Plutonium-238	U	0.00	+/-0.00766	0.0664	0.028	+/-0.00766	0.050	pCi/L			JXR5	11/09/17	1300	1713389	2
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Plutonium-239/240	U	-0.00383	+/-0.00856	0.0861	0.0378	+/-0.00856	0.050	pCi/L							
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*IsoU "As Received"*

Uranium-234		0.262	+/-0.0294	0.0596	0.026	+/-0.0322	1.00	pCi/L			JXR5	11/08/17	1322	1713390	3
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Uranium-235/236	U	0.0313	+/-0.0144	0.0634	0.027	+/-0.0144	1.00	pCi/L							
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Uranium-238		0.121	+/-0.0209	0.0576	0.025	+/-0.0217	0.500	pCi/L							
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### Rad Gamma Spec Analysis

*Gammasespec "As Received"*

Cesium-137	U	1.66	+/-1.97	8.01	3.49	+/-2.01	8.00	pCi/L			MXR1	11/07/17	0943	1711850	4
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Cobalt-60	U	-1.75	+/-1.94	7.11	2.74	+/-1.98	8.00	pCi/L							
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Neptunium-237	U	0.543	+/-3.01	10.8	4.78	+/-3.01		pCi/L							
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Potassium-40	U	-30.4	+/-20.1	79.1	31.4	+/-21.4		pCi/L							
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Sodium-22	U	-0.606	+/-1.85	7.43	2.93	+/-1.86		pCi/L							
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### Rad Gas Flow Proportional Counting

*GFPC, Sr90, liquid "As Received"*

Strontium-90	U	0.0699	+/-0.119	0.430	0.187	+/-0.120	0.500	pCi/L			LXB3	11/11/17	1542	1714184	5
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*WSP-GrossA/B "As Received"*

Beta		3.33	+/-0.949	2.89	1.34	+/-0.990	3.00	pCi/L			AXH4	11/15/17	1143	1716449	6
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Alpha	U	1.10	+/-0.795	2.71	1.05	+/-0.801	3.00	pCi/L			AXH4	11/15/17	1648	1716449	7
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### 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"	1713388	61.3	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1713389	46.1 *	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1713390	73.3	(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: CAPA-18-147598

Sample ID: 436027004

Project: ESHL00114

Client ID: ARSL004

Report Date: November 16, 2017

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"						1714184	86.6	(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

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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: CAPA-18-147599

Sample ID: 436027008

Matrix: W

Collect Date: 20-OCT-17

Receive Date: 24-OCT-17

Collector: Client

Report Date: November 16, 2017

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	-0.00216	+/-0.00648	0.0379	0.016	+/-0.00648	0.050	pCi/L			JXR5	11/05/17	1218	1713388	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	-0.0429	+/-0.0165	0.0572	0.0241	+/-0.0165	0.050	pCi/L			JXR5	11/08/17	1455	1713389	2
Plutonium-239/240	U	-0.0297	+/-0.0195	0.0742	0.0326	+/-0.0195	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.253	+/-0.0286	0.0615	0.0268	+/-0.0313	1.00	pCi/L			JXR5	11/05/17	1533	1713390	3
Uranium-235/236	U	0.0323	+/-0.013	0.0655	0.0279	+/-0.0131	1.00	pCi/L							
Uranium-238		0.110	+/-0.0193	0.0595	0.0258	+/-0.0201	0.500	pCi/L							
<b>Rad Gamma Spec Analysis</b>															
<i>Gammaspex "As Received"</i>															
Cesium-137	U	-1.59	+/-1.17	3.82	1.59	+/-1.22	8.00	pCi/L			MXR1	11/07/17	0950	1711850	4
Cobalt-60	U	1.06	+/-1.20	5.42	2.22	+/-1.23	8.00	pCi/L							
Neptunium-237	U	-0.805	+/-2.24	8.34	3.75	+/-2.24		pCi/L							
Potassium-40	U	6.84	+/-17.6	69.7	30.0	+/-17.7		pCi/L							
Sodium-22	U	0.159	+/-1.13	4.75	1.90	+/-1.13		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	0.301	+/-0.140	0.444	0.194	+/-0.142	0.500	pCi/L			LXB3	11/11/17	1542	1714184	5
<i>WSP-GrossA/B "As Received"</i>															
Beta	U	1.78	+/-0.788	2.52	1.16	+/-0.803	3.00	pCi/L			AXH4	11/15/17	1143	1716449	6
Alpha	U	1.22	+/-0.847	2.86	1.01	+/-0.854	3.00	pCi/L			AXH4	11/15/17	1648	1716449	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"	1713388	107 *	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1713389	61.6	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1713390	75.3	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1714184	86.6	(50%-105%)

# GEL LABORATORIES LLC

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

## 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: CAPA-18-147599

Sample ID: 436027008

Project: ESHL00114

Client ID: ARSL004

Report Date: November 16, 2017

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	

### 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

Report Date: November 16, 2017  
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Client : Los Alamos National Laboratory  
TA-00, SM1237, Rm104C

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 436027

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1713388										
QC1203905947	435630002	DUP									
Americium-241	U	-0.00202	U	0.00497	pCi/L	0.261		(0-1)	JXR5	11/05/17	12:18
	Uncert:	+/-0.00729		+/-0.00608							
	TPU:	+/-0.00729		+/-0.00609							
**Americium-243 Tracer	2.62	2.15		2.50	pCi/L		95.2	(50%-105%)			
	Uncert:	+/-0.0731		+/-0.0808							
	TPU:	+/-0.136		+/-0.144							
QC1203905948	LCS										
Americium-241	1.97			1.80	pCi/L		91.7	(80%-120%)	JXR5	11/05/17	12:18
	Uncert:			+/-0.0588							
	TPU:			+/-0.100							
**Americium-243 Tracer	2.10			1.92	pCi/L		91.4	(50%-105%)			
	Uncert:			+/-0.0629							
	TPU:			+/-0.114							
QC1203905946	MB										
Americium-241			U	0.00284	pCi/L				JXR5	11/06/17	17:11
	Uncert:			+/-0.00634							
	TPU:			+/-0.00635							
**Americium-243 Tracer	2.10			1.41	pCi/L		67.2	(50%-105%)			
	Uncert:			+/-0.0769							
	TPU:			+/-0.130							
Batch	1713389										
QC1203905950	436322006	DUP									
Plutonium-238	U	-0.0122	U	0.00248	pCi/L	0.43		(0-1)	JXR5	11/09/17	13:00
	Uncert:	+/-0.00968		+/-0.00743							
	TPU:	+/-0.00968		+/-0.00743							
Plutonium-239/240	U	-0.0184	U	0.00248	pCi/L	0.53		(0-1)			
	Uncert:	+/-0.0122		+/-0.00743							
	TPU:	+/-0.0122		+/-0.00743							
**Plutonium-242 Tracer	2.47	1.83		1.66	pCi/L		67.2	(50%-105%)			
	Uncert:	+/-0.0879		+/-0.0791							
	TPU:	+/-0.165		+/-0.156							
QC1203905951	LCS										
Plutonium-238			U	0.00726	pCi/L			(80%-120%)	JXR5	11/08/17	14:56
	Uncert:			+/-0.00541							
	TPU:			+/-0.00543							
Plutonium-239/240	1.98			2.14	pCi/L		108	(80%-120%)			
	Uncert:			+/-0.072							
	TPU:			+/-0.140							
**Plutonium-242 Tracer	1.97			1.49	pCi/L		75.6	(50%-105%)			
	Uncert:			+/-0.0692							
	TPU:			+/-0.131							

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## QC Summary

Workorder: 436027

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1713389										
QC1203905949	MB										
Plutonium-238			U	0.00	pCi/L				JXR5	11/08/17	14:56
				Uncert:							
				TPU:							
Plutonium-239/240			U	0.00872	pCi/L						
				Uncert:							
				TPU:							
**Plutonium-242 Tracer	1.97			1.69	pCi/L		85.5	(50%-105%)			
				Uncert:							
				TPU:							
Batch	1713390										
QC1203905953	435630002	DUP									
Uranium-234		0.500		0.567	pCi/L	0.351		(0-1)	JXR5	11/06/17	09:16
		Uncert:		+/-0.0414							
		TPU:		+/-0.0503							
Uranium-235/236		U	0.0367	U	0.0623	pCi/L	0.413	(0-1)			
		Uncert:		+/-0.0168							
		TPU:		+/-0.0171							
Uranium-238		0.265		0.264	pCi/L	0.005		(0-1)			
		Uncert:		+/-0.0295							
		TPU:		+/-0.0324							
**Uranium-232 Tracer	2.62	1.79		1.89	pCi/L		72.1	(50%-105%)			
		Uncert:		+/-0.0894							
		TPU:		+/-0.160							
QC1203905954	LCS										
Uranium-234				2.34	pCi/L				JXR5	11/06/17	09:16
		Uncert:		+/-0.0715							
		TPU:		+/-0.136							
Uranium-235/236				0.163	pCi/L						
		Uncert:		+/-0.0215							
		TPU:		+/-0.0229							
Uranium-238	2.70			2.64	pCi/L		97.9	(80%-120%)			
		Uncert:		+/-0.0759							
		TPU:		+/-0.151							
**Uranium-232 Tracer	2.10			1.69	pCi/L		80.9	(50%-105%)			
		Uncert:		+/-0.0678							
		TPU:		+/-0.124							
QC1203905952	MB										
Uranium-234			U	0.0352	pCi/L				JXR5	11/05/17	15:33
		Uncert:		+/-0.0123							
		TPU:		+/-0.0125							
Uranium-235/236			U	0.0124	pCi/L						
		Uncert:		+/-0.00762							
		TPU:		+/-0.00764							
Uranium-238			U	0.00252	pCi/L						
		Uncert:		+/-0.00665							
		TPU:		+/-0.00666							

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## QC Summary

Workorder: 436027

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1713390										
**Uranium-232 Tracer	2.10			1.51	pCi/L		71.8	(50%-105%)			
	Uncert:			+/-0.0729							
	TPU:			+/-0.129							
<b>Rad Gamma Spec</b>											
Batch	1711850										
QC1203902341	435410002	DUP									
Cesium-137	U	0.321	U	-0.252	pCi/L	0.106		(0-1)	MXR1	11/07/17	11:43
	Uncert:	+/-1.15		+/-1.54							
	TPU:	+/-1.15		+/-1.54							
Cobalt-60	U	0.479	U	-1.74	pCi/L	0.437		(0-1)			
	Uncert:	+/-0.935		+/-1.55							
	TPU:	+/-0.941		+/-1.60							
Neptunium-237	U	-2.02	U	0.208	pCi/L	0.245		(0-1)			
	Uncert:	+/-2.10		+/-2.40							
	TPU:	+/-2.15		+/-2.40							
Potassium-40	U	10.7	U	20.6	pCi/L	0.107		(0-1)			
	Uncert:	+/-14.6		+/-31.7							
	TPU:	+/-14.6		+/-31.7							
Sodium-22	U	0.534	U	-0.493	pCi/L	0.245		(0-1)			
	Uncert:	+/-1.00		+/-1.08							
	TPU:	+/-1.01		+/-1.08							
QC1203902342	LCS										
Americium-241	34300			37000	pCi/L		108	(80%-120%)	MXR1	11/03/17	15:07
	Uncert:			+/-822							
	TPU:			+/-1940							
Cesium-137	13000			13400	pCi/L		103	(80%-120%)			
	Uncert:			+/-180							
	TPU:			+/-587							
Cobalt-60	11300			11700	pCi/L		103	(80%-120%)			
	Uncert:			+/-191							
	TPU:			+/-557							
Neptunium-237			U	74.3	pCi/L						
	Uncert:			+/-62.8							
	TPU:			+/-65.2							
Potassium-40			U	12.6	pCi/L						
	Uncert:			+/-95.7							
	TPU:			+/-95.7							
Sodium-22			U	5.12	pCi/L						
	Uncert:			+/-17.1							
	TPU:			+/-17.1							
QC1203902340	MB										
Cesium-137			U	-1.1	pCi/L				MXR1	11/07/17	11:02
	Uncert:			+/-1.11							
	TPU:			+/-1.14							
Cobalt-60			U	0.669	pCi/L						
	Uncert:			+/-1.21							

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## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1711850										
Neptunium-237	TPU:			+/-1.22							
			U	0.0266	pCi/L						
	Uncert:			+/-2.12							
Potassium-40	TPU:			+/-2.12							
			U	2.19	pCi/L						
	Uncert:			+/-16.9							
Sodium-22	TPU:			+/-16.9							
			U	-1.23	pCi/L						
	Uncert:			+/-0.990							
	TPU:			+/-1.03							
<b>Rad Gas Flow</b>											
Batch	1714184										
QC1203907995	436149002	DUP									
Strontium-90	U	-0.105	U	0.0561	pCi/L	0.355		(0-1)	LXB3	11/11/17	15:43
	Uncert:	+/-0.104		+/-0.123							
	TPU:	+/-0.104		+/-0.123							
**Strontium Carrier	7.85	6.80		7.80	mg		99.4	(50%-105%)			
QC1203907997	LCS										
Strontium-90	23.7			26.9	pCi/L		113	(80%-120%)	LXB3	11/13/17	08:20
	Uncert:			+/-0.700							
	TPU:			+/-2.41							
**Strontium Carrier	7.85			4.80	mg		61.1	(50%-105%)			
QC1203907994	MB										
Strontium-90			U	-0.0173	pCi/L				LXB3	11/11/17	15:43
	Uncert:			+/-0.0672							
	TPU:			+/-0.0672							
**Strontium Carrier	7.85			6.70	mg		85.4	(50%-105%)			
QC1203907996	436149002	MS									
Strontium-90	237	U	-0.105	181	pCi/L		76.3	(75%-125%)	LXB3	11/11/17	15:43
	Uncert:		+/-0.104	+/-4.90							
	TPU:		+/-0.104	+/-15.4							
**Strontium Carrier	7.85	6.80		8.10	mg		103	(50%-105%)			
Batch	1716449										
QC1203913665	437078009	DUP									
Alpha		2.35	U	1.11	pCi/L	0.36		(0-1)	AXH4	11/15/17	16:48
	Uncert:	+/-0.879		+/-0.802							
	TPU:	+/-0.901		+/-0.808							
Beta		2.54	U	4.00	pCi/L	0.363		(0-1)		11/15/17	11:42
	Uncert:	+/-0.959		+/-0.980							
	TPU:	+/-0.982		+/-1.04							
QC1203913668	LCS										
Alpha	12.1			11.6	pCi/L		95.6	(80%-120%)	AXH4	11/15/17	16:50
	Uncert:			+/-0.557							
	TPU:			+/-1.12							
Beta	47.4			49.7	pCi/L		105	(80%-120%)		11/15/17	12:09

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## QC Summary

Workorder: 436027

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1716449										
				Uncert:							
				TPU:							
QC1203913664	MB										
Alpha			U	0.235	pCi/L				AXH4	11/15/17	16:48
				Uncert:							
				TPU:							
Beta			U	0.276	pCi/L					11/15/17	12:08
				Uncert:							
				TPU:							
QC1203913666	437078009	MS									
Alpha		483	2.35	371	pCi/L		76.3	(75%-125%)	AXH4	11/16/17	10:18
			Uncert:	+/-0.879							
			TPU:	+/-0.901							
Beta		1900	U	2.54	2020	pCi/L	107	(75%-125%)		11/15/17	12:08
			Uncert:	+/-0.959							
			TPU:	+/-0.982							
QC1203913667	437078009	MSD									
Alpha		483	2.35	453	pCi/L	0.494	93.3	(0-1)	AXH4	11/15/17	16:50
			Uncert:	+/-0.879							
			TPU:	+/-0.901							
Beta		1900	U	2.54	1790	pCi/L	0.364	94.2	(0-1)		11/15/17
			Uncert:	+/-0.959							12:08
			TPU:	+/-0.982							

### 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

Workorder: 436027

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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.