

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:

2018-510 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 ²)	Shipment Activity (dpm*g/100cm ²)	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 ² or Beta > 160,000,000 dpm*g/100cm ² . If YES - Do not ship.				
On the external surface of the sample container, alpha activity ≥ 24 dpm/cm ² , beta activity ≥ 240 dpm/cm ² , 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"> Am-241 > 27 Cs-137 > 270 Pu-238 > 27 Pu-239/240 > 27 Th-228 > 27 U-234 > 270 U-238 > 270 H-3 > 27,000,000 	<ul style="list-style-type: none"> Am-241 > 270,000 Cs-137 > 270,000 Pu-238 > 270,000 Pu-239/240 > 270,000 Th-228 > 270,000 U-234 > 1,600,000,000 U-238 > unlimited H-3 > 27,000,000,000 		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) <i>Miss. [Signature]</i>	10/19/17
(Signature) <i>[Signature]</i>	3:00

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) <i>S. Sherwood</i>	10/19/17
(Signature) <i>[Signature]</i>	3:00

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147560

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10/18/2017	dk	FIELD MATRIX:	WG	dk
TIME COLLECTED (HH:MM):	12 25	dk	MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-49 S1		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 Potential _____ pH _____ Specific Conductance _____
 Temperature _____ Turbidity _____

COLLECTED BY (PRINT): A. Vigil D. Hestec

RELINQUISHED BY (Printed Name) Daniel Jaramila (Signature) <i>DJ</i>	Date/Time 10/18/17 1548	RECEIVED BY (Printed Name) <i>M. Martin</i> (Signature) <i>M. Martin</i>	Date/Time 10/18/17 1548
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-18-147561

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10/18/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	14 39	OK	MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-49 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 Potential _____ pH _____ Specific Conductance _____
Temperature _____ Turbidity _____

COLLECTED BY (PRINT):

D. Hughes A. Vigil

RELINQUISHED BY (Printed Name) Daniel Sandoval (Signature) [Signature]	Date/Time 10/18/17 1548	RECEIVED BY (Printed Name) [Signature] (Signature) [Signature]	Date/Time 10/18/17 1548
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-18-147586

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	<u>10/18/2017</u>	<u>OK</u>	FIELD MATRIX:	<u>WG</u>	<u>OK</u>
TIME COLLECTED (HH:MM):	<u>1225</u>	<u>OK</u>	MEDIA:		
PRS ID:	<u>NA</u>		SAMPLE TECH CODE:	<u>GSP</u>	
LOCATION ID:	<u>R-49 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-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	<u>↓</u>	<u>↓</u>
	WSP-8270C-SVOA	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>

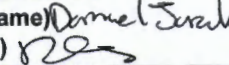
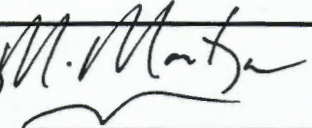
SAMPLE COMMENTS: NoneLOCATION COMMENTS: Sampled 50 ft from running diesel generator

FIELD PARAMETERS:

Sample Time	<u>NA</u>	HH:MM	Dissolved Oxygen	<u>3.80</u>	Flow (in gpm)	<u>1.54</u>
Oxidation-Reduction Potential	<u>162.3</u>		pH	<u>8.0</u>	Specific Conductance	<u>150.0</u>
Temperature	<u>22.4</u>		Turbidity	<u>6.71</u>		

COLLECTED BY (PRINT): A. G. Gil / D. Hughes

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11508**EVENT NAME:** Pajarito (TA-54) & Chromium October
Monthly MY2018 Q1**SAMPLE ID:** CAPA-18-147586**WORK ORDER:**

RELINQUISHED BY (Printed Name) Daniel Serrano (Signature) 	Date/Time 1548 10/18/17	RECEIVED BY (Printed Name) M. Montoya (Signature) 	Date/Time 10/18/17 1548
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-18-147611

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10/18/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1225	OK	MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	C-SP	
LOCATION ID:	R-49 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	1 2 DJA	HCL	Y	NA

SAMPLE COMMENTS:

10-18-17

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 D. Hughes

RELINQUISHED BY (Printed Name) Daniel Jacob (Signature) <i>[Signature]</i>	Date/Time 10/18/17 1548	RECEIVED BY (Printed Name) M. Montz (Signature) <i>[Signature]</i>	Date/Time 10/18/17 1548
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-18-147587

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	<u>10/18/17</u>	<u>dk</u>	FIELD MATRIX:	<u>WG</u>	<u>dk</u>
TIME COLLECTED (HH:MM):	<u>1439</u>	<u>dk</u>	MEDIA:		
PRS ID:	<u>NA</u>		SAMPLE TECH CODE:	<u>GSP</u>	
LOCATION ID:	<u>R-49 S2</u>		FIELD PREP:	<u>UF</u>	
LOCATION TYPE:	<u>N</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 / NA

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-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	<u>↓</u>	<u>↓</u>
	WSP-8270C-SVOA	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 SD Pt for running dosimetry

FIELD PARAMETERS:

Sample Time	<u>NA</u>	HH:MM	Dissolved Oxygen	<u>6.53</u>	Flow (in gpm)	<u>2.47</u>
Oxidation-Reduction Potential	<u>223.4</u>		pH	<u>8.00</u>	Specific Conductance	<u>141.5</u>
Temperature	<u>22.5</u>		Turbidity	<u>0.31</u>		

COLLECTED BY (PRINT): D. Hughes, A. U. S. I

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11508**EVENT NAME:** Pajarito (TA-54) & Chromium October
Monthly MY2018 Q1**SAMPLE ID:** CAPA-18-147587**WORK ORDER:**

RELINQUISHED BY (Printed Name) <i>Dana Jant</i> (Signature) <i>[Signature]</i>	Date/Time <i>10/18/17</i> <i>1548</i>	RECEIVED BY <i>M. Martin</i> (Printed Name) <i>[Signature]</i> (Signature)	Date/Time <i>10/18/17</i> <i>1548</i>
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-18-147612

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10/18/2017	ck	FIELD MATRIX:	WG	ck
TIME COLLECTED (HH:MM):	05 10/18/17 1439	ck	MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-49 S2		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 10/18/17	HCL	Y	NA


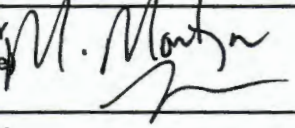
SAMPLE COMMENTS:

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 D. H. Lopez

RELINQUISHED BY (Printed Name) Daniel S. Lopez (Signature) 	Date/Time 10/18/17 1548	RECEIVED BY (Printed Name) M. Montoya (Signature) 	Date/Time 10/18/17 1548
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

DATA VALIDATION REPORT

Chain Of Custody No. 2018-510

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
435630	EPA:120.1	2				
435630	EPA:150.1	2				
435630	EPA:160.1	2				
435630	EPA:170.0	4		2		
435630	EPA:245.2	4				
435630	EPA:300.0	2				
435630	EPA:310.1	2				
435630	EPA:335.4	2				
435630	EPA:350.1	2				
435630	EPA:351.2	2				
435630	EPA:353.2	2				
435630	EPA:365.4	2				
435630	EPA:900	2				
435630	EPA:901.1	2				
435630	EPA:905.0	2				
435630	HASL-300:AM-241	2				
435630	HASL-300:ISOPU	2				
435630	HASL-300:ISOU	2				
435630	SM:A2340B	2				
435630	SW-846:6010C	2				
435630	SW-846:6020	2				
435630	SW-846:6850	2				
435630	SW-846:8260B	2		2		
435630	SW-846:8270D	2				
435630	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
435630	EPA:120.1	1713570	1713570	2										1				2			
435630	EPA:150.1	1713720	1713720	2										1				1			
435630	EPA:160.1	1711941	1711941	2					1					1				1			
435630	EPA:170.0	NA	NA	4		2															
435630	EPA:245.2	1716437	1716435	4					1	1				1				1			
435630	EPA:300.0	1711920	1711920	2					1					1				1			
435630	EPA:310.1	1713711	1713711	2						1				1				1			
435630	EPA:335.4	1711667	1711666	2					1	1				1				1			
435630	EPA:350.1	1712962	1712955	2					1	1				1				1			
435630	EPA:351.2	1712660	1712656	2					1	1				1				1			
435630	EPA:353.2	1713174	1713174	2					1					1				1			
435630	EPA:365.4	1713122	1713121	2					1	2				1				2			
435630	EPA:900	1714187	1714187	2					1	1	1			1				1			
435630	EPA:900	1717894	1717894	2					1	1	1			1				1			
435630	EPA:901.1	1711850	1711850	2					1					1				1			
435630	EPA:905.0	1714181	1714181	2					1	1				1				1			
435630	HASL-300:AM-241	1713388	1713388	2					1					1				1			
435630	HASL-300:ISOPU	1713389	1713389	2					1					1				1			
435630	HASL-300:ISOU	1713390	1713390	2					1					1				1			
435630	SM:A2340B	1719596	1719596	2																	
435630	SW-846:6010C	1711521	1711520	2					1	1				1				1			
435630	SW-846:6020	1711535	1711534	2					1	1				1				1			
435630	SW-846:6850	1713226	1713223	2					1	1	1			1							
435630	SW-846:8260B	1714198	1714198	2		2			2					4							
435630	SW-846:8270D	1711736	1711735	2					1	1	1			1							
435630	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	CAMO-18-147637	1203906356	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPA-18-147560	435630001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPA-18-147561	435630004	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203906355	LCS	0	0	1	0
EPA:120.1	GENERAL CHEMISTRY	WST15-17-148253	1203906357	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147560	1203906752	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147560	435630001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147561	435630004	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203906747	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147560	435630001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147561	435630004	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CTUA-17-142763	1203902620	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203902618	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203902617	MB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147560	435630001	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147561	435630004	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147586	435630002	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147587	435630005	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147611	435630003	FTB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147612	435630006	FTB	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147560	1203913626	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147560	1203913627	MS	0	0	1	0
EPA:245.2	INORGANIC	CAPA-18-147560	435630001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147561	435630004	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147586	435630002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147587	435630005	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203913625	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203913624	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147560	1203902542	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147560	435630001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147561	435630004	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203902541	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203902540	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147560	1203906741	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147560	1203906745	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147560	435630001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147561	435630004	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203906737	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAPA-18-147586	1203901841	DUP	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147586	1203901843	MS	0	0	1	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:335.4	INORGANIC	CAPA-18-147586	435630002	REG	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147587	435630005	REG	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203901840	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203901839	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147560	435630001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147561	435630004	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203904838	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203904837	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	MSGP-17-131990	1203904839	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	MSGP-17-131990	1203904841	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-147649	1203904070	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-147649	1203904071	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147586	435630002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147587	435630005	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203904067	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203904066	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147560	1203905379	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147560	435630001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147561	435630004	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-18-147560	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-18-147560	435630001	REG	1	0	0	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-18-147561	435630004	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	CAMO-18-147649	1203917215	DUP	1	0	0	0
EPA:900	RAD	CAMO-18-147649	1203917216	MS	0	0	1	0
EPA:900	RAD	CAMO-18-147649	1203917217	MSD	0	0	1	0
EPA:900	RAD	CAMO-18-147684	1203908000	DUP	1	0	0	0
EPA:900	RAD	CAMO-18-147684	1203908001	MS	0	0	1	0
EPA:900	RAD	CAMO-18-147684	1203908002	MSD	0	0	1	0
EPA:900	RAD	CAPA-18-147586	435630002	REG	2	0	0	0
EPA:900	RAD	CAPA-18-147587	435630005	REG	2	0	0	0
EPA:900	RAD	LCS	1203908003	LCS	0	0	1	0
EPA:900	RAD	LCS	1203917218	LCS	0	0	1	0
EPA:900	RAD	MB	1203907999	MB	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:900	RAD	MB	1203917214	MB	1	0	0	0
EPA:901.1	RAD	CAMO-18-147652	1203902341	DUP	5	0	0	0
EPA:901.1	RAD	CAPA-18-147586	435630002	REG	5	0	0	0
EPA:901.1	RAD	CAPA-18-147587	435630005	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-18-147586	435630002	REG	1	0	0	0
EPA:905.0	RAD	CAPA-18-147587	435630005	REG	1	0	0	0
EPA:905.0	RAD	CAPA-18-147591	1203907991	DUP	1	0	0	0
EPA:905.0	RAD	CAPA-18-147591	1203907992	MS	0	0	1	0
EPA:905.0	RAD	LCS	1203907993	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203907990	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-18-147586	435630002	REG	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147587	435630005	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-18-147586	435630002	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147587	435630005	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-18-147586	435630002	REG	3	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147587	435630005	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-18-147560	435630001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAPA-18-147561	435630004	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147560	1203901499	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147560	1203901500	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAPA-18-147560	435630001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147561	435630004	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203901498	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203901497	MB	17	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147560	1203901528	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147560	1203901529	MS	0	0	11	0
SW-846:6020	INORGANIC	CAPA-18-147560	435630001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147561	435630004	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203901527	LCS	0	0	11	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6020	INORGANIC	MB	1203901526	MB	11	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-18-147560	435630001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147561	435630004	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-846:8260B	VOC	CAPA-18-147586	435630002	REG	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147587	435630005	REG	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147611	435630003	FTB	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147612	435630006	FTB	80	3	0	0
SW-846:8260B	VOC	LCS	1203908044	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203908045	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203908046	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203908047	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203908042	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203908043	MB	80	3	0	0
SW-846:8270D	SVOC	CAMO-18-147679	1203901988	MS	0	6	76	0
SW-846:8270D	SVOC	CAMO-18-147679	1203901989	MSD	0	6	76	0
SW-846:8270D	SVOC	CAPA-18-147586	435630002	REG	80	6	0	0
SW-846:8270D	SVOC	CAPA-18-147587	435630005	REG	80	6	0	0
SW-846:8270D	SVOC	LCS	1203901987	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203901986	MB	80	6	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147586	435630002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147587	435630005	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147598	1203905562	DUP	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?

DATA VALIDATION REPORT

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203901497	METHOD BLANK	SW-846:6010C	W	Sodium	165	J	ug/L	300
MB	1203904837	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0354	J	mg/L	0.050
MB	1203905249	METHOD BLANK	EPA:365.4	W	Total Phosphate as Phosphorus	0.0361	J	mg/L	0.050
MB	1203913624	METHOD BLANK	EPA:245.2	W	Mercury	-0.084	J	ug/L	0.200
CAPA-18-147611	435630003	TRIP BLANK	EPA:170.0	W	Temperature	2		Deg C	
CAPA-18-147612	435630006	TRIP BLANK	EPA:170.0	W	Temperature	2		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
CAPA-18-147560	1203913624	METHOD BLANK	EPA:245.2	Mercury	-0.084	ug/L	0.067	U	0.200	N	5	100	Y
CAPA-18-147586	1203913624	METHOD BLANK	EPA:245.2	Mercury	-0.084	ug/L	0.067	U	0.200	N	5	100	Y
CAPA-18-147561	1203913624	METHOD BLANK	EPA:245.2	Mercury	-0.084	ug/L	0.067	U	0.200	N	5	100	Y
CAPA-18-147587	1203913624	METHOD BLANK	EPA:245.2	Mercury	-0.084	ug/L	0.067	U	0.200	N	5	100	Y
CAPA-18-147560	1203904837	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0354	mg/L	0.0238	J	0.050	Y	5	100	Y
CAPA-18-147561	1203904837	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0354	mg/L	0.0638		0.050	Y	5	100	Y
CAPA-18-147560	1203905249	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0361	mg/L	0.0714		0.050	Y	5	100	Y
CAPA-18-147561	1203905249	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0361	mg/L	0.0827		0.050	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

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

DATA VALIDATION REPORT

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
MSGP-17-131990	1203904841		EPA:350.1	Ammonia as Nitrogen	1712955	10-27-2017	W	121		110	90	10		
CAMO-18-147649	1203904071		EPA:351.2	Total Kjeldahl Nitrogen	1712656	10-25-2017	W	83.9		110	90	10		

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

LCS Lab Sample	LCSD Lab	Analytical Method	Parameter Name	Lab Lot ID	Analysis	Sample Matrix	LCS Spike Recovery	LCSD Spike Recovery	Upper Limit	Lower Limit	Upper Rejection Limit	Lower Rejection Limit	RPD	RPD Limit
1203908044		SW-846:8260B	Acetone	1714198	10-30-2017	W	46		157	48		10		
1203908044		SW-846:8260B	Butanone[2-]	1714198	10-30-2017	W	51		138	55		10		
1203901987		SW-846:8270D	Dichlorobenzidine[3,3'-]	1711735	10-24-2017	W	129		127	43				

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

DATA VALIDATION REPORT

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-49 S1	2018-510	CAPA-18-147560	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J	U	I4	N	0.0238	mg/L	0.0238	mg/L			W	10/18/2017	1712962	VAL	Y	
R-49 S1	2018-510	CAPA-18-147560	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.0714	mg/L	0.0714	mg/L			W	10/18/2017	1713122	VAL	Y	
R-49 S2	2018-510	CAPA-18-147561	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	I4	N	0.0638	mg/L	0.0638	mg/L			W	10/18/2017	1712962	VAL	Y	
R-49 S2	2018-510	CAPA-18-147561	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.0827	mg/L	0.0827	mg/L			W	10/18/2017	1713122	VAL	Y	
R-49 S1	2018-510	CAPA-18-147586	REG	INIT	VOC	SW-846:8260B	Acetone	U	UJ	V12a	N	1.50	ug/L	1.50	ug/L			W	10/18/2017	1714198	VAL	Y	
R-49 S1	2018-510	CAPA-18-147586	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	-0.00202	pCi/L	-0.00202	pCi/L	0.0354	0.00729	W	10/18/2017	1713388	VAL	Y	
R-49 S1	2018-510	CAPA-18-147586	REG	INIT	VOC	SW-846:8260B	Butanone[2-]	U	UJ	V12a	N	1.50	ug/L	1.50	ug/L			W	10/18/2017	1714198	VAL	Y	
R-49 S1	2018-510	CAPA-18-147586	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	0.923	pCi/L	0.923	pCi/L	4.21	1.06	W	10/18/2017	1711850	VAL	Y	
R-49 S1	2018-510	CAPA-18-147586	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	0.579	pCi/L	0.579	pCi/L	4.14	1.05	W	10/18/2017	1711850	VAL	Y	
R-49 S1	2018-510	CAPA-18-147586	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	0.196	pCi/L	0.196	pCi/L	7.60	2.04	W	10/18/2017	1711850	VAL	Y	
R-49 S1	2018-510	CAPA-18-147586	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.00204	pCi/L	0.00204	pCi/L	0.0354	0.0054	W	10/18/2017	1713389	VAL	Y	
R-49 S1	2018-510	CAPA-18-147586	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0265	pCi/L	-0.0265	pCi/L	0.0459	0.00935	W	10/18/2017	1713389	VAL	Y	
R-49 S1	2018-510	CAPA-18-147586	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	19	pCi/L	19	pCi/L	33.5	17.4	W	10/18/2017	1711850	VAL	Y	
R-49 S1	2018-510	CAPA-18-147586	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-0.731	pCi/L	-0.731	pCi/L	3.83	1.03	W	10/18/2017	1711850	VAL	Y	
R-49 S1	2018-510	CAPA-18-147586	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.0628	pCi/L	-0.0628	pCi/L	0.448	0.120	W	10/18/2017	1714181	VAL	Y	
R-49 S1	2018-510	CAPA-18-147586	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0367	pCi/L	0.0367	pCi/L	0.0608	0.0138	W	10/18/2017	1713390	VAL	Y	
R-49 S2	2018-510	CAPA-18-147587	REG	INIT	VOC	SW-846:8260B	Acetone	U	UJ	V12a	N	1.50	ug/L	1.50	ug/L			W	10/18/2017	1714198	VAL	Y	
R-49 S2	2018-510	CAPA-18-147587	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.0115	pCi/L	0.0115	pCi/L	0.0502	0.0081	W	10/18/2017	1713388	VAL	Y	
R-49 S2	2018-510	CAPA-18-147587	REG	INIT	VOC	SW-846:8260B	Butanone[2-]	U	UJ	V12a	N	1.50	ug/L	1.50	ug/L			W	10/18/2017	1714198	VAL	Y	
R-49 S2	2018-510	CAPA-18-147587	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	0.658	pCi/L	0.658	pCi/L	4.11	1.06	W	10/18/2017	1711850	VAL	Y	
R-49 S2	2018-510	CAPA-18-147587	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-1.05	pCi/L	-1.05	pCi/L	3.84	1.01	W	10/18/2017	1711850	VAL	Y	
R-49 S2	2018-510	CAPA-18-147587	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.943	pCi/L	0.943	pCi/L	2.52	0.730	W	10/18/2017	1717894	VAL	Y	
R-49 S2	2018-510	CAPA-18-147587	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-0.25	pCi/L	-0.25	pCi/L	7.12	1.91	W	10/18/2017	1711850	VAL	Y	
R-49 S2	2018-510	CAPA-18-147587	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.00649	pCi/L	-0.00649	pCi/L	0.0375	0.00718	W	10/18/2017	1713389	VAL	Y	
R-49 S2	2018-510	CAPA-18-147587	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0173	pCi/L	-0.0173	pCi/L	0.0486	0.00749	W	10/18/2017	1713389	VAL	Y	
R-49 S2	2018-510	CAPA-18-147587	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-29	pCi/L	-29	pCi/L	59.8	15.7	W	10/18/2017	1711850	VAL	Y	
R-49 S2	2018-510	CAPA-18-147587	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	0.931	pCi/L	0.931	pCi/L	3.22	0.619	W	10/18/2017	1711850	VAL	Y	
R-49 S2	2018-510	CAPA-18-147587	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.243	pCi/L	0.243	pCi/L	0.451	0.137	W	10/18/2017	1714181	VAL	Y	
R-49 S2	2018-510	CAPA-18-147587	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0335	pCi/L	0.0335	pCi/L	0.0679	0.0124	W	10/18/2017	1713390	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-49 S1	2018-510	CAPA-18-147611	FTB	INIT	VOC	SW-846:8260B	Acetone	U	JJ	V12a	N	1.50	ug/L	1.50	ug/L			W	10/18/2017		1714198	VAL	Y
R-49 S1	2018-510	CAPA-18-147611	FTB	INIT	VOC	SW-846:8260B	Butanone[2-]	U	JJ	V12a	N	1.50	ug/L	1.50	ug/L			W	10/18/2017		1714198	VAL	Y
R-49 S2	2018-510	CAPA-18-147612	FTB	INIT	VOC	SW-846:8260B	Acetone	U	JJ	V12a	N	1.50	ug/L	1.50	ug/L			W	10/18/2017		1714198	VAL	Y
R-49 S2	2018-510	CAPA-18-147612	FTB	INIT	VOC	SW-846:8260B	Butanone[2-]	U	JJ	V12a	N	1.50	ug/L	1.50	ug/L			W	10/18/2017		1714198	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 qualify. 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.

V12a

The LCS percent recovery was < the LAL but >10%. Follow the external laboratory limits located within the associated data package.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147560	R-49 S1	REG	EPA:120.1	0	1
CAPA-18-147560	R-49 S1	REG	EPA:150.1	0	1
CAPA-18-147560	R-49 S1	REG	EPA:160.1	0	1
CAPA-18-147560	R-49 S1	REG	EPA:170.0	0	1
CAPA-18-147560	R-49 S1	REG	EPA:245.2	0	1
CAPA-18-147560	R-49 S1	REG	EPA:300.0	0	4
CAPA-18-147560	R-49 S1	REG	EPA:310.1	0	2
CAPA-18-147560	R-49 S1	REG	EPA:350.1	0	1
CAPA-18-147560	R-49 S1	REG	EPA:353.2	0	1
CAPA-18-147560	R-49 S1	REG	EPA:365.4	0	1
CAPA-18-147560	R-49 S1	REG	SM:A2340B	0	1
CAPA-18-147560	R-49 S1	REG	SW-846:6010C	0	17
CAPA-18-147560	R-49 S1	REG	SW-846:6020	0	11

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147560	R-49 S1	REG	SW-846:6850	0	1
CAPA-18-147561	R-49 S2	REG	EPA:120.1	0	1
CAPA-18-147561	R-49 S2	REG	EPA:150.1	0	1
CAPA-18-147561	R-49 S2	REG	EPA:160.1	0	1
CAPA-18-147561	R-49 S2	REG	EPA:170.0	0	1
CAPA-18-147561	R-49 S2	REG	EPA:245.2	0	1
CAPA-18-147561	R-49 S2	REG	EPA:300.0	0	4
CAPA-18-147561	R-49 S2	REG	EPA:310.1	0	2
CAPA-18-147561	R-49 S2	REG	EPA:350.1	0	1
CAPA-18-147561	R-49 S2	REG	EPA:353.2	0	1
CAPA-18-147561	R-49 S2	REG	EPA:365.4	0	1
CAPA-18-147561	R-49 S2	REG	SM:A2340B	0	1
CAPA-18-147561	R-49 S2	REG	SW-846:6010C	0	17
CAPA-18-147561	R-49 S2	REG	SW-846:6020	0	11
CAPA-18-147561	R-49 S2	REG	SW-846:6850	0	1
CAPA-18-147586	R-49 S1	REG	EPA:170.0	0	1
CAPA-18-147586	R-49 S1	REG	EPA:245.2	0	1
CAPA-18-147586	R-49 S1	REG	EPA:335.4	0	1
CAPA-18-147586	R-49 S1	REG	EPA:351.2	0	1
CAPA-18-147586	R-49 S1	REG	EPA:900	0	2
CAPA-18-147586	R-49 S1	REG	EPA:901.1	0	5
CAPA-18-147586	R-49 S1	REG	EPA:905.0	0	1
CAPA-18-147586	R-49 S1	REG	HASL-300:AM-241	0	1
CAPA-18-147586	R-49 S1	REG	HASL-300:ISOPU	0	2
CAPA-18-147586	R-49 S1	REG	HASL-300:ISOU	0	3
CAPA-18-147586	R-49 S1	REG	SW-846:8260B	0	80
CAPA-18-147586	R-49 S1	REG	SW-846:8270D	0	80
CAPA-18-147586	R-49 S1	REG	SW-846:9060	0	1
CAPA-18-147587	R-49 S2	REG	EPA:170.0	0	1
CAPA-18-147587	R-49 S2	REG	EPA:245.2	0	1
CAPA-18-147587	R-49 S2	REG	EPA:335.4	0	1
CAPA-18-147587	R-49 S2	REG	EPA:351.2	0	1
CAPA-18-147587	R-49 S2	REG	EPA:900	0	2
CAPA-18-147587	R-49 S2	REG	EPA:901.1	0	5
CAPA-18-147587	R-49 S2	REG	EPA:905.0	0	1
CAPA-18-147587	R-49 S2	REG	HASL-300:AM-241	0	1
CAPA-18-147587	R-49 S2	REG	HASL-300:ISOPU	0	2

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147587	R-49 S2	REG	HASL-300:ISOU	0	3
CAPA-18-147587	R-49 S2	REG	SW-846:8260B	0	80
CAPA-18-147587	R-49 S2	REG	SW-846:8270D	0	80
CAPA-18-147587	R-49 S2	REG	SW-846:9060	0	1
CAPA-18-147611	R-49 S1	FTB	EPA:170.0	0	1
CAPA-18-147611	R-49 S1	FTB	SW-846:8260B	0	80
CAPA-18-147612	R-49 S2	FTB	EPA:170.0	0	1
CAPA-18-147612	R-49 S2	FTB	SW-846:8260B	0	80

November 14, 2017

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

Re: LANL- WQH Water Samples
Work Order: 435630
SDG: 2018-510

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on October 20, 2017, and analyzed for 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: 2018-51 and 2018-510
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 435630
SDG: 2018-510

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 435630
SDG # : 2018-510**

November 14, 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 20, 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:

<u>Laboratory ID</u>	<u>Client ID</u>
435630001	CAPA-18-147560
435630002	CAPA-18-147586
435630003	CAPA-18-147611
435630004	CAPA-18-147561
435630005	CAPA-18-147587
435630006	CAPA-18-147612

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/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 14 November 2017

State	Certification
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

2018-510

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 ²)	Shipment Activity (dpm*g/100cm ²)	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 ² or Beta > 160,000,000 dpm*g/100cm ² . If YES - Do not ship.				
On the external surface of the sample container, alpha activity ≥ 24 dpm/cm ² , beta activity ≥ 240 dpm/cm ² , 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"> Am-241 > 27 Cs-137 > 270 Pu-238 > 27 Pu-239/240 > 27 Th-228 > 27 U-234 > 270 U-238 > 270 H-3 > 27,000,000 	<ul style="list-style-type: none"> Am-241 > 270,000 Cs-137 > 270,000 Pu-238 > 270,000 Pu-239/240 > 270,000 Th-228 > 270,000 U-234 > 1,600,000,000 U-238 > unlimited H-3 > 27,000,000,000 		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 M. [Signature]	10/19/17
(Signature) [Signature]	3:00

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) S. Sherwood	10/19/17
(Signature) [Signature]	3:00

SAMPLE RECEIPT & REVIEW FORM

Client: ESHL			SDG/AR/COC/Work Order: 435630		
Received By: ZKW			Date Received: 10/20/17		
Carrier and Tracking Number			Circle Applicable: 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 <input type="checkbox"/> 5908 1782 9950-2c 5908 1783 0037-2c 5908 1782 9971-2c 5908 1783 0004-3c 5908 1782 0026-2c 5908 1782 9993-2c 5908 1782 9982-2c 5908 1783 0015-3c 5908 1782 9949-3c 5908 1782 9960-3c		
			*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.		
Suspected Hazard Information			Shipped as a DOT Hazardous? <input checked="" type="checkbox"/> Hazard Class Shipped: _____ UN#: _____		
COC/Samples marked or classified as radioactive?			Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3		
Is package, COC, and/or Samples marked HAZ?			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"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Wet Ice <input checked="" type="checkbox"/> Ice Packs <input checked="" type="checkbox"/> Dry ice <input checked="" type="checkbox"/> None <input type="checkbox"/> Other: _____ *all temperatures are recorded in Celsius
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: IR3-16 Secondary Temperature Device Serial # (If Applicable): _____
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe) TKN cont. for -147589 read broken
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: If Preservation added, Lot#: _____
7	Do any samples require Volatile Analysis?	<input checked="" 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"/>			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected: See Below & Attached
12	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments (Use Continuation Form if needed):
 5908 1782 9938 -21c (rchem)
 5908 1782 9927 -20c (rchem)
 * We didn't receive one vial for -148252

PM (or PMA) review: Initials

RH10ff

Date

10/23/17

Page

of

LABORATORIES LLC SAMPLE RECEIPT & REVIEW CONTINUATION FORM

Client: EHL Received By: EW Date Received: 10/20/17 SDG/AR/COC/Work Order: 435630

* We only rec'd two containers each for:
 -148250 Herb, HEXP, PCB, Pest, & Oil & Grease
 -147255
 -147256
 -147257
 -147264
 -147265
 -147266
 -147267
 -147268
 -147269

PM (or PMA) review: Initials KW Date 10/23 Page 1 of 1

LOS ALAMOS, NM 87545
UNITED STATES US

BILL SENDER

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

SHI.
ACTW
CAD:

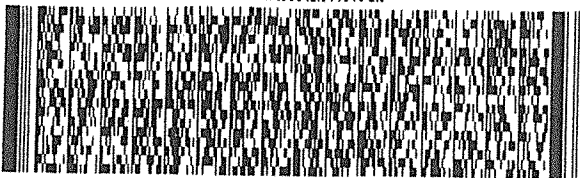
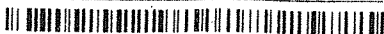
RT 257
ST F1

0 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 656-8171

REF: 21PD0ASRGW04BAGWS0



FedEx
Express

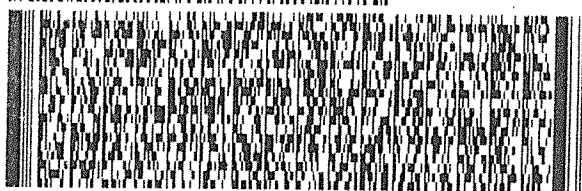


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REF: 7ED10AXU101020100



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1 of 3
TRK# 5908 1782 9971
0201

MASTER

X7 RBWA

FRI - 20 OCT 10:30A
PRIORITY OVERNIGHT

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SC-US CHS



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: 19OCT17
ACTWGT: 45.0 LB MAN
CAD: 0014176/CAFE2916

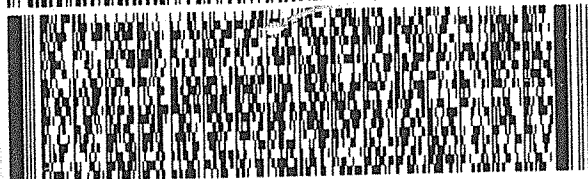
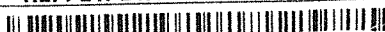
BILL SENDER

10 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 656-8171

REF: 21PD0ASRGW04BAGWS0



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Express

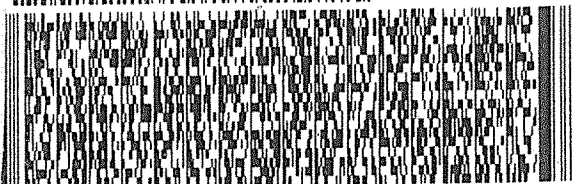
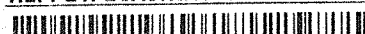


10 VALERIE DAVIS
GENERAL ENGINEERING I
2040 SAVAGE RD

CHARLESTON SC 29407

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REF: 21PD0ASRGW04BAGWS0



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Exp



TRK# 5908 1782 9960
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PRIORITY OVERNIGHT

29407

SC-US CHS



2 of 2

MPS# 5908 1782 9950
0263

Mstr# 5908 1782 9949

0201

X7 RBWA

FRI - 20 OCT 1
PRIORITY OVERNIGHT

2

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

SH
AC
CA
BIL

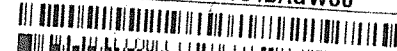
RT 257
ST F1

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRGW04BAGWS0



2 of 2
MPS# 5908 1782 9938
Mstr# 5908 1782 9927

X7 RBWA

FRI - 20 OCT 10:30
PRIORITY OVERNIGHT

2940
SC-US CH

ORIGIN ID:SAFA
KEITH GREENE
LOS ALAMOS NATL LAB.
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545
UNITED STATES US

ACTWGT: 45.0
CAD: 001417

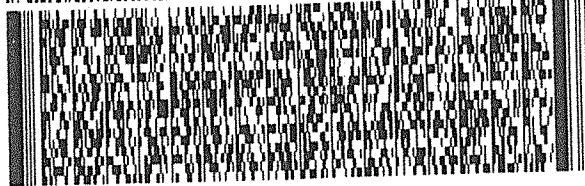
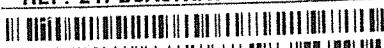
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRGW04BAGWS0

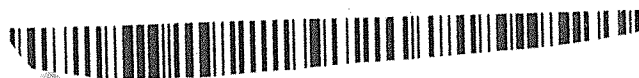


2 of 3
MPS# 5908 1782 9982
Mstr# 5908 1782 9971

X7 RBWA

FRI - 20 OCT 10:30
PRIORITY OVERNIGHT

29407
SC-US CHS



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: 19OCT17
ACTWGT: 66.0 LB MAN
CAD: 0014176/CAFE291

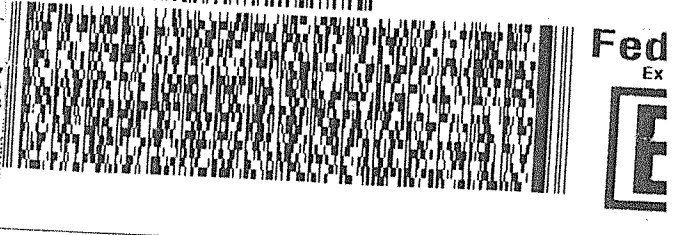
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRGW04BAGWS0



1 of 2
RK# 5908 1782 9949
MASTER

X7 RBWA

FRI - 20 OCT 10:30
PRIORITY OVERNIGHT

2940
SC-US CH

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: 19OCT17
ACTWGT: 51.0 LB
CAD: 0014176/CAFE291

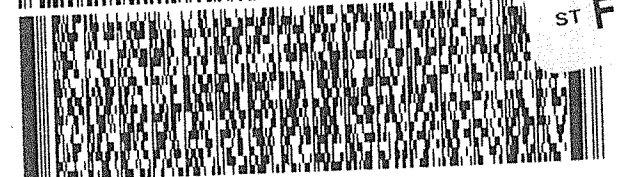
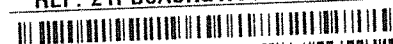
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TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRGW04BAGWS0

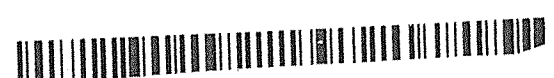


1 of 2
TRK# 5908 1782 9927
MASTER

X7 RBWA

FRI - 20 OCT 10:30
PRIORITY OVERNIGHT

SC



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

LOS ALAMOS, NM 87545
UNITED STATES US

ACTWGT: 40.0 LB MAN
CAD: 0014176/CAFE2916

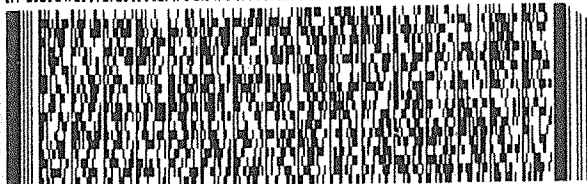
BILL SENDER

0 VALERIE DAVIS
GENERAL ENGINEERING
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRGW04BAGWS0



RT 257
ST F1
5
10:30
A
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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: 19OCT1
ACTWGT: 44.0 LB M
CAD: 0014176/CAFE

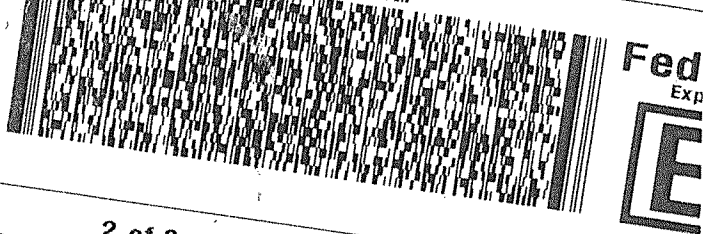
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TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 7E010AXU101020100



3

3 of 3

MPS# 5908 1782 9993

Mstr# 5908 1782 9971

0201

X7 RBWA

FRI - 20 OCT 10:30A
PRIORITY OVERNIGHT

29407
SC-US CHS



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: 19OCT17
ACTWGT: 40.0 LB MAN
CAD: 0014176/CAFE2916

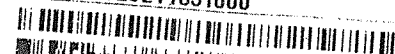
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: WE6L11551000



A
9927
10.20
pre
E

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: 19OCT17
ACTWGT: 44.0 LB M
CAD: 0014176/CAFE

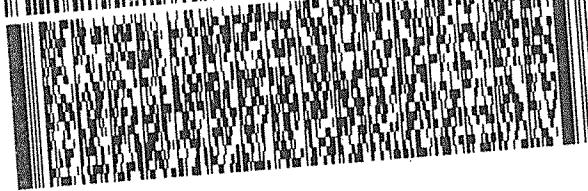
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 7E010AXU101020100



3

TRK# 5908 1783 0037

X7 RBWA

FRI - 20 OCT 10:30
PRIORITY OVERNIGHT

29407
SC-US CHS



1 of 3

TRK# 5908 1783 0004

MASTER

X7 RBWA

FRI - 20 OCT
PRIORITY OVEF

SC-U



Data Review Qualifier Flag Definition Sheet

Data Review Qualifier Definitions

Qualifier	Explanation
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*	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 #: 2018-510
Work Order #: 435630**

Method/Analysis Information

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

Analytical Method: SW-846:8260B

Analytical Batch Number: 1714198

Sample Analysis

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

Sample ID	Client ID
435630002	CAPA-18-147586
435630003	CAPA-18-147611
435630005	CAPA-18-147587
435630006	CAPA-18-147612
1203908042	Method Blank (MB)
1203908043	Method Blank (MB)
1203908044	Laboratory Control Sample (LCS)
1203908045	Laboratory Control Sample (LCS)
1203908046	Laboratory Control Sample (LCS)
1203908047	Laboratory Control Sample (LCS)
1203908048	435630002(CAPA-18-147586) Post Spike (PS)
1203908049	435630002(CAPA-18-147586) Post Spike (PS)
1203908050	435630002(CAPA-18-147586) Post Spike Duplicate (PSD)
1203908051	435630002(CAPA-18-147586) Post Spike Duplicate (PSD)

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

Target analytes were detected in the blanks 1203908042 (MB) and 1203908043 (MB) below the reporting limit.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS/and or LCSD (See Below) recoveries were not all within the acceptance limits. The unacceptable recoveries were less than 5% of the requested analyte list. This satisfies the client criteria. The results are reported.

Sample	Analyte	Value
1203908044 (LCS)	2-Butanone	51* (55%-138%)
	Acetone	46* (48%-157%)

QC Sample Designation

Sample 435630002 (CAPA-18-147586) was designated for spike analysis.

Matrix Spike/Matrix Spike Duplicate Recovery Statement

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the required 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:

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOA6.I	Agilent 6890N/5975 GC/MS w/ OI 4560/Archon Autosampler	HP6890N/HP5975	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: 2018-510 GEL Work Order: 435630

The Qualifiers in this report are defined as follows:

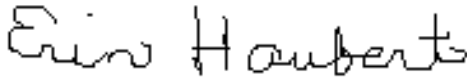
- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a surrogate compound
- B The target analyte was detected in the associated blank.
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- DL Indicates that 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: 14 NOV 2017

Title: Data Validator

Sample Data Summary

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-510

Lab Sample ID: 435630002

Date Collected: 10/18/2017 12:25

Date Received: 10/20/2017 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAPA-18-147586

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714198

Inst: VOA6.I

Dilution: 1

Run Date: 10/30/2017 18:04

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 10/30/2017 18:04

Data File: 103017V6\6F120.D

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-510

Lab Sample ID: 435630002

Date Collected: 10/18/2017 12:25

Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147586

Batch ID: 1714198

Run Date: 10/30/2017 18:04

Prep Date: 10/30/2017 18:04

Data File: 103017V6\6F120.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
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: 2018-510

Lab Sample ID: 435630002

Date Collected: 10/18/2017 12:25

Date Received: 10/20/2017 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714198

Inst: VOA6.I

Dilution: 1

Run Date: 10/30/2017 18:04

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 10/30/2017 18:04

Data File: 103017V6\6F120.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	52.5	50.0	ug/L 105	(71%-134%)
Bromofluorobenzene	49.3	50.0	ug/L 99	(70%-131%)
Toluene-d8	48.1	50.0	ug/L 96	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.592	6.11	ug/L	0	J
	unknown siloxane	13.75	7.62	ug/L	0	J

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-510

Lab Sample ID: 435630003

Date Collected: 10/18/2017 12:25

Date Received: 10/20/2017 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAPA-18-147611

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714198

Inst: VOA6.I

Dilution: 1

Run Date: 10/30/2017 18:32

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 10/30/2017 18:32

Data File: 103017V6\6F121.D

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-510

Lab Sample ID: 435630003

Date Collected: 10/18/2017 12:25

Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147611

Batch ID: 1714198

Run Date: 10/30/2017 18:32

Prep Date: 10/30/2017 18:32

Data File: 103017V6\6F121.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
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: 2018-510

Lab Sample ID: 435630003

Date Collected: 10/18/2017 12:25

Date Received: 10/20/2017 08:55

Matrix: W

Client: ARSL004

Method: SW-846:8260B

Project: ESHL00114

SOP Ref: GL-OA-E-038

Batch ID: 1714198

Inst: VOA6.I

Dilution: 1

Run Date: 10/30/2017 18:32

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 10/30/2017 18:32

Data File: 103017V6\6F121.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	52.9	50.0	ug/L 106	(71%-134%)
Bromofluorobenzene	49.6	50.0	ug/L 99	(70%-131%)
Toluene-d8	47.8	50.0	ug/L 96	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.592	5.13	ug/L	0	J
	unknown siloxane	13.75	5.98	ug/L	0	J

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-510

Lab Sample ID: 435630005

Date Collected: 10/18/2017 14:39

Date Received: 10/20/2017 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAPA-18-147587

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714198

Inst: VOA6.I

Dilution: 1

Run Date: 10/30/2017 19:01

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 10/30/2017 19:01

Data File: 103017V6\6F122.D

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-510

Lab Sample ID: 435630005

Date Collected: 10/18/2017 14:39

Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147587

Batch ID: 1714198

Run Date: 10/30/2017 19:01

Prep Date: 10/30/2017 19:01

Data File: 103017V6\6F122.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
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: 2018-510	Date Collected: 10/18/2017 14:39	Matrix: W
Lab Sample ID: 435630005	Date Received: 10/20/2017 08:55	
	Client: ARSL004	Project: ESHL00114
Client ID: CAPA-18-147587	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714198	Inst: VOA6.I	Dilution: 1
Run Date: 10/30/2017 19:01	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 10/30/2017 19:01		
Data File: 103017V6\6F122.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	52.7	50.0	ug/L 105	(71%-134%)
Bromofluorobenzene	49.3	50.0	ug/L 99	(70%-131%)
Toluene-d8	48.2	50.0	ug/L 96	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.584	5.89	ug/L	0	J
	unknown siloxane	13.75	10.2	ug/L	0	J

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-510

Lab Sample ID: 435630006

Date Collected: 10/18/2017 14:39

Date Received: 10/20/2017 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714198

Inst: VOA6.I

Dilution: 1

Run Date: 10/31/2017 12:54

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 10/31/2017 12:54

Data File: 103117V6\6F208.D

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-510

Lab Sample ID: 435630006

Date Collected: 10/18/2017 14:39

Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147612

Batch ID: 1714198

Run Date: 10/31/2017 12:54

Prep Date: 10/31/2017 12:54

Data File: 103117V6\6F208.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

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**

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SDG Number: 2018-510

Lab Sample ID: 435630006

Date Collected: 10/18/2017 14:39

Date Received: 10/20/2017 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714198

Inst: VOA6.I

Dilution: 1

Run Date: 10/31/2017 12:54

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 10/31/2017 12:54

Data File: 103117V6\6F208.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	50.6	50.0	ug/L 101	(71%-134%)
Bromofluorobenzene	49.5	50.0	ug/L 99	(70%-131%)
Toluene-d8	47.5	50.0	ug/L 95	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.592	5.3	ug/L	0	J

Quality Control Summary

Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-510**Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203908044	LCS for batch 1714198	100	97	99
1203908045	LCS for batch 1714198	100	95	98
1203908042	MB for batch 1714198	100	98	101
435630002	CAPA-18-147586	105	96	99
435630003	CAPA-18-147611	106	96	99
435630005	CAPA-18-147587	105	96	99
1203908048	CAPA-18-147586PS	107	95	98
1203908050	CAPA-18-147586PSD	102	94	97
1203908049	CAPA-18-147586PS	102	94	96
1203908051	CAPA-18-147586PSD	106	95	99
1203908046	LCS for batch 1714198	104	96	99
1203908047	LCS for batch 1714198	102	95	98
1203908043	MB for batch 1714198	104	97	101
435630006	CAPA-18-147612	101	95	99

Surrogate**Acceptance Limits**

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

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714198

Matrix: WATER

Lab Sample ID 1203908044

Instrument: VOA6.I

Analysis Date: 10/30/2017 10:04

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	LCS m,p-Xylenes	100	0.0	96.6	97	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1190	95	61-125
67-64-1	LCS Acetone	250	0.0	115	46 *	48-157
74-88-4	LCS Iodomethane	250	0.0	250	100	72-128
75-15-0	LCS Carbon disulfide	250	0.0	272	109	69-138
108-05-4	LCS Vinyl acetate	250	0.0	247	99	67-125
78-93-3	LCS 2-Butanone	250	0.0	128	51 *	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	235	94	66-124
591-78-6	LCS 2-Hexanone	250	0.0	189	75	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	44.5	89	40-160
74-87-3	LCS Chloromethane	50.0	0.0	43.8	88	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	45.5	91	65-137
74-83-9	LCS Bromomethane	50.0	0.0	43.7	87	63-137
75-00-3	LCS Chloroethane	50.0	0.0	48.1	96	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	50.8	102	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	46.2	92	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	53.6	107	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	50.3	101	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	51.6	103	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	53.2	106	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	51.8	104	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	51.8	104	75-123

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714198

Matrix: WATER

Lab Sample ID 1203908044

Instrument: VOA6.I

Analysis Date: 10/30/2017 10:04

Dilution: 1

Analyst: JPI

Purge Vol: 5 mL

Batch ID: 1714198

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	56.1	112	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	51.0	102	76-125
67-66-3	LCS Chloroform	50.0	0.0	50.8	102	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	53.9	108	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	52.0	104	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	56.7	113	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	50.2	100	74-122
71-43-2	LCS Benzene	50.0	0.0	50.0	100	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	52.3	105	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	49.8	100	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	50.5	101	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	54.7	109	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	54.2	108	78-131
108-88-3	LCS Toluene	50.0	0.0	48.4	97	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	55.4	111	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	50.0	100	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	47.0	94	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	50.5	101	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	48.6	97	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	52.4	105	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	48.3	97	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	49.3	99	73-125

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714198

Matrix: WATER

Lab Sample ID 1203908044

Instrument: VOA6.I

Analysis Date: 10/30/2017 10:04

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

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	48.7	97	74-126
100-42-5	LCS Styrene	50.0	0.0	51.7	103	72-130
75-25-2	LCS Bromoform	50.0	0.0	48.9	98	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	49.8	100	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	50.4	101	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	50.6	101	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	48.1	96	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	49.2	98	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	50.4	101	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	48.3	97	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	48.3	97	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	50.3	101	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	50.3	101	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	50.4	101	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	50.1	100	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	48.3	97	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	47.7	95	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	50.9	102	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	50.2	100	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	51.5	103	72-136
91-20-3	LCS Naphthalene	50.0	0.0	54.6	109	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	50.7	101	70-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714198

Matrix: WATER

Lab Sample ID 1203908044

Instrument: VOA6.I

Analysis Date: 10/30/2017 10:04

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	51.8	104	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	53.6	107	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	47.7	95	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5540	111	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714198

Matrix: WATER

Lab Sample ID 1203908045

Instrument: VOA6.I

Analysis Date: 10/30/2017 11:29

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

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	265	106	60-140
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	264	106	61-148
107-05-1	LCS Allyl chloride	250	0.0	251	100	59-125
107-13-1	LCS Acrylonitrile	250	0.0	260	104	65-122
107-12-0	LCS Propionitrile	250	0.0	248	99	64-124
126-98-7	LCS Methacrylonitrile	250	0.0	256	103	64-126
80-62-6	LCS Methyl methacrylate	250	0.0	261	104	69-127
97-63-2	LCS Ethyl methacrylate	250	0.0	250	100	66-130
78-83-1	LCS Isobutyl alcohol	2500	0.0	2530	101	65-135
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	49.2	98	66-147

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714198

Matrix: WATER

Lab Sample ID 1203908046

Instrument: VOA6.I

Analysis Date: 10/31/2017 10:33

Dilution: 1

Analyst: JPI

Purge Vol: 5 mL

Batch ID: 1714198

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	88.0	88	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1100	88	61-125
67-64-1	LCS Acetone	250	0.0	168	67	48-157
74-88-4	LCS Iodomethane	250	0.0	231	92	72-128
75-15-0	LCS Carbon disulfide	250	0.0	245	98	69-138
108-05-4	LCS Vinyl acetate	250	0.0	272	109	67-125
78-93-3	LCS 2-Butanone	250	0.0	181	73	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	228	91	66-124
591-78-6	LCS 2-Hexanone	250	0.0	238	95	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	65.1	130	40-160
74-87-3	LCS Chloromethane	50.0	0.0	48.7	97	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	49.6	99	65-137
74-83-9	LCS Bromomethane	50.0	0.0	51.9	104	63-137
75-00-3	LCS Chloroethane	50.0	0.0	53.8	108	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	58.9	118	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	51.0	102	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	49.6	99	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	46.0	92	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	47.9	96	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	49.1	98	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	47.2	94	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	47.9	96	75-123

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714198

Matrix: WATER

Lab Sample ID 1203908046

Instrument: VOA6.I

Analysis Date: 10/31/2017 10:33

Dilution: 1

Analyst: JPI

Purge Vol: 5 mL

Batch ID: 1714198

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	51.3	103	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	47.0	94	76-125
67-66-3	LCS Chloroform	50.0	0.0	47.6	95	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	50.3	101	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	47.3	95	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	53.4	107	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	48.8	98	74-122
71-43-2	LCS Benzene	50.0	0.0	45.0	90	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	48.3	97	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	46.0	92	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	47.3	95	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	51.4	103	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	49.7	99	78-131
108-88-3	LCS Toluene	50.0	0.0	43.7	87	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	50.8	102	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	46.6	93	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	43.7	87	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	45.8	92	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	44.7	89	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	49.2	98	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	44.7	89	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	45.2	90	73-125

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714198

Matrix: WATER

Lab Sample ID 1203908046

Instrument: VOA6.I

Analysis Date: 10/31/2017 10:33

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

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	44.7	89	74-126
100-42-5	LCS Styrene	50.0	0.0	47.9	96	72-130
75-25-2	LCS Bromoform	50.0	0.0	44.4	89	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	45.0	90	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	46.2	92	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	47.3	95	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	44.5	89	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	44.7	89	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	45.6	91	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	44.1	88	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	44.8	90	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	44.9	90	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	45.9	92	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	45.5	91	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	45.5	91	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	44.2	88	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	44.0	88	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	46.0	92	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	45.9	92	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	47.9	96	72-136
91-20-3	LCS Naphthalene	50.0	0.0	51.7	103	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	48.0	96	70-130

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714198

Matrix: WATER

Lab Sample ID 1203908046

Instrument: VOA6.I

Analysis Date: 10/31/2017 10:33

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

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	47.8	96	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	49.8	100	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	44.4	89	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5140	103	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714198

Matrix: WATER

Lab Sample ID 1203908047

Instrument: VOA6.I

Analysis Date: 10/31/2017 11:29

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

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	257	103	60-140
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	278	111	61-148
107-05-1	LCS Allyl chloride	250	0.0	250	100	59-125
107-13-1	LCS Acrylonitrile	250	0.0	256	102	65-122
107-12-0	LCS Propionitrile	250	0.0	244	97	64-124
126-98-7	LCS Methacrylonitrile	250	0.0	250	100	64-126
80-62-6	LCS Methyl methacrylate	250	0.0	248	99	69-127
97-63-2	LCS Ethyl methacrylate	250	0.0	240	96	66-130
78-83-1	LCS Isobutyl alcohol	2500	0.0	2470	99	65-135
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	50.1	100	66-147

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Post Spike

Client ID: CAPA-18-147586PS

Matrix: W

Lab Sample ID 1203908048

Instrument: VOA6.I

Analysis Date: 10/30/2017 19:29

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

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	86.2	86	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1170	94	56-131
67-64-1	PS Acetone	250	0.00 U	120	48	25-155
74-88-4	PS Iodomethane	250	0.00 U	236	94	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	241	96	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	212	85	48-133
78-93-3	PS 2-Butanone	250	0.00 U	149	60	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	228	91	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	169	68	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	43.3	87	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	36.6	73	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	36.9	74	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	44.7	89	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	43.6	87	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	46.6	93	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	44.1	88	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	49.2	98	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	49.3	99	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	50.0	100	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	49.1	98	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	48.3	97	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	49.0	98	69-127

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Post Spike

Client ID: CAPA-18-147586PS

Matrix: W

Lab Sample ID 1203908048

Instrument: VOA6.I

Analysis Date: 10/30/2017 19:29

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

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	49.1	98	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	50.2	100	71-130
67-66-3	PS Chloroform	50.0	0.00 U	49.2	98	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	50.0	100	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	45.4	91	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	52.3	105	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	51.9	104	69-130
71-43-2	PS Benzene	50.0	0.00 U	45.1	90	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	47.8	96	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	46.6	93	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	50.2	100	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	53.6	107	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	49.7	99	70-134
108-88-3	PS Toluene	50.0	0.00 U	43.4	87	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	51.9	104	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	48.5	97	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	46.0	92	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	44.1	88	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	47.1	94	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	51.1	102	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	44.3	89	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	44.3	89	61-130

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Post Spike

Client ID: CAPA-18-147586PS

Matrix: W

Lab Sample ID 1203908048

Instrument: VOA6.I

Analysis Date: 10/30/2017 19:29

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

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	44.4	89	62-131
100-42-5	PS Styrene	50.0	0.00 U	47.2	94	59-135
75-25-2	PS Bromoform	50.0	0.00 U	47.0	94	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	42.8	86	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	47.4	95	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	50.1	100	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	44.7	89	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	42.1	84	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	43.6	87	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	42.3	85	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	43.0	86	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	43.3	87	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	44.0	88	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	43.0	86	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	43.8	88	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	43.0	86	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	42.1	84	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	42.1	84	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	46.2	92	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	43.7	87	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	50.0	100	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	44.5	89	52-135

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Post Spike

Client ID: CAPA-18-147586PS

Matrix: W

Lab Sample ID 1203908048

Instrument: VOA6.I

Analysis Date: 10/30/2017 19:29

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

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	43.3	87	50-133
630-20-6	PS 1,1,1,2-Tetrachloroethane	50.0	0.00 U	50.4	101	71-133
95-50-1	PS 1,2-Dichlorobenzene	50.0	0.00 U	43.5	87	60-125
71-36-3	PS n-Butyl alcohol	5000	0.00 U	5280	106	60-140

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147586PSD

Matrix: W

Lab Sample ID 1203908050

Instrument: VOA6.I

Analysis Date: 10/30/2017 19:57

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

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	83.6	84	59-132	3	0-20
75-05-8	PSD Acetonitrile	1250	0.00 U	1150	92	56-131	2	0-20
67-64-1	PSD Acetone	250	0.00 U	115	46	25-155	5	0-20
74-88-4	PSD Iodomethane	250	0.00 U	231	93	66-133	2	0-20
75-15-0	PSD Carbon disulfide	250	0.00 U	240	96	61-141	0	0-20
108-05-4	PSD Vinyl acetate	250	0.00 U	205	82	48-133	3	0-20
78-93-3	PSD 2-Butanone	250	0.00 U	143	57	25-143	4	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00 U	220	88	61-127	3	0-20
591-78-6	PSD 2-Hexanone	250	0.00 U	162	65	33-138	4	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00 U	42.5	85	33-164	2	0-20
74-87-3	PSD Chloromethane	50.0	0.00 U	38.5	77	53-139	5	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00 U	38.7	77	58-140	5	0-20
74-83-9	PSD Bromomethane	50.0	0.00 U	44.8	90	59-146	0	0-20
75-00-3	PSD Chloroethane	50.0	0.00 U	43.2	86	65-129	1	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00 U	46.2	92	65-141	1	0-20
60-29-7	PSD Ethyl ether	50.0	0.00 U	42.9	86	69-127	3	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00 U	48.3	97	59-130	2	0-20
75-09-2	PSD Methylene chloride	50.0	0.00 U	47.5	95	62-123	4	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00 U	48.6	97	69-132	3	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00 U	48.2	96	65-127	2	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00 U	47.4	95	67-127	2	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00 U	47.7	95	69-127	3	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147586PSD

Matrix: W

Lab Sample ID 1203908050

Instrument: VOA6.I

Analysis Date: 10/30/2017 19:57

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

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 48.1	96	66-137	2	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00	U 47.3	95	71-130	6	0-20
67-66-3	PSD Chloroform	50.0	0.00	U 47.9	96	71-129	3	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00	U 48.5	97	69-139	3	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00	U 45.3	91	67-130	0	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00	U 51.1	102	66-143	2	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00	U 49.5	99	69-130	5	0-20
71-43-2	PSD Benzene	50.0	0.00	U 44.5	89	66-125	1	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00	U 46.5	93	65-131	3	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00	U 45.9	92	67-127	2	0-20
74-95-3	PSD Dibromomethane	50.0	0.00	U 47.6	95	72-129	5	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00	U 51.3	103	70-138	4	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00	U 47.8	96	70-134	4	0-20
108-88-3	PSD Toluene	50.0	0.00	U 42.6	85	60-126	2	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00	U 49.7	99	69-135	4	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00	U 46.0	92	66-125	5	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00	U 44.6	89	67-124	3	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00	U 43.3	87	60-130	2	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00	U 45.5	91	68-143	3	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00	U 48.9	98	71-127	4	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00	U 43.1	86	64-124	3	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00	U 43.0	86	61-130	3	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147586PSD

Matrix: W

Lab Sample ID 1203908050

Instrument: VOA6.I

Analysis Date: 10/30/2017 19:57

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

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	43.0	86	62-131	3	0-20
100-42-5	PSD Styrene	50.0	0.00 U	45.7	91	59-135	3	0-20
75-25-2	PSD Bromoform	50.0	0.00 U	44.9	90	64-138	5	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00 U	42.1	84	55-133	2	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00 U	46.2	92	62-129	3	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00 U	47.6	95	70-124	5	0-20
108-86-1	PSD Bromobenzene	50.0	0.00 U	42.5	85	62-124	5	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00 U	40.7	81	50-133	3	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00 U	42.3	85	53-135	3	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00 U	41.1	82	56-128	3	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00 U	41.3	83	53-130	4	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00 U	41.9	84	55-135	3	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00 U	42.5	85	53-132	3	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00 U	41.7	83	50-138	3	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00 U	42.4	85	49-138	3	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00 U	41.1	82	56-126	4	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00 U	40.2	80	55-125	5	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00 U	40.2	80	43-142	5	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00 U	44.7	89	62-141	3	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00 U	40.4	81	40-147	8	0-20
91-20-3	PSD Naphthalene	50.0	0.00 U	47.7	95	62-134	5	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00 U	42.5	85	52-135	5	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 8 of 8

SDG Number: 2018-510

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147586PSD

Matrix: W

Lab Sample ID 1203908050

Instrument: VOA6.I

Analysis Date: 10/30/2017 19:57

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

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	41.0	82	50-133	5	0-20
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00 U	49.0	98	71-133	3	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00 U	42.3	85	60-125	3	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00 U	5180	104	60-140	2	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 2

SDG Number: 2018-510

Sample Type: Post Spike

Client ID: CAPA-18-147586PS

Matrix: W

Lab Sample ID 1203908049

Instrument: VOA6.I

Analysis Date: 10/30/2017 20:25

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	PS Acrolein	250	0.00 U	240	96	49-141
76-13-1	PS Trichlorotrifluoroethane	250	0.00 U	273	109	57-149
107-05-1	PS Allyl chloride	250	0.00 U	251	101	54-128
107-13-1	PS Acrylonitrile	250	0.00 U	256	102	59-129
107-12-0	PS Propionitrile	250	0.00 U	241	97	58-131
126-98-7	PS Methacrylonitrile	250	0.00 U	254	102	59-134
80-62-6	PS Methyl methacrylate	250	0.00 U	250	100	62-135
97-63-2	PS Ethyl methacrylate	250	0.00 U	239	96	60-136
78-83-1	PS Isobutyl alcohol	2500	0.00 U	2390	96	60-143
126-99-8	PS 2-Chloro-1,3-butadiene	50.0	0.00 U	49.2	98	63-146

Volatile

Page 2 of 2

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-510

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147586PSD

Matrix: W

Lab Sample ID 1203908051

Instrument: VOA6.I

Analysis Date: 10/30/2017 20:53

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1714198

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
107-02-8	PSD Acrolein	250	0.00 U	264	106	49-141	10	0-20
76-13-1	PSD Trichlorotrifluoroethane	250	0.00 U	265	106	57-149	3	0-20
107-05-1	PSD Allyl chloride	250	0.00 U	244	98	54-128	3	0-20
107-13-1	PSD Acrylonitrile	250	0.00 U	272	109	59-129	6	0-20
107-12-0	PSD Propionitrile	250	0.00 U	261	104	58-131	8	0-20
126-98-7	PSD Methacrylonitrile	250	0.00 U	264	106	59-134	4	0-20
80-62-6	PSD Methyl methacrylate	250	0.00 U	261	104	62-135	4	0-20
97-63-2	PSD Ethyl methacrylate	250	0.00 U	243	97	60-136	1	0-20
78-83-1	PSD Isobutyl alcohol	2500	0.00 U	2650	106	60-143	10	0-20
126-99-8	PSD 2-Chloro-1,3-butadiene	50.0	0.00 U	47.6	95	63-146	3	0-20

Method Blank Summary

Page 1 of 1

SDG Number:	2018-510	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1714198	Instrument ID:	VOA6.I	Data File:	103017V6\6F108BA.D
Lab Sample ID:	1203908042	Prep Date:	10/30/2017 12:25	Analyzed:	10/30/17 12:25
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 1714198	1203908044	103017V6\6F103LA.D	10/30/17	1004
02 LCS for batch 1714198	1203908045	103017V6\6F106LA.D	10/30/17	1129
03 CAPA-18-147586	435630002	103017V6\6F120.D	10/30/17	1804
04 CAPA-18-147611	435630003	103017V6\6F121.D	10/30/17	1832
05 CAPA-18-147587	435630005	103017V6\6F122.D	10/30/17	1901
06 CAPA-18-147586PS	1203908048	103017V6\6F123.D	10/30/17	1929
07 CAPA-18-147586PSD	1203908050	103017V6\6F124.D	10/30/17	1957
08 CAPA-18-147586PS	1203908049	103017V6\6F125.D	10/30/17	2025
09 CAPA-18-147586PSD	1203908051	103017V6\6F126.D	10/30/17	2053

Method Blank Summary

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SDG Number:	2018-510	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1714198	Instrument ID:	VOA6.I	Data File:	103117V6\6F206BA.D
Lab Sample ID:	1203908043	Prep Date:	10/31/2017 11:58	Analyzed:	10/31/17 11:58
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
11 LCS for batch 1714198	1203908046	103117V6\6F203LA.D	10/31/17	1033
12 LCS for batch 1714198	1203908047	103117V6\6F205LA.D	10/31/17	1129
13 CAPA-18-147612	435630006	103117V6\6F208.D	10/31/17	1254

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-510		Matrix: WATER
Lab Sample ID: 1203908042		
Client Sample: QC for batch 1714198	Client: ARSL004	Project: QC
Client ID: MB for batch 1714198	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714198	Inst: VOA6.I	Dilution: 1
Run Date: 10/30/2017 12:25	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 10/30/2017 12:25		
Data File: 103017V6\6F108BA.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	J	0.350	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-510

Lab Sample ID: 1203908042

Client Sample: QC for batch 1714198

Client ID: MB for batch 1714198

Batch ID: 1714198

Run Date: 10/30/2017 12:25

Prep Date: 10/30/2017 12:25

Data File: 103017V6\6F108BA.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

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	J	0.440	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number: 2018-510	Matrix: WATER	
Lab Sample ID: 1203908042		
Client Sample: QC for batch 1714198	Client: ARSL004	Project: QC
Client ID: MB for batch 1714198	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714198	Inst: VOA6.I	Dilution: 1
Run Date: 10/30/2017 12:25	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 10/30/2017 12:25		
Data File: 103017V6\6F108BA.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	50.0	50.0	ug/L 100	(71%-134%)
Bromofluorobenzene	50.4	50.0	ug/L 101	(70%-131%)
Toluene-d8	49.0	50.0	ug/L 98	(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

Page 1 of 3

SDG Number: 2018-510

Lab Sample ID: 1203908043

Client Sample: QC for batch 1714198

Client ID: MB for batch 1714198

Batch ID: 1714198

Run Date: 10/31/2017 11:58

Prep Date: 10/31/2017 11:58

Data File: 103117V6\6F206BA.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

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	J	0.470	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	J	0.350	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-510

Matrix: WATER

Lab Sample ID: 1203908043

Client Sample: QC for batch 1714198

Client: ARSL004

Project: QC

Client ID: MB for batch 1714198

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714198

Inst: VOA6.I

Dilution: 1

Run Date: 10/31/2017 11:58

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 10/31/2017 11:58

Data File: 103117V6\6F206BA.D

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	J	0.520	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**

Page 3 of 3

SDG Number: 2018-510	Matrix: WATER	
Lab Sample ID: 1203908043		
Client Sample: QC for batch 1714198	Client: ARSL004	Project: QC
Client ID: MB for batch 1714198	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714198	Inst: VOA6.I	Dilution: 1
Run Date: 10/31/2017 11:58	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 10/31/2017 11:58		
Data File: 103117V6\6F206BA.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	51.9	50.0	ug/L 104	(71%-134%)
Bromofluorobenzene	50.3	50.0	ug/L 101	(70%-131%)
Toluene-d8	48.6	50.0	ug/L 97	(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

Page 1 of 3

SDG Number: 2018-510

Lab Sample ID: 1203908044

Client Sample: QC for batch 1714198

Client ID: LCS for batch 1714198

Batch ID: 1714198

Run Date: 10/30/2017 10:04

Prep Date: 10/30/2017 10:04

Data File: 103017V6\6F103LA.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

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		53.6	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		53.9	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		50.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		50.0	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		51.8	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		53.6	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		52.0	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	50.7	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		50.6	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		51.8	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		50.3	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		50.2	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		52.4	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		47.7	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		50.2	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		49.8	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		50.4	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		48.3	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		47.0	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		47.7	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		56.1	ug/L	0.300	1.00
78-93-3	2-Butanone		128	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		48.3	ug/L	0.300	1.00
591-78-6	2-Hexanone		189	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		48.3	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		50.1	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		235	ug/L	1.50	5.00
67-64-1	Acetone		115	ug/L	1.50	10.0
75-05-8	Acetonitrile		1190	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		50.0	ug/L	0.300	1.00
108-86-1	Bromobenzene		48.1	ug/L	0.300	1.00
74-97-5	Bromochloromethane		51.0	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		54.7	ug/L	0.300	1.00
75-25-2	Bromoform		48.9	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-510

Lab Sample ID: 1203908044

Client Sample: QC for batch 1714198

Client ID: LCS for batch 1714198

Batch ID: 1714198

Run Date: 10/30/2017 10:04

Prep Date: 10/30/2017 10:04

Data File: 103017V6\6F103LA.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

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		43.7	ug/L	0.300	1.00
75-15-0	Carbon disulfide		272	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		56.7	ug/L	0.300	1.00
108-90-7	Chlorobenzene		48.3	ug/L	0.300	1.00
75-00-3	Chloroethane		48.1	ug/L	0.300	1.00
67-66-3	Chloroform		50.8	ug/L	0.300	1.00
74-87-3	Chloromethane		43.8	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		48.6	ug/L	0.300	1.00
74-95-3	Dibromomethane		50.5	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		44.5	ug/L	0.300	1.00
60-29-7	Ethyl ether		46.2	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		49.3	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	51.5	ug/L	0.300	1.00
74-88-4	Iodomethane		250	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		49.8	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		50.3	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		51.7	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		50.5	ug/L	0.300	1.00
108-88-3	Toluene		48.4	ug/L	0.300	1.00
79-01-6	Trichloroethylene		52.3	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		50.8	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		247	ug/L	1.50	5.00
75-01-4	Vinyl chloride		45.5	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		51.8	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		54.2	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		96.6	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5540	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		50.9	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		49.2	ug/L	0.300	1.00
95-47-6	o-Xylene		48.7	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		50.4	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-510	Matrix:	WATER
Lab Sample ID:	1203908044		
Client Sample:	QC for batch 1714198	Client:	ARSL004
Client ID:	LCS for batch 1714198	Method:	SW-846:8260B
Batch ID:	1714198	Inst:	VOA6.I
Run Date:	10/30/2017 10:04	Analyst:	JP1
Prep Date:	10/30/2017 10:04	Purge Vol:	5 mL
Data File:	103017V6\6F103LA.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		51.6	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		50.3	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		53.2	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		55.4	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.1	50.0	100	(71%-134%)
Bromofluorobenzene	49.7	50.0	99	(70%-131%)
Toluene-d8	48.6	50.0	97	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-510

Lab Sample ID: 1203908045

Client Sample: QC for batch 1714198

Client ID: LCS for batch 1714198

Batch ID: 1714198

Run Date: 10/30/2017 11:29

Prep Date: 10/30/2017 11:29

Data File: 103017V6\6F106LA.D

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

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		49.2	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		265	ug/L	1.50	5.00
107-13-1	Acrylonitrile		260	ug/L	1.50	5.00
107-05-1	Allyl chloride		251	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-510

Matrix: WATER

Lab Sample ID: 1203908045

Client Sample: QC for batch 1714198

Client: ARSL004

Project: QC

Client ID: LCS for batch 1714198

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714198

Inst: VOA6.I

Dilution: 1

Run Date: 10/30/2017 11:29

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 10/30/2017 11:29

Data File: 103017V6\6F106LA.D

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		250	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		2530	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		256	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		261	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		248	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		264	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:	2018-510	Matrix:	WATER
Lab Sample ID:	1203908045		
Client Sample:	QC for batch 1714198	Client:	ARSL004
Client ID:	LCS for batch 1714198	Method:	SW-846:8260B
Batch ID:	1714198	Inst:	VOA6.I
Run Date:	10/30/2017 11:29	Analyst:	JP1
Prep Date:	10/30/2017 11:29		
Data File:	103017V6\6F106LA.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	49.8	50.0	ug/L	100	(71%-134%)
Bromofluorobenzene	49.1	50.0	ug/L	98	(70%-131%)
Toluene-d8	47.5	50.0	ug/L	95	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-510

Lab Sample ID: 1203908046

Client Sample: QC for batch 1714198

Client ID: LCS for batch 1714198

Batch ID: 1714198

Run Date: 10/31/2017 10:33

Prep Date: 10/31/2017 10:33

Data File: 103117V6\6F203LA.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

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		49.8	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		50.3	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		46.2	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		46.6	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		47.2	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		49.6	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		47.3	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	48.0	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		47.3	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	B	47.8	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		45.9	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		45.9	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		49.2	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		44.4	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		48.8	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		46.0	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		45.6	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		44.2	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		43.7	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		44.0	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		51.3	ug/L	0.300	1.00
78-93-3	2-Butanone		181	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		44.1	ug/L	0.300	1.00
591-78-6	2-Hexanone		238	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		44.8	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		45.5	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		228	ug/L	1.50	5.00
67-64-1	Acetone		168	ug/L	1.50	10.0
75-05-8	Acetonitrile		1100	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		45.0	ug/L	0.300	1.00
108-86-1	Bromobenzene		44.5	ug/L	0.300	1.00
74-97-5	Bromochloromethane		47.0	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		51.4	ug/L	0.300	1.00
75-25-2	Bromoform		44.4	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-510

Lab Sample ID: 1203908046

Client Sample: QC for batch 1714198

Client ID: LCS for batch 1714198

Batch ID: 1714198

Run Date: 10/31/2017 10:33

Prep Date: 10/31/2017 10:33

Data File: 103117V6\6F203LA.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		51.9	ug/L	0.300	1.00
75-15-0	Carbon disulfide		245	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		53.4	ug/L	0.300	1.00
108-90-7	Chlorobenzene		44.7	ug/L	0.300	1.00
75-00-3	Chloroethane		53.8	ug/L	0.300	1.00
67-66-3	Chloroform		47.6	ug/L	0.300	1.00
74-87-3	Chloromethane		48.7	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		44.7	ug/L	0.300	1.00
74-95-3	Dibromomethane		47.3	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		65.1	ug/L	0.300	1.00
60-29-7	Ethyl ether		51.0	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		45.2	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	47.9	ug/L	0.300	1.00
74-88-4	Iodomethane		231	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		45.0	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		46.0	ug/L	1.00	10.0
91-20-3	Naphthalene		51.7	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		47.9	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		45.8	ug/L	0.300	1.00
108-88-3	Toluene		43.7	ug/L	0.300	1.00
79-01-6	Trichloroethylene		48.3	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		58.9	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		272	ug/L	1.50	5.00
75-01-4	Vinyl chloride		49.6	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		47.9	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		49.7	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		88.0	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5140	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		46.0	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		44.7	ug/L	0.300	1.00
95-47-6	o-Xylene		44.7	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		45.5	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-510	Matrix:	WATER
Lab Sample ID:	1203908046		
Client Sample:	QC for batch 1714198	Client:	ARSL004
Client ID:	LCS for batch 1714198	Method:	SW-846:8260B
Batch ID:	1714198	Inst:	VOA6.I
Run Date:	10/31/2017 10:33	Analyst:	JP1
Prep Date:	10/31/2017 10:33	Purge Vol:	5 mL
Data File:	103117V6\6F203LA.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		47.9	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		44.9	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		49.1	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		50.8	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.0	50.0	104	(71%-134%)
Bromofluorobenzene	49.7	50.0	99	(70%-131%)
Toluene-d8	48.1	50.0	96	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-510

Lab Sample ID: 1203908047

Client Sample: QC for batch 1714198

Client ID: LCS for batch 1714198

Batch ID: 1714198

Run Date: 10/31/2017 11:29

Prep Date: 10/31/2017 11:29

Data File: 103117V6\6F205LA.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

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		50.1	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		257	ug/L	1.50	5.00
107-13-1	Acrylonitrile		256	ug/L	1.50	5.00
107-05-1	Allyl chloride		250	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: 2018-510

Lab Sample ID: 1203908047

Client Sample: QC for batch 1714198

Client ID: LCS for batch 1714198

Batch ID: 1714198

Run Date: 10/31/2017 11:29

Prep Date: 10/31/2017 11:29

Data File: 103117V6\6F205LA.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

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		240	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		2470	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		250	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		248	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		244	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		278	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number:	2018-510	Matrix:	WATER
Lab Sample ID:	1203908047		
Client Sample:	QC for batch 1714198	Client:	ARSL004
Client ID:	LCS for batch 1714198	Method:	SW-846:8260B
Batch ID:	1714198	Inst:	VOA6.I
Run Date:	10/31/2017 11:29	Analyst:	JP1
Prep Date:	10/31/2017 11:29	Purge Vol:	5 mL
Data File:	103117V6\6F205LA.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	51.0	50.0	102	(71%-134%)
Bromofluorobenzene	49.1	50.0	98	(70%-131%)
Toluene-d8	47.6	50.0	95	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	2018-510	Date Collected:	10/18/2017 12:25	Matrix:	W
Lab Sample ID:	1203908048	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714198	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147586PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714198	Inst:	VOA6.I	Dilution:	1
Run Date:	10/30/2017 19:29	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	10/30/2017 19:29				
Data File:	103017V6\6F123.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		50.4	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		50.0	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		47.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		48.5	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		48.3	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		49.2	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		45.4	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	44.5	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		50.1	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		43.3	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		44.0	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		46.2	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		51.1	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		43.5	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		51.9	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		46.6	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		43.6	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		43.0	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		46.0	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		42.1	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		49.1	ug/L	0.300	1.00
78-93-3	2-Butanone		149	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		42.3	ug/L	0.300	1.00
591-78-6	2-Hexanone		169	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		43.0	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		43.8	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		228	ug/L	1.50	5.00
67-64-1	Acetone		120	ug/L	1.50	10.0
75-05-8	Acetonitrile		1170	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		45.1	ug/L	0.300	1.00
108-86-1	Bromobenzene		44.7	ug/L	0.300	1.00
74-97-5	Bromochloromethane		50.2	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		53.6	ug/L	0.300	1.00
75-25-2	Bromoform		47.0	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-510	Date Collected: 10/18/2017 12:25	Matrix: W
Lab Sample ID: 1203908048	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714198	Client: ARSL004	Project: QC
Client ID: CAPA-18-147586PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714198	Inst: VOA6.I	Dilution: 1
Run Date: 10/30/2017 19:29	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 10/30/2017 19:29		
Data File: 103017V6\6F123.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		44.7	ug/L	0.300	1.00
75-15-0	Carbon disulfide		241	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		52.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		44.3	ug/L	0.300	1.00
75-00-3	Chloroethane		43.6	ug/L	0.300	1.00
67-66-3	Chloroform		49.2	ug/L	0.300	1.00
74-87-3	Chloromethane		36.6	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		47.1	ug/L	0.300	1.00
74-95-3	Dibromomethane		50.2	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		43.3	ug/L	0.300	1.00
60-29-7	Ethyl ether		44.1	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		44.3	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	43.7	ug/L	0.300	1.00
74-88-4	Iodomethane		236	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		42.8	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		49.3	ug/L	1.00	10.0
91-20-3	Naphthalene		50.0	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		47.2	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		44.1	ug/L	0.300	1.00
108-88-3	Toluene		43.4	ug/L	0.300	1.00
79-01-6	Trichloroethylene		47.8	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		46.6	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		212	ug/L	1.50	5.00
75-01-4	Vinyl chloride		36.9	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		49.0	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		49.7	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		86.2	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5280	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		42.1	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		42.1	ug/L	0.300	1.00
95-47-6	o-Xylene		44.4	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		43.0	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-510	Date Collected:	10/18/2017 12:25	Matrix:	W
Lab Sample ID:	1203908048	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714198	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147586PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714198	Inst:	VOA6.I	Dilution:	1
Run Date:	10/30/2017 19:29	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	10/30/2017 19:29				
Data File:	103017V6\6F123.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		50.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		43.3	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		49.1	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		51.9	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.7	50.0	107	(71%-134%)
Bromofluorobenzene	49.0	50.0	98	(70%-131%)
Toluene-d8	47.6	50.0	95	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	2018-510	Date Collected:	10/18/2017 12:25	Matrix:	W
Lab Sample ID:	1203908049	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714198	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147586PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714198	Inst:	VOA6.I	Dilution:	1
Run Date:	10/30/2017 20:25	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	10/30/2017 20:25				
Data File:	103017V6\6F125.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		49.2	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		240	ug/L	1.50	5.00
107-13-1	Acrylonitrile		256	ug/L	1.50	5.00
107-05-1	Allyl chloride		251	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-510	Date Collected:	10/18/2017 12:25	Matrix:	W
Lab Sample ID:	1203908049	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714198	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147586PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714198	Inst:	VOA6.I	Dilution:	1
Run Date:	10/30/2017 20:25	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	10/30/2017 20:25				
Data File:	103017V6\6F125.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		239	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		2390	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		254	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		250	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		241	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		273	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:	2018-510	Date Collected:	10/18/2017 12:25	Matrix:	W
Lab Sample ID:	1203908049	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714198	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147586PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714198	Inst:	VOA6.I	Dilution:	1
Run Date:	10/30/2017 20:25	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	10/30/2017 20:25				
Data File:	103017V6\6F125.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	51.1	50.0	ug/L 102	(71%-134%)
Bromofluorobenzene	48.0	50.0	ug/L 96	(70%-131%)
Toluene-d8	47.1	50.0	ug/L 94	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-510	Date Collected: 10/18/2017 12:25	Matrix: W
Lab Sample ID: 1203908050	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714198	Client: ARSL004	Project: QC
Client ID: CAPA-18-147586PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714198	Inst: VOA6.I	Dilution: 1
Run Date: 10/30/2017 19:57	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 10/30/2017 19:57		
Data File: 103017V6\6F124.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		49.0	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		48.5	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		46.2	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		46.0	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		47.4	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		48.3	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		45.3	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	42.5	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		47.6	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		41.0	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		42.5	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		44.7	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		48.9	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		42.3	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		49.5	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		45.9	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		42.3	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		41.1	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		44.6	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		40.2	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		48.1	ug/L	0.300	1.00
78-93-3	2-Butanone		143	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		41.1	ug/L	0.300	1.00
591-78-6	2-Hexanone		162	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		41.3	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		42.4	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		220	ug/L	1.50	5.00
67-64-1	Acetone		115	ug/L	1.50	10.0
75-05-8	Acetonitrile		1150	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		44.5	ug/L	0.300	1.00
108-86-1	Bromobenzene		42.5	ug/L	0.300	1.00
74-97-5	Bromochloromethane		47.3	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		51.3	ug/L	0.300	1.00
75-25-2	Bromoform		44.9	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-510	Date Collected: 10/18/2017 12:25	Matrix: W
Lab Sample ID: 1203908050	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714198	Client: ARSL004	Project: QC
Client ID: CAPA-18-147586PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714198	Inst: VOA6.I	Dilution: 1
Run Date: 10/30/2017 19:57	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 10/30/2017 19:57		
Data File: 103017V6\6F124.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		44.8	ug/L	0.300	1.00
75-15-0	Carbon disulfide		240	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		51.1	ug/L	0.300	1.00
108-90-7	Chlorobenzene		43.1	ug/L	0.300	1.00
75-00-3	Chloroethane		43.2	ug/L	0.300	1.00
67-66-3	Chloroform		47.9	ug/L	0.300	1.00
74-87-3	Chloromethane		38.5	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		45.5	ug/L	0.300	1.00
74-95-3	Dibromomethane		47.6	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		42.5	ug/L	0.300	1.00
60-29-7	Ethyl ether		42.9	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		43.0	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	40.4	ug/L	0.300	1.00
74-88-4	Iodomethane		231	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		42.1	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		47.5	ug/L	1.00	10.0
91-20-3	Naphthalene		47.7	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		45.7	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		43.3	ug/L	0.300	1.00
108-88-3	Toluene		42.6	ug/L	0.300	1.00
79-01-6	Trichloroethylene		46.5	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		46.2	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		205	ug/L	1.50	5.00
75-01-4	Vinyl chloride		38.7	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		47.7	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		47.8	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		83.6	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5180	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		40.2	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		40.7	ug/L	0.300	1.00
95-47-6	o-Xylene		43.0	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		41.7	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-510	Date Collected: 10/18/2017 12:25	Matrix: W
Lab Sample ID: 1203908050	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714198	Client: ARSL004	Project: QC
Client ID: CAPA-18-147586PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714198	Inst: VOA6.I	Dilution: 1
Run Date: 10/30/2017 19:57	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 10/30/2017 19:57		
Data File: 103017V6\6F124.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		48.6	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		41.9	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		48.2	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		49.7	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.8	50.0	102	(71%-134%)
Bromofluorobenzene	48.5	50.0	97	(70%-131%)
Toluene-d8	47.2	50.0	94	(74%-124%)

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-510	Date Collected:	10/18/2017 12:25	Matrix:	W
Lab Sample ID:	1203908051	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714198	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147586PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714198	Inst:	VOA6.I	Dilution:	1
Run Date:	10/30/2017 20:53	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	10/30/2017 20:53				
Data File:	103017V6\6F126.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		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		264	ug/L	1.50	5.00
107-13-1	Acrylonitrile		272	ug/L	1.50	5.00
107-05-1	Allyl chloride		244	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-510	Date Collected: 10/18/2017 12:25	Matrix: W
Lab Sample ID: 1203908051	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714198	Client: ARSL004	Project: QC
Client ID: CAPA-18-147586PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714198	Inst: VOA6.I	Dilution: 1
Run Date: 10/30/2017 20:53	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 10/30/2017 20:53		
Data File: 103017V6\6F126.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		243	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2650	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		264	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		261	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		261	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		265	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:	2018-510	Date Collected:	10/18/2017 12:25	Matrix:	W
Lab Sample ID:	1203908051	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714198	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147586PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714198	Inst:	VOA6.I	Dilution:	1
Run Date:	10/30/2017 20:53	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	10/30/2017 20:53				
Data File:	103017V6\6F126.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	52.8	50.0	106	(71%-134%)
Bromofluorobenzene	49.3	50.0	99	(70%-131%)
Toluene-d8	47.3	50.0	95	(74%-124%)

Semi-Volatile Analysis

Case Narrative

**GC/MS Semivolatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-510
Work Order #: 435630**

Method/Analysis Information

Procedure:	Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry
Analytical Method:	SW846 3510C/8270D
Prep Method:	SW846 3510C
Analytical Batch Number:	1711736
Prep Batch Number:	1711735

Sample Analysis

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

Sample ID	Client ID
435630002	CAPA-18-147586
435630005	CAPA-18-147587
1203901986	Method Blank (MB)
1203901987	Laboratory Control Sample (LCS)
1203901988	435566004(CAMO-18-147679) Matrix Spike (MS)
1203901989	435566004(CAMO-18-147679) 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 435630002 (CAPA-18-147586) and 435630005 (CAPA-18-147587) 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 and/or LCSD (See Below) did not meet spike recovery acceptance criteria. Since the target analytes were not detected in the associated samples above the reporting limits, the positive bias had no adverse impact on the data.

Sample	Analyte	Value
1203901987 (LCS)	3,3'-Dichlorobenzidine	129* (43%-127%)

QC Sample Designation

Sample 435566004 (CAMO-18-147679) was selected for analysis as the matrix spike and matrix spike duplicate.

Spike Recovery Statement

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

Sample	Analyte	Value
1203901988 (CAMO-18-147679MS)	3,3'-Dichlorobenzidine	129* (34%-124%)

MS/MSD Relative Percent Difference (RPD) Statement

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

Sample	Analyte	Value
1203901988MS and 1203901989MSD (CAMO-18-147679)	Benzidine	RPD 41* (0%-30%)

Internal Standard (ISTD) Acceptance

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

Technical Information:**Holding Time Specifications**

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

Preparation/Analytical Method Verification

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

Sample Dilutions

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

Sample Re-extraction/Re-analysis

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

Miscellaneous Information:**Manual Integrations**

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

TIC Comment

Tentatively identified compounds (TIC) were requested for samples 435630002 (CAPA-18-147586) and 435630005 (CAPA-18-147587) 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:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
MSD3.I	Agilent 7890A/5975C GC/MS w/ 7683 Autosampler	HP7890A/HP5975C	DB-5MS	25m x 0.2mm, 0.33um (5% Phenylmethylpolysiloxane)

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: 2018-510 GEL Work Order: 435630

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Barbara Bailey

Date: 14 NOV 2017

Title: Data Validator

Sample Data Summary

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

Page 1 of 3

SDG Number: 2018-510

Lab Sample ID: 435630002

Date Collected: 10/18/2017 12:25

Date Received: 10/20/2017 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1711736

Inst: MSD3.I

Dilution: 1

Run Date: 10/24/2017 21:05

Analyst: JLD1

Inj. Vol: 1 uL

Prep Date: 10/24/2017 06:59

Aliquot: 920 mL

Final Volume: 1 mL

Data File: s102417a.s\s3j2425.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.26	ug/L	3.26	10.9
120-82-1	1,2,4-Trichlorobenzene	U	3.26	ug/L	3.26	10.9
95-50-1	1,2-Dichlorobenzene	U	3.26	ug/L	3.26	10.9
122-66-7	Azobenzene	U	3.26	ug/L	3.26	10.9
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.26	ug/L	3.26	10.9
106-46-7	1,4-Dichlorobenzene	U	3.26	ug/L	3.26	10.9
123-91-1	1,4-Dioxane	U	3.26	ug/L	3.26	10.9
90-12-0	1-Methylnaphthalene	U	0.326	ug/L	0.326	1.09
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.26	ug/L	3.26	10.9
95-95-4	2,4,5-Trichlorophenol	U	3.26	ug/L	3.26	10.9
88-06-2	2,4,6-Trichlorophenol	U	3.26	ug/L	3.26	10.9
120-83-2	2,4-Dichlorophenol	U	3.26	ug/L	3.26	10.9
105-67-9	2,4-Dimethylphenol	U	3.26	ug/L	3.26	10.9
51-28-5	2,4-Dinitrophenol	U	5.43	ug/L	5.43	21.7
121-14-2	2,4-Dinitrotoluene	U	3.26	ug/L	3.26	10.9
606-20-2	2,6-Dinitrotoluene	U	3.26	ug/L	3.26	10.9
91-58-7	2-Chloronaphthalene	U	0.446	ug/L	0.446	1.09
95-57-8	2-Chlorophenol	U	3.26	ug/L	3.26	10.9
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.26	ug/L	3.26	10.9
91-57-6	2-Methylnaphthalene	U	0.326	ug/L	0.326	1.09
88-75-5	2-Nitrophenol	U	3.26	ug/L	3.26	10.9
91-94-1	3,3'-Dichlorobenzidine	U	3.26	ug/L	3.26	10.9
101-55-3	4-Bromophenylphenylether	U	3.26	ug/L	3.26	10.9
59-50-7	Parachlorometa cresol	U	3.26	ug/L	3.26	10.9
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.59	ug/L	3.59	10.9
7005-72-3	4-Chlorophenylphenylether	U	3.26	ug/L	3.26	10.9
100-02-7	4-Nitrophenol	U	3.26	ug/L	3.26	10.9
83-32-9	Acenaphthene	U	0.326	ug/L	0.326	1.09
208-96-8	Acenaphthylene	U	0.326	ug/L	0.326	1.09
62-53-3	Aniline	U	4.57	ug/L	4.57	10.9
120-12-7	Anthracene	U	0.326	ug/L	0.326	1.09
1912-24-9	Atrazine	U	3.26	ug/L	3.26	10.9
92-87-5	Benzidine	U	4.24	ug/L	4.24	10.9
56-55-3	Benzo(a)anthracene	U	0.326	ug/L	0.326	1.09
50-32-8	Benzo(a)pyrene	U	0.326	ug/L	0.326	1.09
205-99-2	Benzo(b)fluoranthene	U	0.326	ug/L	0.326	1.09
191-24-2	Benzo(ghi)perylene	U	0.326	ug/L	0.326	1.09

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

Page 2 of 3

SDG Number: 2018-510
Lab Sample ID: 435630002

Date Collected: 10/18/2017 12:25
Date Received: 10/20/2017 08:55
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD3.I
Analyst: JLD1
Aliquot: 920 mL
Column: DB-5ms

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

Client ID: CAPA-18-147586
Batch ID: 1711736
Run Date: 10/24/2017 21:05
Prep Date: 10/24/2017 06:59
Data File: s102417a.s\sj2425.D

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.326	ug/L	0.326	1.09
65-85-0	Benzoic acid	U	6.52	ug/L	6.52	21.7
100-51-6	Benzyl alcohol	U	3.26	ug/L	3.26	10.9
85-68-7	Butylbenzylphthalate	U	3.26	ug/L	3.26	10.9
218-01-9	Chrysene	U	0.326	ug/L	0.326	1.09
84-74-2	Di-n-butylphthalate	U	3.26	ug/L	3.26	10.9
117-84-0	Di-n-octylphthalate	U	3.26	ug/L	3.26	10.9
53-70-3	Dibenzo(a,h)anthracene	U	0.326	ug/L	0.326	1.09
132-64-9	Dibenzofuran	U	3.26	ug/L	3.26	10.9
84-66-2	Diethylphthalate	U	3.26	ug/L	3.26	10.9
131-11-3	Dimethylphthalate	U	3.26	ug/L	3.26	10.9
88-85-7	Dinoseb	U	3.26	ug/L	3.26	10.9
122-39-4	Diphenylamine	U	3.26	ug/L	3.26	10.9
206-44-0	Fluoranthene	U	0.326	ug/L	0.326	1.09
86-73-7	Fluorene	U	0.326	ug/L	0.326	1.09
118-74-1	Hexachlorobenzene	U	3.26	ug/L	3.26	10.9
87-68-3	Hexachlorobutadiene	U	3.26	ug/L	3.26	10.9
77-47-4	Hexachlorocyclopentadiene	U	3.26	ug/L	3.26	10.9
67-72-1	Hexachloroethane	U	3.26	ug/L	3.26	10.9
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.326	ug/L	0.326	1.09
78-59-1	Isophorone	U	3.80	ug/L	3.80	10.9
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.26	ug/L	3.26	10.9
924-16-3	N-Nitrosodi-n-butylamine	U	3.26	ug/L	3.26	10.9
55-18-5	N-Nitrosodiethylamine	U	3.26	ug/L	3.26	10.9
621-64-7	N-Nitrosodi--n-propylamine	U	3.26	ug/L	3.26	10.9
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.26	ug/L	3.26	10.9
91-20-3	Naphthalene	U	0.326	ug/L	0.326	1.09
98-95-3	Nitrobenzene	U	3.26	ug/L	3.26	10.9
608-93-5	Pentachlorobenzene	U	3.26	ug/L	3.26	10.9
87-86-5	Pentachlorophenol	U	3.26	ug/L	3.26	10.9
85-01-8	Phenanthrene	U	0.326	ug/L	0.326	1.09
108-95-2	Phenol	U	3.26	ug/L	3.26	10.9
129-00-0	Pyrene	U	0.326	ug/L	0.326	1.09
110-86-1	Pyridine	U	3.26	ug/L	3.26	10.9
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.26	ug/L	3.26	10.9
111-91-1	bis(2-Chloroethoxy)methane	U	3.26	ug/L	3.26	10.9
111-44-4	bis(2-Chloroethyl) ether	U	3.26	ug/L	3.26	10.9
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.26	ug/L	3.26	10.9

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

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SDG Number: 2018-510

Lab Sample ID: 435630002

Date Collected: 10/18/2017 12:25

Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147586

Batch ID: 1711736

Run Date: 10/24/2017 21:05

Prep Date: 10/24/2017 06:59

Data File: s102417a.s\s3j2425.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD3.I

Analyst: JLD1

Aliquot: 920 mL

Column: DB-5ms

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
65794-96-9	m,p-Cresols	U	4.02	ug/L	4.02	10.9
99-09-2	3-Nitroaniline	U	3.26	ug/L	3.26	10.9
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol	U	3.26	ug/L	3.26	10.9
88-74-4	2-Nitroaniline	U	3.26	ug/L	3.26	10.9
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline	U	3.26	ug/L	3.26	10.9
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	62.1	109	ug/L	57 (32%-124%)
2-Fluorobiphenyl	34.0	54.3	ug/L	63 (32%-112%)
2-Fluorophenol	31.6	109	ug/L	29 (15%-88%)
Nitrobenzene-d5	39.1	54.3	ug/L	72 (36%-115%)
Phenol-d5	20.8	109	ug/L	19 (15%-91%)
p-Terphenyl-d14	41.3	54.3	ug/L	76 (36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000067-66-3	Trichloromethane	2.216	77.8	ug/L	97	NJ
000056-23-5	Carbon Tetrachloride	2.457	5.87	ug/L	91	NJ

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

SDG Number: 2018-510

Lab Sample ID: 435630005

Date Collected: 10/18/2017 14:39

Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147587

Batch ID: 1711736

Run Date: 10/24/2017 21:34

Prep Date: 10/24/2017 06:59

Data File: s102417a.s\sj2426.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD3.I

Analyst: JLD1

Aliquot: 950 mL

Column: DB-5ms

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
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**

Page 2 of 3

SDG Number: 2018-510

Lab Sample ID: 435630005

Date Collected: 10/18/2017 14:39

Date Received: 10/20/2017 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1711736

Inst: MSD3.I

Dilution: 1

Run Date: 10/24/2017 21:34

Analyst: JLD1

Inj. Vol: 1 uL

Prep Date: 10/24/2017 06:59

Aliquot: 950 mL

Final Volume: 1 mL

Data File: s102417a.s\sj2426.D

Column: DB-5ms

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: 2018-510

Lab Sample ID: 435630005

Date Collected: 10/18/2017 14:39

Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147587

Batch ID: 1711736

Run Date: 10/24/2017 21:34

Prep Date: 10/24/2017 06:59

Data File: s102417a.s\s3j2426.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD3.I

Analyst: JLD1

Aliquot: 950 mL

Column: DB-5ms

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
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	77.4	105	ug/L	74	(32%-124%)
2-Fluorobiphenyl	36.5	52.6	ug/L	69	(32%-112%)
2-Fluorophenol	35.1	105	ug/L	33	(15%-88%)
Nitrobenzene-d5	41.1	52.6	ug/L	78	(36%-115%)
Phenol-d5	22.8	105	ug/L	22	(15%-91%)
p-Terphenyl-d14	43.6	52.6	ug/L	83	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000067-66-3	Trichloromethane	2.221	77.1	ug/L	97	NJ
000056-23-5	Carbon Tetrachloride	2.462	6.95	ug/L	91	NJ

Quality Control Summary

Semi-Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-510**Matrix Type: LIQUID**

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203901986	MB for batch 1711735	38	26	87	74	71	96
1203901987	LCS for batch 1711735	41	28	74	78	89	88
1203901988	CAMO-18-147679MS	49	40	70	73	94	87
1203901989	CAMO-18-147679MSD	44	35	66	64	81	78
435630002	CAPA-18-147586	29	19	72	63	57	76
435630005	CAPA-18-147587	33	22	78	69	74	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: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1711735

Matrix: WATER

Lab Sample ID 1203901987

Instrument: MSD3.I

Analysis Date: 10/24/2017 16:09

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1711735

Inj. Vol: 1 uL

Batch ID: 1711736

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	22.8	46	30-88
110-86-1	LCS Pyridine	50.0	0.0	23.7	47	27-89
62-53-3	LCS Aniline	50.0	0.0	36.6	73	49-112
108-95-2	LCS Phenol	50.0	0.0	14.5	29	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	40.3	81	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	36.6	73	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	36.2	72	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	36.4	73	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	37.8	76	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)et	50.0	0.0	43.5	87	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	32.6	65	44-102
95-48-7	LCS o-Cresol	50.0	0.0	31.4	63	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	32.6	65	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	43.3	87	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	31.8	64	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	39.6	79	53-115
78-59-1	LCS Isophorone	50.0	0.0	40.7	81	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	39.6	79	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	29.9	60	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	39.7	79	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	39.2	78	53-109
65-85-0	LCS Benzoic acid	100	0.0	27.5	28	21-74

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1711735

Matrix: WATER

Lab Sample ID 1203901987

Instrument: MSD3.I

Analysis Date: 10/24/2017 16:09

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1711735

Inj. Vol: 1 uL

Batch ID: 1711736

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	50.0	100	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	40.4	81	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	38.6	77	42-103
91-20-3	LCS Naphthalene	50.0	0.0	38.6	77	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	39.1	78	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	26.6	53	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	42.4	85	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	42.4	85	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	45.6	91	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	58.7	117	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	48.9	98	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	51.3	103	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	56.3	113	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	44.9	90	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	40.1	80	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	45.5	91	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	39.9	80	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	51.2	102	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	15.5	31	15-137

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1711735

Matrix: WATER

Lab Sample ID 1203901987

Instrument: MSD3.I

Analysis Date: 10/24/2017 16:09

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1711735

Inj. Vol: 1 uL

Batch ID: 1711736

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	48.2	96	52-114
7005-72-3	LCS 4-Chlorophenylphenylether	50.0	0.0	49.5	99	52-121
100-01-6	LCS 4-Nitroaniline <i>p-Nitroaniline</i>	50.0	0.0	55.6	111	44-137
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	43.8	88	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	44.3	89	55-113
122-66-7	LCS Azobenzene <i>1,2-Diphenylhydrazine</i>	50.0	0.0	41.4	83	53-115
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	43.3	87	54-116
118-74-1	LCS Hexachlorobenzene	50.0	0.0	42.4	85	54-115
87-86-5	LCS Pentachlorophenol	50.0	0.0	41.7	83	41-116
85-01-8	LCS Phenanthrene	50.0	0.0	46.9	94	55-110
120-12-7	LCS Anthracene	50.0	0.0	46.9	94	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	50.5	101	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	53.4	107	54-118
129-00-0	LCS Pyrene	50.0	0.0	43.8	88	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	46.8	94	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	44.4	89	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	46.5	93	57-112
218-01-9	LCS Chrysene	50.0	0.0	46.0	92	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	48.9	98	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	46.5	93	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	46.2	92	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	46.0	92	40-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-510

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1711735

Matrix: WATER

Lab Sample ID 1203901987

Instrument: MSD3.I

Analysis Date: 10/24/2017 16:09

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1711735

Inj. Vol: 1 uL

Batch ID: 1711736

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	43.6	87	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	41.2	82	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	39.6	79	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	25.9	52	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	42.1	84	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	44.9	90	44-102
1912-24-9	LCS Atrazine	50.0	0.0	51.4	103	60-131
92-87-5	LCS Benzidine	100	0.0	139	139	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	64.4	129 *	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	36.9	74	39-99

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-510

Sample Type: Matrix Spike

Client ID: CAMO-18-147679MS

Matrix: W

Lab Sample ID 1203901988

Instrument: MSD3.I

Analysis Date: 10/24/2017 19:06

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1711735

Inj. Vol: 1 uL

Batch ID: 1711736

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	116	0.00 U	63.9	55	25-106
110-86-1	MS Pyridine	116	0.00 U	56.5	49	24-93
62-53-3	MS Aniline	116	0.00 U	79.1	68	37-113
108-95-2	MS Phenol	116	0.00 U	49.1	42	23-82
111-44-4	MS bis(2-Chloroethyl) ether	116	0.00 U	90.0	77	39-114
95-57-8	MS 2-Chlorophenol	116	0.00 U	86.8	75	37-108
541-73-1	MS 1,3-Dichlorobenzene	116	0.00 U	73.2	63	27-97
106-46-7	MS 1,4-Dichlorobenzene	116	0.00 U	74.0	64	28-97
95-50-1	MS 1,2-Dichlorobenzene	116	0.00 U	77.6	67	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)et	116	0.00 U	95.8	82	32-127
100-51-6	MS Benzyl alcohol	116	0.00 U	83.4	72	37-116
95-48-7	MS o-Cresol	116	0.00 U	82.6	71	34-109
65794-96-9	MS m,p-Cresols	116	0.00 U	88.5	76	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	116	0.00 U	101	87	42-118
67-72-1	MS Hexachloroethane	116	0.00 U	66.5	57	29-94
98-95-3	MS Nitrobenzene	116	0.00 U	91.0	78	38-123
78-59-1	MS Isophorone	116	0.00 U	93.0	80	43-120
88-75-5	MS 2-Nitrophenol	116	0.00 U	92.0	79	39-115
105-67-9	MS 2,4-Dimethylphenol	116	0.00 U	74.1	64	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	116	0.00 U	92.4	79	42-118
120-83-2	MS 2,4-Dichlorophenol	116	0.00 U	93.8	81	40-111
65-85-0	MS Benzoic acid	233	0.00 U	87.1	37	17-95

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-510

Sample Type: Matrix Spike

Client ID: CAMO-18-147679MS

Matrix: W

Lab Sample ID 1203901988

Instrument: MSD3.I

Analysis Date: 10/24/2017 19:06

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1711735

Inj. Vol: 1 uL

Batch ID: 1711736

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS 4-Chloroaniline	116	0.00 U	109	94	44-138
87-68-3	MS Hexachlorobutadiene	116	0.00 U	73.8	64	26-98
59-50-7	MS Parachlorometa cresol 4-Chloro-3-methylphenol	116	0.00 U	100	86	41-122
91-57-6	MS 2-Methylnaphthalene	116	0.00 U	83.0	71	29-109
91-20-3	MS Naphthalene	116	0.00 U	82.8	71	31-108
90-12-0	MS 1-Methylnaphthalene	116	0.00 U	84.4	73	33-112
77-47-4	MS Hexachlorocyclopentadiene	116	0.00 U	56.8	49	26-79
88-06-2	MS 2,4,6-Trichlorophenol	116	0.00 U	102	88	39-124
95-95-4	MS 2,4,5-Trichlorophenol	116	0.00 U	102	88	42-120
91-58-7	MS 2-Chloronaphthalene	116	0.00 U	93.4	80	29-113
88-74-4	MS 2-Nitroaniline o-Nitroaniline	116	0.00 U	106	91	41-121
99-09-2	MS 3-Nitroaniline m-Nitroaniline	116	0.00 U	135	116	42-144
131-11-3	MS Dimethylphthalate	116	0.00 U	115	99	45-128
606-20-2	MS 2,6-Dinitrotoluene	116	0.00 U	121	104	46-124
121-14-2	MS 2,4-Dinitrotoluene	116	0.00 U	132	114	45-125
208-96-8	MS Acenaphthylene	116	0.00 U	103	88	35-120
83-32-9	MS Acenaphthene	116	0.00 U	103	89	35-117
51-28-5	MS 2,4-Dinitrophenol	116	0.00 U	100	86	27-122
132-64-9	MS Dibenzofuran	116	0.00 U	106	91	38-113
58-90-2	MS 2,3,4,6-Tetrachlorophenol	116	0.00 U	97.7	84	40-128
84-66-2	MS Diethylphthalate	116	0.00 U	122	105	43-127
100-02-7	MS 4-Nitrophenol	116	0.00 U	55.8	48	17-85

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Matrix Spike

Client ID: CAMO-18-147679MS

Matrix: W

Lab Sample ID 1203901988

Instrument: MSD3.I

Analysis Date: 10/24/2017 19:06

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1711735

Inj. Vol: 1 uL

Batch ID: 1711736

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS	Fluorene	116	0.00	U	110	95	39-117
7005-72-3	MS	4-Chlorophenylphenylether	116	0.00	U	113	97	39-121
100-01-6	MS	4-Nitroaniline <i>p</i> -Nitroaniline	116	0.00	U	133	115	30-133
534-52-1	MS	2-Methyl-4,6-dinitrophenol	116	0.00	U	104	90	32-126
122-39-4	MS	Diphenylamine	116	0.00	U	102	87	37-118
122-66-7	MS	Azobenzene <i>1,2-Diphenylhydrazine</i>	116	0.00	U	92.6	80	38-120
101-55-3	MS	4-Bromophenylphenylether	116	0.00	U	98.9	85	39-121
118-74-1	MS	Hexachlorobenzene	116	0.00	U	98.8	85	40-118
87-86-5	MS	Pentachlorophenol	116	0.00	U	103	89	35-121
85-01-8	MS	Phenanthrene	116	0.00	U	108	93	40-115
120-12-7	MS	Anthracene	116	0.00	U	106	92	38-120
84-74-2	MS	Di-n-butylphthalate	116	0.00	U	116	100	41-128
206-44-0	MS	Fluoranthene	116	0.00	U	125	107	41-119
129-00-0	MS	Pyrene	116	0.00	U	98.7	85	35-128
85-68-7	MS	Butylbenzylphthalate	116	0.00	U	108	93	40-129
117-81-7	MS	bis(2-Ethylhexyl)phthalate	116	0.00	U	104	89	38-131
56-55-3	MS	Benzo(a)anthracene	116	0.00	U	109	94	39-120
218-01-9	MS	Chrysene	116	0.00	U	108	93	41-124
117-84-0	MS	Di-n-octylphthalate	116	0.00	U	116	100	37-134
205-99-2	MS	Benzo(b)fluoranthene	116	0.00	U	111	96	31-122
207-08-9	MS	Benzo(k)fluoranthene	116	0.00	U	113	97	33-123
50-32-8	MS	Benzo(a)pyrene	116	0.00	U	108	93	32-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Matrix Spike

Client ID: CAMO-18-147679MS

Matrix: W

Lab Sample ID 1203901988

Instrument: MSD3.I

Analysis Date: 10/24/2017 19:06

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1711735

Inj. Vol: 1 uL

Batch ID: 1711736

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	116	0.00 U	93.2	80	27-121
53-70-3	MS Dibenzo(a,h)anthracene	116	0.00 U	88.6	76	30-125
191-24-2	MS Benzo(ghi)perylene	116	0.00 U	83.2	72	24-126
123-91-1	MS 1,4-Dioxane	116	0.00 U	67.9	58	24-110
930-55-2	MS N-Nitrosopyrrolidine	116	0.00 U	103	89	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	116	0.00 U	96.5	83	32-101
1912-24-9	MS Atrazine	116	0.00 U	117	100	42-129
92-87-5	MS Benzidine	233	0.00 U	259	111	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	116	0.00 U	150	129 *	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	116	0.00 U	76.0	65	26-102

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-147679MSD

Matrix: W

Lab Sample ID 1203901989

Instrument: MSD3.I

Analysis Date: 10/24/2017 19:36

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1711735

Inj. Vol: 1 uL

Batch ID: 1711736

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	116	0.00	U	59.5	51	25-106	7	0-30
110-86-1	MSD Pyridine	116	0.00	U	45.4	39	24-93	22	0-30
62-53-3	MSD Aniline	116	0.00	U	71.3	61	37-113	10	0-30
108-95-2	MSD Phenol	116	0.00	U	42.4	36	23-82	15	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	116	0.00	U	85.4	73	39-114	5	0-30
95-57-8	MSD 2-Chlorophenol	116	0.00	U	80.9	70	37-108	7	0-30
541-73-1	MSD 1,3-Dichlorobenzene	116	0.00	U	67.3	58	27-97	8	0-30
106-46-7	MSD 1,4-Dichlorobenzene	116	0.00	U	67.6	58	28-97	9	0-30
95-50-1	MSD 1,2-Dichlorobenzene	116	0.00	U	70.9	61	28-99	9	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)et	116	0.00	U	89.4	77	32-127	7	0-30
100-51-6	MSD Benzyl alcohol	116	0.00	U	76.0	65	37-116	9	0-30
95-48-7	MSD o-Cresol	116	0.00	U	74.2	64	34-109	11	0-30
65794-96-9	MSD m,p-Cresols	116	0.00	U	80.0	69	36-120	10	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine N-Nitrosodipropylamine	116	0.00	U	92.6	80	42-118	9	0-30
67-72-1	MSD Hexachloroethane	116	0.00	U	60.1	52	29-94	10	0-30
98-95-3	MSD Nitrobenzene	116	0.00	U	85.0	73	38-123	7	0-30
78-59-1	MSD Isophorone	116	0.00	U	88.7	76	43-120	5	0-30
88-75-5	MSD 2-Nitrophenol	116	0.00	U	87.4	75	39-115	5	0-30
105-67-9	MSD 2,4-Dimethylphenol	116	0.00	U	67.3	58	39-107	10	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	116	0.00	U	86.3	74	42-118	7	0-30
120-83-2	MSD 2,4-Dichlorophenol	116	0.00	U	86.0	74	40-111	9	0-30
65-85-0	MSD Benzoic acid	233	0.00	U	77.6	33	17-95	12	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-147679MSD

Matrix: W

Lab Sample ID 1203901989

Instrument: MSD3.I

Analysis Date: 10/24/2017 19:36

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1711735

Inj. Vol: 1 uL

Batch ID: 1711736

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	116	0.00 U	99.3	85	44-138	10	0-30
87-68-3	MSD Hexachlorobutadiene	116	0.00 U	68.3	59	26-98	8	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	116	0.00 U	91.0	78	41-122	9	0-30
91-57-6	MSD 2-Methylnaphthalene	116	0.00 U	75.4	65	29-109	10	0-30
91-20-3	MSD Naphthalene	116	0.00 U	76.5	66	31-108	8	0-30
90-12-0	MSD 1-Methylnaphthalene	116	0.00 U	76.9	66	33-112	9	0-30
77-47-4	MSD Hexachlorocyclopentadiene	116	0.00 U	49.8	43	26-79	13	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	116	0.00 U	93.8	81	39-124	9	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	116	0.00 U	93.0	80	42-120	9	0-30
91-58-7	MSD 2-Chloronaphthalene	116	0.00 U	81.6	70	29-113	14	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	116	0.00 U	96.2	83	41-121	10	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	116	0.00 U	119	103	42-144	12	0-30
131-11-3	MSD Dimethylphthalate	116	0.00 U	106	91	45-128	8	0-30
606-20-2	MSD 2,6-Dinitrotoluene	116	0.00 U	110	94	46-124	10	0-30
121-14-2	MSD 2,4-Dinitrotoluene	116	0.00 U	119	102	45-125	10	0-30
208-96-8	MSD Acenaphthylene	116	0.00 U	91.2	78	35-120	12	0-30
83-32-9	MSD Acenaphthene	116	0.00 U	90.8	78	35-117	13	0-30
51-28-5	MSD 2,4-Dinitrophenol	116	0.00 U	89.7	77	27-122	11	0-30
132-64-9	MSD Dibenzofuran	116	0.00 U	93.0	80	38-113	13	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	116	0.00 U	85.7	74	40-128	13	0-30
84-66-2	MSD Diethylphthalate	116	0.00 U	110	94	43-127	11	0-30
100-02-7	MSD 4-Nitrophenol	116	0.00 U	46.8	40	17-85	18	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-147679MSD

Matrix: W

Lab Sample ID 1203901989

Instrument: MSD3.I

Analysis Date: 10/24/2017 19:36

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1711735

Inj. Vol: 1 uL

Batch ID: 1711736

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	116	0.00 U	97.9	84	39-117	12	0-30
7005-72-3	MSD 4-Chlorophenylphenylether	116	0.00 U	99.7	86	39-121	12	0-30
100-01-6	MSD 4-Nitroaniline <i>p-Nitroaniline</i>	116	0.00 U	116	99	30-133	14	0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	116	0.00 U	94.1	81	32-126	10	0-30
122-39-4	MSD Diphenylamine	116	0.00 U	93.4	80	37-118	8	0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	116	0.00 U	84.6	73	38-120	9	0-30
101-55-3	MSD 4-Bromophenylphenylether	116	0.00 U	88.6	76	39-121	11	0-30
118-74-1	MSD Hexachlorobenzene	116	0.00 U	89.2	77	40-118	10	0-30
87-86-5	MSD Pentachlorophenol	116	0.00 U	90.7	78	35-121	13	0-30
85-01-8	MSD Phenanthrene	116	0.00 U	95.9	82	40-115	12	0-30
120-12-7	MSD Anthracene	116	0.00 U	97.7	84	38-120	9	0-30
84-74-2	MSD Di-n-butylphthalate	116	0.00 U	105	90	41-128	10	0-30
206-44-0	MSD Fluoranthene	116	0.00 U	113	97	41-119	10	0-30
129-00-0	MSD Pyrene	116	0.00 U	86.9	75	35-128	13	0-30
85-68-7	MSD Butylbenzylphthalate	116	0.00 U	96.8	83	40-129	11	0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	116	0.00 U	94.4	81	38-131	9	0-30
56-55-3	MSD Benzo(a)anthracene	116	0.00 U	98.9	85	39-120	10	0-30
218-01-9	MSD Chrysene	116	0.00 U	98.0	84	41-124	10	0-30
117-84-0	MSD Di-n-octylphthalate	116	0.00 U	107	92	37-134	8	0-30
205-99-2	MSD Benzo(b)fluoranthene	116	0.00 U	98.2	84	31-122	12	0-30
207-08-9	MSD Benzo(k)fluoranthene	116	0.00 U	99.7	86	33-123	12	0-30
50-32-8	MSD Benzo(a)pyrene	116	0.00 U	97.0	83	32-118	11	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-510

Sample Type: Matrix Spike Duplicate

Client ID: CAMO-18-147679MSD

Matrix: W

Lab Sample ID 1203901989

Instrument: MSD3.I

Analysis Date: 10/24/2017 19:36

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1711735

Inj. Vol: 1 uL

Batch ID: 1711736

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	116	0.00	U	92.7	80	27-121	1	0-30
53-70-3	MSD Dibenzo(a,h)anthracene	116	0.00	U	88.3	76	30-125	0	0-30
191-24-2	MSD Benzo(ghi)perylene	116	0.00	U	84.4	73	24-126	1	0-30
123-91-1	MSD 1,4-Dioxane	116	0.00	U	64.7	56	24-110	5	0-30
930-55-2	MSD N-Nitrosopyrrolidine	116	0.00	U	92.9	80	47-119	11	0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	116	0.00	U	85.8	74	32-101	12	0-30
1912-24-9	MSD Atrazine	116	0.00	U	107	92	42-129	8	0-30
92-87-5	MSD Benzidine	233	0.00	U	170	73	15-130	41 *	0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	116	0.00	U	134	115	34-124	11	0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	116	0.00	U	70.0	60	26-102	8	0-30

Method Blank Summary

Page 1 of 1

SDG Number:	2018-510	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1711735	Instrument ID:	MSD3.I	Data File:	s102417a.s\s3j2414.D
Lab Sample ID:	1203901986	Prep Date:	10/24/2017 06:59	Analyzed:	10/24/17 15:40
Column:	DB-5ms				

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

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 1711735	1203901987	s102417a.s\s3j2415.D	10/24/17	1609
02 CAMO-18-147679MS	1203901988	s102417a.s\s3j2421.D	10/24/17	1906
03 CAMO-18-147679MSD	1203901989	s102417a.s\s3j2422.D	10/24/17	1936
04 CAPA-18-147586	435630002	s102417a.s\s3j2425.D	10/24/17	2105
05 CAPA-18-147587	435630005	s102417a.s\s3j2426.D	10/24/17	2134

Quality Control Data

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

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SDG Number: 2018-510

Lab Sample ID: 1203901986

Client Sample: QC for batch 1711735

Client ID: MB for batch 1711735

Batch ID: 1711736

Run Date: 10/24/2017 15:40

Prep Date: 10/24/2017 06:59

Data File: s102417a.s\sj2414.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: MSD3.I
Analyst: JLD1
Aliquot: 1000 mL
Column: DB-5ms

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: 2018-510

Lab Sample ID: 1203901986

Client Sample: QC for batch 1711735

Client ID: MB for batch 1711735

Batch ID: 1711736

Run Date: 10/24/2017 15:40

Prep Date: 10/24/2017 06:59

Data File: s102417a.s\sj2414.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: MSD3.I

Analyst: JLD1

Aliquot: 1000 mL

Column: DB-5ms

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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SDG Number: 2018-510

Lab Sample ID: 1203901986

Client Sample: QC for batch 1711735

Client ID: MB for batch 1711735

Batch ID: 1711736

Run Date: 10/24/2017 15:40

Prep Date: 10/24/2017 06:59

Data File: s102417a.s\3j2414.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: MSD3.I
Analyst: JLD1
Aliquot: 1000 mL
Column: DB-5ms

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	70.7	100	ug/L 71	(32%-124%)
2-Fluorobiphenyl	36.8	50.0	ug/L 74	(32%-112%)
2-Fluorophenol	38.2	100	ug/L 38	(15%-88%)
Nitrobenzene-d5	43.6	50.0	ug/L 87	(36%-115%)
Phenol-d5	26.4	100	ug/L 26	(15%-91%)
p-Terphenyl-d14	47.8	50.0	ug/L 96	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	2.114	4.59	ug/L	0	J
000067-66-3	Trichloromethane	2.216	90	ug/L	97	NJ
000056-23-5	Carbon Tetrachloride	2.451	7.5	ug/L	90	NJ

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

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SDG Number: 2018-510

Lab Sample ID: 1203901987

Client Sample: QC for batch 1711735

Client ID: LCS for batch 1711735

Batch ID: 1711736

Run Date: 10/24/2017 16:09

Prep Date: 10/24/2017 06:59

Data File: s102417a.s\sj2415.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: MSD3.I
Analyst: JLD1
Aliquot: 1000 mL
Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		44.9	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		36.9	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		37.8	ug/L	3.00	10.0
122-66-7	Azobenzene		41.4	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		36.2	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		36.4	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		25.9	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		39.1	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		39.9	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		42.4	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		39.2	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		29.9	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		40.1	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		56.3	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		51.3	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		42.4	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		36.6	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		43.8	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		38.6	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		39.6	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		64.4	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		43.3	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		40.4	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		50.0	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		49.5	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		15.5	ug/L	3.00	10.0
83-32-9	Acenaphthene		44.9	ug/L	0.300	1.00
208-96-8	Acenaphthylene		44.8	ug/L	0.300	1.00
62-53-3	Aniline		36.6	ug/L	4.20	10.0
120-12-7	Anthracene		46.9	ug/L	0.300	1.00
1912-24-9	Atrazine		51.4	ug/L	3.00	10.0
92-87-5	Benzidine	E	139	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		46.5	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		46.0	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		46.5	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		39.6	ug/L	0.300	1.00

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-510

Lab Sample ID: 1203901987

Client Sample: QC for batch 1711735

Client ID: LCS for batch 1711735

Batch ID: 1711736

Run Date: 10/24/2017 16:09

Prep Date: 10/24/2017 06:59

Data File: s102417a.s\sj2415.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD3.I

Analyst: JLD1

Aliquot: 1000 mL

Column: DB-5ms

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		46.2	ug/L	0.300	1.00
65-85-0	Benzoic acid		27.5	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		32.6	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		46.8	ug/L	3.00	10.0
218-01-9	Chrysene		46.0	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		50.5	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		48.9	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		41.2	ug/L	0.300	1.00
132-64-9	Dibenzofuran		45.5	ug/L	3.00	10.0
84-66-2	Diethylphthalate		51.2	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		48.9	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		44.3	ug/L	3.00	10.0
206-44-0	Fluoranthene		53.4	ug/L	0.300	1.00
86-73-7	Fluorene		48.2	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		42.4	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		32.0	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		26.6	ug/L	3.00	10.0
67-72-1	Hexachloroethane		31.8	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		43.6	ug/L	0.300	1.00
78-59-1	Isophorone		40.7	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		22.8	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		43.3	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		42.1	ug/L	3.00	10.0
91-20-3	Naphthalene		38.6	ug/L	0.300	1.00
98-95-3	Nitrobenzene		39.6	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		41.7	ug/L	3.00	10.0
85-01-8	Phenanthrene		46.9	ug/L	0.300	1.00
108-95-2	Phenol		14.5	ug/L	3.00	10.0
129-00-0	Pyrene		43.8	ug/L	0.300	1.00
110-86-1	Pyridine		23.7	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		43.5	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		39.7	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		40.3	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		44.4	ug/L	3.00	10.0

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

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SDG Number: 2018-510	Matrix: WATER
Lab Sample ID: 1203901987	
Client Sample: QC for batch 1711735	Client: ARSL004
Client ID: LCS for batch 1711735	Method: SW846 3510C/8270D
Batch ID: 1711736	Inst: MSD3.I
Run Date: 10/24/2017 16:09	Analyst: JLD1
Prep Date: 10/24/2017 06:59	Aliquot: 1000 mL
Data File: s102417a.s\s3j2415.D	Column: DB-5ms
	Project: QC
	SOP Ref: GL-OA-E-009
	Dilution: 1
	Inj. Vol: 1 uL
	Final Volume: 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		32.6	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		58.7	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		31.4	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		45.6	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		55.6	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	88.8	100	ug/L	89	(32%-124%)
2-Fluorobiphenyl	39.2	50.0	ug/L	78	(32%-112%)
2-Fluorophenol	40.6	100	ug/L	41	(15%-88%)
Nitrobenzene-d5	37.1	50.0	ug/L	74	(36%-115%)
Phenol-d5	27.6	100	ug/L	28	(15%-91%)
p-Terphenyl-d14	44.2	50.0	ug/L	88	(36%-121%)

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

Page 1 of 3

SDG Number: 2018-510
Lab Sample ID: 1203901988
Client Sample: QC for batch 1711735
Client ID: CAMO-18-147679MS
Batch ID: 1711736
Run Date: 10/24/2017 19:06
Prep Date: 10/24/2017 06:59
Data File: s102417a.s\sj2421.D

Date Collected: 10/17/2017 12:54
Date Received: 10/19/2017 08:55
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD3.I
Analyst: JLD1
Aliquot: 430 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		96.5	ug/L	6.98	23.3
120-82-1	1,2,4-Trichlorobenzene		76.0	ug/L	6.98	23.3
95-50-1	1,2-Dichlorobenzene		77.6	ug/L	6.98	23.3
122-66-7	Azobenzene		92.6	ug/L	6.98	23.3
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		73.2	ug/L	6.98	23.3
106-46-7	1,4-Dichlorobenzene		74.0	ug/L	6.98	23.3
123-91-1	1,4-Dioxane		67.9	ug/L	6.98	23.3
90-12-0	1-Methylnaphthalene		84.4	ug/L	0.698	2.33
58-90-2	2,3,4,6-Tetrachlorophenol		97.7	ug/L	6.98	23.3
95-95-4	2,4,5-Trichlorophenol		102	ug/L	6.98	23.3
88-06-2	2,4,6-Trichlorophenol		102	ug/L	6.98	23.3
120-83-2	2,4-Dichlorophenol		93.8	ug/L	6.98	23.3
105-67-9	2,4-Dimethylphenol		74.1	ug/L	6.98	23.3
51-28-5	2,4-Dinitrophenol		100	ug/L	11.6	46.5
121-14-2	2,4-Dinitrotoluene		132	ug/L	6.98	23.3
606-20-2	2,6-Dinitrotoluene		121	ug/L	6.98	23.3
91-58-7	2-Chloronaphthalene		93.4	ug/L	0.953	2.33
95-57-8	2-Chlorophenol		86.8	ug/L	6.98	23.3
534-52-1	2-Methyl-4,6-dinitrophenol		104	ug/L	6.98	23.3
91-57-6	2-Methylnaphthalene		83.0	ug/L	0.698	2.33
88-75-5	2-Nitrophenol		92.0	ug/L	6.98	23.3
91-94-1	3,3'-Dichlorobenzidine		150	ug/L	6.98	23.3
101-55-3	4-Bromophenylphenylether		98.9	ug/L	6.98	23.3
59-50-7	Parachlorometa cresol		100	ug/L	6.98	23.3
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		109	ug/L	7.67	23.3
7005-72-3	4-Chlorophenylphenylether		113	ug/L	6.98	23.3
100-02-7	4-Nitrophenol		55.8	ug/L	6.98	23.3
83-32-9	Acenaphthene		103	ug/L	0.698	2.33
208-96-8	Acenaphthylene		103	ug/L	0.698	2.33
62-53-3	Aniline		79.1	ug/L	9.77	23.3
120-12-7	Anthracene		106	ug/L	0.698	2.33
1912-24-9	Atrazine		117	ug/L	6.98	23.3
92-87-5	Benzidine	E	259	ug/L	9.07	23.3
56-55-3	Benzo(a)anthracene		109	ug/L	0.698	2.33
50-32-8	Benzo(a)pyrene		108	ug/L	0.698	2.33
205-99-2	Benzo(b)fluoranthene		111	ug/L	0.698	2.33
191-24-2	Benzo(ghi)perylene		83.2	ug/L	0.698	2.33

**Semi-Volatile
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Sample Summary**

SDG Number: 2018-510	Date Collected: 10/17/2017 12:54	Matrix: W
Lab Sample ID: 1203901988	Date Received: 10/19/2017 08:55	
Client Sample: QC for batch 1711735	Client: ARSL004	Project: QC
Client ID: CAMO-18-147679MS	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1711736	Inst: MSD3.I	Dilution: 1
Run Date: 10/24/2017 19:06	Analyst: JLD1	Inj. Vol: 1 uL
Prep Date: 10/24/2017 06:59	Aliquot: 430 mL	Final Volume: 1 mL
Data File: s102417a.s\3j2421.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		113	ug/L	0.698	2.33
65-85-0	Benzoic acid		87.1	ug/L	14.0	46.5
100-51-6	Benzyl alcohol		83.4	ug/L	6.98	23.3
85-68-7	Butylbenzylphthalate		108	ug/L	6.98	23.3
218-01-9	Chrysene		108	ug/L	0.698	2.33
84-74-2	Di-n-butylphthalate		116	ug/L	6.98	23.3
117-84-0	Di-n-octylphthalate		116	ug/L	6.98	23.3
53-70-3	Dibenzo(a,h)anthracene		88.6	ug/L	0.698	2.33
132-64-9	Dibenzofuran		106	ug/L	6.98	23.3
84-66-2	Diethylphthalate		122	ug/L	6.98	23.3
131-11-3	Dimethylphthalate		115	ug/L	6.98	23.3
88-85-7	Dinoseb	U	6.98	ug/L	6.98	23.3
122-39-4	Diphenylamine		102	ug/L	6.98	23.3
206-44-0	Fluoranthene		125	ug/L	0.698	2.33
86-73-7	Fluorene		110	ug/L	0.698	2.33
118-74-1	Hexachlorobenzene		98.8	ug/L	6.98	23.3
87-68-3	Hexachlorobutadiene		73.8	ug/L	6.98	23.3
77-47-4	Hexachlorocyclopentadiene		56.8	ug/L	6.98	23.3
67-72-1	Hexachloroethane		66.5	ug/L	6.98	23.3
193-39-5	Indeno(1,2,3-cd)pyrene		93.2	ug/L	0.698	2.33
78-59-1	Isophorone		93.0	ug/L	8.14	23.3
62-75-9	N-Methyl-N-nitrosomethylamine		63.9	ug/L	6.98	23.3
924-16-3	N-Nitrosodi-n-butylamine	U	6.98	ug/L	6.98	23.3
55-18-5	N-Nitrosodiethylamine	U	6.98	ug/L	6.98	23.3
621-64-7	N-Nitrosodi--n-propylamine		101	ug/L	6.98	23.3
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		103	ug/L	6.98	23.3
91-20-3	Naphthalene		82.8	ug/L	0.698	2.33
98-95-3	Nitrobenzene		91.0	ug/L	6.98	23.3
608-93-5	Pentachlorobenzene	U	6.98	ug/L	6.98	23.3
87-86-5	Pentachlorophenol		103	ug/L	6.98	23.3
85-01-8	Phenanthrene		108	ug/L	0.698	2.33
108-95-2	Phenol		49.1	ug/L	6.98	23.3
129-00-0	Pyrene		98.7	ug/L	0.698	2.33
110-86-1	Pyridine		56.5	ug/L	6.98	23.3
108-60-1	bis(2-Chloro-1-methylethyl)ether		95.8	ug/L	6.98	23.3
111-91-1	bis(2-Chloroethoxy)methane		92.4	ug/L	6.98	23.3
111-44-4	bis(2-Chloroethyl) ether		90.0	ug/L	6.98	23.3
117-81-7	bis(2-Ethylhexyl)phthalate		104	ug/L	6.98	23.3

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Sample Summary**

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SDG Number: 2018-510	Date Collected: 10/17/2017 12:54	Matrix: W
Lab Sample ID: 1203901988	Date Received: 10/19/2017 08:55	
Client Sample: QC for batch 1711735	Client: ARSL004	Project: QC
Client ID: CAMO-18-147679MS	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1711736	Inst: MSD3.I	Dilution: 1
Run Date: 10/24/2017 19:06	Analyst: JLD1	Inj. Vol: 1 uL
Prep Date: 10/24/2017 06:59	Aliquot: 430 mL	Final Volume: 1 mL
Data File: s102417a.s\3j2421.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		88.5	ug/L	8.60	23.3
99-09-2	3-Nitroaniline		135	ug/L	6.98	23.3
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		82.6	ug/L	6.98	23.3
88-74-4	2-Nitroaniline		106	ug/L	6.98	23.3
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		133	ug/L	6.98	23.3
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	218	233	ug/L	94 (32%-124%)
2-Fluorobiphenyl	84.3	116	ug/L	73 (32%-112%)
2-Fluorophenol	114	233	ug/L	49 (15%-88%)
Nitrobenzene-d5	81.9	116	ug/L	70 (36%-115%)
Phenol-d5	93.9	233	ug/L	40 (15%-91%)
p-Terphenyl-d14	102	116	ug/L	87 (36%-121%)

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-510	Date Collected: 10/17/2017 12:54	Matrix: W
Lab Sample ID: 1203901989	Date Received: 10/19/2017 08:55	
Client Sample: QC for batch 1711735	Client: ARSL004	Project: QC
Client ID: CAMO-18-147679MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1711736	Inst: MSD3.I	Dilution: 1
Run Date: 10/24/2017 19:36	Analyst: JLD1	Inj. Vol: 1 uL
Prep Date: 10/24/2017 06:59	Aliquot: 430 mL	Final Volume: 1 mL
Data File: s102417a.s\sj2422.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		85.8	ug/L	6.98	23.3
120-82-1	1,2,4-Trichlorobenzene		70.0	ug/L	6.98	23.3
95-50-1	1,2-Dichlorobenzene		70.9	ug/L	6.98	23.3
122-66-7	Azobenzene		84.6	ug/L	6.98	23.3
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		67.3	ug/L	6.98	23.3
106-46-7	1,4-Dichlorobenzene		67.6	ug/L	6.98	23.3
123-91-1	1,4-Dioxane		64.7	ug/L	6.98	23.3
90-12-0	1-Methylnaphthalene		76.9	ug/L	0.698	2.33
58-90-2	2,3,4,6-Tetrachlorophenol		85.7	ug/L	6.98	23.3
95-95-4	2,4,5-Trichlorophenol		93.0	ug/L	6.98	23.3
88-06-2	2,4,6-Trichlorophenol		93.8	ug/L	6.98	23.3
120-83-2	2,4-Dichlorophenol		86.0	ug/L	6.98	23.3
105-67-9	2,4-Dimethylphenol		67.3	ug/L	6.98	23.3
51-28-5	2,4-Dinitrophenol		89.7	ug/L	11.6	46.5
121-14-2	2,4-Dinitrotoluene		119	ug/L	6.98	23.3
606-20-2	2,6-Dinitrotoluene		110	ug/L	6.98	23.3
91-58-7	2-Chloronaphthalene		81.6	ug/L	0.953	2.33
95-57-8	2-Chlorophenol		80.9	ug/L	6.98	23.3
534-52-1	2-Methyl-4,6-dinitrophenol		94.1	ug/L	6.98	23.3
91-57-6	2-Methylnaphthalene		75.4	ug/L	0.698	2.33
88-75-5	2-Nitrophenol		87.4	ug/L	6.98	23.3
91-94-1	3,3'-Dichlorobenzidine		134	ug/L	6.98	23.3
101-55-3	4-Bromophenylphenylether		88.6	ug/L	6.98	23.3
59-50-7	Parachlorometa cresol		91.0	ug/L	6.98	23.3
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		99.3	ug/L	7.67	23.3
7005-72-3	4-Chlorophenylphenylether		99.7	ug/L	6.98	23.3
100-02-7	4-Nitrophenol		46.8	ug/L	6.98	23.3
83-32-9	Acenaphthene		90.8	ug/L	0.698	2.33
208-96-8	Acenaphthylene		91.2	ug/L	0.698	2.33
62-53-3	Aniline		71.3	ug/L	9.77	23.3
120-12-7	Anthracene		97.7	ug/L	0.698	2.33
1912-24-9	Atrazine		107	ug/L	6.98	23.3
92-87-5	Benzidine		170	ug/L	9.07	23.3
56-55-3	Benzo(a)anthracene		98.9	ug/L	0.698	2.33
50-32-8	Benzo(a)pyrene		97.0	ug/L	0.698	2.33
205-99-2	Benzo(b)fluoranthene		98.2	ug/L	0.698	2.33
191-24-2	Benzo(ghi)perylene		84.4	ug/L	0.698	2.33

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-510	Date Collected: 10/17/2017 12:54	Matrix: W
Lab Sample ID: 1203901989	Date Received: 10/19/2017 08:55	
Client Sample: QC for batch 1711735	Client: ARSL004	Project: QC
Client ID: CAMO-18-147679MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1711736	Inst: MSD3.I	Dilution: 1
Run Date: 10/24/2017 19:36	Analyst: JLD1	Inj. Vol: 1 uL
Prep Date: 10/24/2017 06:59	Aliquot: 430 mL	Final Volume: 1 mL
Data File: s102417a.s\sj2422.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		99.7	ug/L	0.698	2.33
65-85-0	Benzoic acid		77.6	ug/L	14.0	46.5
100-51-6	Benzyl alcohol		76.0	ug/L	6.98	23.3
85-68-7	Butylbenzylphthalate		96.8	ug/L	6.98	23.3
218-01-9	Chrysene		98.0	ug/L	0.698	2.33
84-74-2	Di-n-butylphthalate		105	ug/L	6.98	23.3
117-84-0	Di-n-octylphthalate		107	ug/L	6.98	23.3
53-70-3	Dibenzo(a,h)anthracene		88.3	ug/L	0.698	2.33
132-64-9	Dibenzofuran		93.0	ug/L	6.98	23.3
84-66-2	Diethylphthalate		110	ug/L	6.98	23.3
131-11-3	Dimethylphthalate		106	ug/L	6.98	23.3
88-85-7	Dinoseb	U	6.98	ug/L	6.98	23.3
122-39-4	Diphenylamine		93.4	ug/L	6.98	23.3
206-44-0	Fluoranthene		113	ug/L	0.698	2.33
86-73-7	Fluorene		97.9	ug/L	0.698	2.33
118-74-1	Hexachlorobenzene		89.2	ug/L	6.98	23.3
87-68-3	Hexachlorobutadiene		68.3	ug/L	6.98	23.3
77-47-4	Hexachlorocyclopentadiene		49.8	ug/L	6.98	23.3
67-72-1	Hexachloroethane		60.1	ug/L	6.98	23.3
193-39-5	Indeno(1,2,3-cd)pyrene		92.7	ug/L	0.698	2.33
78-59-1	Isophorone		88.7	ug/L	8.14	23.3
62-75-9	N-Methyl-N-nitrosomethylamine		59.5	ug/L	6.98	23.3
924-16-3	N-Nitrosodi-n-butylamine	U	6.98	ug/L	6.98	23.3
55-18-5	N-Nitrosodiethylamine	U	6.98	ug/L	6.98	23.3
621-64-7	N-Nitrosodi--n-propylamine		92.6	ug/L	6.98	23.3
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		92.9	ug/L	6.98	23.3
91-20-3	Naphthalene		76.5	ug/L	0.698	2.33
98-95-3	Nitrobenzene		85.0	ug/L	6.98	23.3
608-93-5	Pentachlorobenzene	U	6.98	ug/L	6.98	23.3
87-86-5	Pentachlorophenol		90.7	ug/L	6.98	23.3
85-01-8	Phenanthrene		95.9	ug/L	0.698	2.33
108-95-2	Phenol		42.4	ug/L	6.98	23.3
129-00-0	Pyrene		86.9	ug/L	0.698	2.33
110-86-1	Pyridine		45.4	ug/L	6.98	23.3
108-60-1	bis(2-Chloro-1-methylethyl)ether		89.4	ug/L	6.98	23.3
111-91-1	bis(2-Chloroethoxy)methane		86.3	ug/L	6.98	23.3
111-44-4	bis(2-Chloroethyl) ether		85.4	ug/L	6.98	23.3
117-81-7	bis(2-Ethylhexyl)phthalate		94.4	ug/L	6.98	23.3

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Sample Summary**

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SDG Number: 2018-510	Date Collected: 10/17/2017 12:54	Matrix: W
Lab Sample ID: 1203901989	Date Received: 10/19/2017 08:55	
Client Sample: QC for batch 1711735	Client: ARSL004	Project: QC
Client ID: CAMO-18-147679MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1711736	Inst: MSD3.I	Dilution: 1
Run Date: 10/24/2017 19:36	Analyst: JLD1	Inj. Vol: 1 uL
Prep Date: 10/24/2017 06:59	Aliquot: 430 mL	Final Volume: 1 mL
Data File: s102417a.s\s3j2422.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		80.0	ug/L	8.60	23.3
99-09-2	3-Nitroaniline		119	ug/L	6.98	23.3
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		74.2	ug/L	6.98	23.3
88-74-4	2-Nitroaniline		96.2	ug/L	6.98	23.3
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		116	ug/L	6.98	23.3
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	188	233	ug/L	81 (32%-124%)
2-Fluorobiphenyl	74.9	116	ug/L	64 (32%-112%)
2-Fluorophenol	102	233	ug/L	44 (15%-88%)
Nitrobenzene-d5	77.2	116	ug/L	66 (36%-115%)
Phenol-d5	80.6	233	ug/L	35 (15%-91%)
p-Terphenyl-d14	90.7	116	ug/L	78 (36%-121%)

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-510
Work Order #: 435630**

Method/Analysis Information

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

Analytical Method: SW-846:6850

Prep Method: SW-846:6850

Analytical Batch Number: 1713226

Prep Batch Number: 1713223

Sample Analysis

Sample ID	Client ID
435630001	435630001 (CAPA-18-147560)
435630004	435630004 (CAPA-18-147561)
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

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Qualifier Definition Report for

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

Client SDG: 2018-510 GEL Work Order: 435630

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-18-147560Date Received: 20-OCT-17GEL Job No (SDG): 2018-510GEL Sample ID: 435630001Date 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	0.340	ug/L		1	26-OCT-17 18:54	per1026018a
	Perchlorate Isotope Ratio			2.93			1	26-OCT-17 18:54	per1026018a
14797-73-0	Perchlorate-101	.05	.2	0.350	ug/L		1	26-OCT-17 18:54	per1026018a
	Perchlorate-O(18)			0.491	ug/L		1	26-OCT-17 18:54	per1026018a

^ 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-18-147561Date Received: 20-OCT-17GEL Job No (SDG): 2018-510GEL Sample ID: 435630004Date 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	0.358	ug/L		1	26-OCT-17 19:25	per1026021a
	Perchlorate Isotope Ratio			2.98			1	26-OCT-17 19:25	per1026021a
14797-73-0	Perchlorate-101	.05	.2	0.362	ug/L		1	26-OCT-17 19:25	per1026021a
	Perchlorate-O(18)			0.505	ug/L		1	26-OCT-17 19:25	per1026021a

^ 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): 2018-510

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): 2018-510

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): 2018-510GEL 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): 2018-510GEL 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): 2018-510GEL 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): 2018-510GEL 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): 2018-510GEL 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 =

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

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-510
Work Order #: 435630

Sample ID	Client ID
435630001	CAPA-18-147560
435630002	CAPA-18-147586
435630004	CAPA-18-147561
435630005	CAPA-18-147587
1203901497	Method Blank (MB) ICP
1203901498	Laboratory Control Sample (LCS)
1203901501	435630001(CAPA-18-147560L) Serial Dilution (SD)
1203901499	435630001(CAPA-18-147560D) Sample Duplicate (DUP)
1203901500	435630001(CAPA-18-147560S) Matrix Spike (MS)
1203901526	Method Blank (MB) ICP-MS
1203901527	Laboratory Control Sample (LCS)
1203901530	435630001(CAPA-18-147560L) Serial Dilution (SD)
1203901528	435630001(CAPA-18-147560D) Sample Duplicate (DUP)
1203901529	435630001(CAPA-18-147560S) Matrix Spike (MS)
1203913624	Method Blank (MB) CVAA
1203913625	Laboratory Control Sample (LCS)
1203913628	435630001(CAPA-18-147560L) Serial Dilution (SD)
1203913626	435630001(CAPA-18-147560D) Sample Duplicate (DUP)
1203913627	435630001(CAPA-18-147560S) Matrix Spike (MS)

Sample Analysis

Samples 435630001,002,004 and 005 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1711521, 1711535, 1716437 and 1719596
Prep Batch :	1711520, 1711534 and 1716435
Standard Operating Procedures:	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
Analytical Method:	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
Prep Method :	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 CaCO₃ 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 CRDL/PQL standard recoveries met the referenced advisory control limits.

ICSA/ICSAB Statement

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

Continuing Calibration Blanks (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 435630001 (CAPA-18-147560)-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

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Qualifier Definition Report for

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

Client SDG: 2018-510 GEL Work Order: 435630

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: 16 NOV 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-510**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435630001**BASIS:** As Received**DATE COLLECTED** 18-OCT-17**CLIENT ID:** CAPA-18-147560**LEVEL:** Low**DATE RECEIVED** 20-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	11/08/17 11:08	110817W2-6	1716437

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-510

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 435630001

BASIS: As Received

DATE COLLECTED 18-OCT-17

CLIENT ID: CAPA-18-147560

LEVEL: Low

DATE RECEIVED 20-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	11/13/17 18:05	111317-1	1711521
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/24/17 08:17	171023-4	1711535
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	10/24/17 08:17	171023-4	1711535
7440-39-3	Barium	16.6	ug/L		1	5	5	1	P	HSC	11/13/17 18:05	111317-1	1711521
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/13/17 18:05	111317-1	1711521
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	11/13/17 18:05	111317-1	1711521
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/24/17 08:17	171023-4	1711535
7440-70-2	Calcium	12400	ug/L		50	200	200	1	P	HSC	11/13/17 18:05	111317-1	1711521
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/24/17 13:30	171024-5	1711535
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/13/17 18:05	111317-1	1711521
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/13/17 18:05	111317-1	1711521
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	11/13/17 18:05	111317-1	1711521
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/24/17 08:17	171023-4	1711535
7439-95-4	Magnesium	3780	ug/L		110	300	300	1	P	HSC	11/13/17 18:05	111317-1	1711521
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	11/13/17 18:05	111317-1	1711521
7439-98-7	Molybdenum	1.69	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/24/17 08:17	171023-4	1711535
7440-02-0	Nickel	0.954	ug/L	J	0.6	2	2	1	MS	BAJ	10/24/17 13:30	171024-5	1711535
7440-09-7	Potassium	1630	ug/L		50	150	150	1	P	HSC	11/15/17 15:20	111517-3	1711521
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/24/17 08:17	171023-4	1711535
7631-86-9	Silica	62600	ug/L		53	213	213	1	P	HSC	11/13/17 18:05	111317-1	1711521
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/24/17 08:17	171023-4	1711535
7440-23-5	Sodium	11600	ug/L		100	300	300	1	P	HSC	11/15/17 15:20	111517-3	1711521
7440-24-6	Strontium	57.6	ug/L		1	5	5	1	P	HSC	11/15/17 12:04	111517-2	1711521
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/24/17 08:17	171023-4	1711535
7440-31-5	Tin	2.61	ug/L	J	2.5	10	10	1	P	HSC	11/13/17 18:05	111317-1	1711521
7440-61-1	Uranium	0.537	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/24/17 08:17	171023-4	1711535
7440-62-2	Vanadium	4.64	ug/L	J	1	5	5	1	P	HSC	11/13/17 18:05	111317-1	1711521
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	11/15/17 12:04	111517-2	1711521

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-510**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 435630001**BASIS:** As Received**DATE COLLECTED** 18-OCT-17**CLIENT ID:** CAPA-18-147560**LEVEL:** Low**DATE RECEIVED** 20-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	46.6	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
1711521	1711520	SW846 3005A	50	mL	50	mL	10/23/17	SXW1
1711535	1711534	SW846 3005A	50	mL	50	mL	10/23/17	SXW1
1716437	1716435	EPA 245.1/245.2 Prep	20	mL	20	mL	11/07/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-510**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435630002**BASIS:** As Received**DATE COLLECTED** 18-OCT-17**CLIENT ID:** CAPA-18-147586**LEVEL:** Low**DATE RECEIVED** 20-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	11/08/17 11:16	110817W2-6	1716437

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1716437	1716435	EPA 245.1/245.2 Prep	20	mL	20	mL	11/07/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-510**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435630004**BASIS:** As Received**DATE COLLECTED** 18-OCT-17**CLIENT ID:** CAPA-18-147561**LEVEL:** Low**DATE RECEIVED** 20-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	11/08/17 11:18	110817W2-6	1716437

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-510

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 435630004

BASIS: As Received

DATE COLLECTED 18-OCT-17

CLIENT ID: CAPA-18-147561

LEVEL: Low

DATE RECEIVED 20-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	11/13/17 18:24	111317-1	1711521
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/24/17 08:44	171023-4	1711535
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	10/24/17 08:44	171023-4	1711535
7440-39-3	Barium	20.6	ug/L		1	5	5	1	P	HSC	11/13/17 18:24	111317-1	1711521
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/13/17 18:24	111317-1	1711521
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	11/13/17 18:24	111317-1	1711521
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/24/17 08:44	171023-4	1711535
7440-70-2	Calcium	12400	ug/L		50	200	200	1	P	HSC	11/13/17 18:24	111317-1	1711521
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/24/17 13:43	171024-5	1711535
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/13/17 18:24	111317-1	1711521
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/13/17 18:24	111317-1	1711521
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	11/13/17 18:24	111317-1	1711521
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/24/17 08:44	171023-4	1711535
7439-95-4	Magnesium	3480	ug/L		110	300	300	1	P	HSC	11/13/17 18:24	111317-1	1711521
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	11/13/17 18:24	111317-1	1711521
7439-98-7	Molybdenum	1.44	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/24/17 08:44	171023-4	1711535
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/24/17 13:43	171024-5	1711535
7440-09-7	Potassium	1350	ug/L		50	150	150	1	P	HSC	11/15/17 15:39	111517-3	1711521
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/24/17 08:44	171023-4	1711535
7631-86-9	Silica	63200	ug/L		53	213	213	1	P	HSC	11/13/17 18:24	111317-1	1711521
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/24/17 08:44	171023-4	1711535
7440-23-5	Sodium	9220	ug/L		100	300	300	1	P	HSC	11/15/17 15:39	111517-3	1711521
7440-24-6	Strontium	57	ug/L		1	5	5	1	P	HSC	11/15/17 12:23	111517-2	1711521
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/24/17 08:44	171023-4	1711535
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	11/13/17 18:24	111317-1	1711521
7440-61-1	Uranium	0.350	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/24/17 08:44	171023-4	1711535
7440-62-2	Vanadium	4.78	ug/L	J	1	5	5	1	P	HSC	11/13/17 18:24	111317-1	1711521
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	11/15/17 12:23	111517-2	1711521

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-510**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 435630004**BASIS:** As Received**DATE COLLECTED** 18-OCT-17**CLIENT ID:** CAPA-18-147561**LEVEL:** Low**DATE RECEIVED** 20-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	45.4	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
1711521	1711520	SW846 3005A	50	mL	50	mL	10/23/17	SXW1
1711535	1711534	SW846 3005A	50	mL	50	mL	10/23/17	SXW1
1716437	1716435	EPA 245.1/245.2 Prep	20	mL	20	mL	11/07/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-510**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435630005**BASIS:** As Received**DATE COLLECTED** 18-OCT-17**CLIENT ID:** CAPA-18-147587**LEVEL:** Low**DATE RECEIVED** 20-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	11/08/17 11:23	110817W2-6	1716437

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1716437	1716435	EPA 245.1/245.2 Prep	20	mL	20	mL	11/07/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2018-510
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>
1203901497								
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Aluminum	68	ug/L	+/-200	U	P	68	200
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	165	ug/L	+/-300	J	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
1203901526								
	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
1203913624								
	Mercury	-0.084	ug/L	+/-0.2	J	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. 2018-510

Client ID: CAPA-18-147560S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 435630001

Spike ID: 1203901500

<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	4700		68	U	5000	92.9		P
Barium	ug/L	75-125	497		16.6		500	96		P
Beryllium	ug/L	75-125	487		1	U	500	97.4		P
Boron	ug/L	75-125	514		15	U	500	100		P
Calcium	ug/L	75-125	17100		12400		5000	94.8		P
Cobalt	ug/L	75-125	493		1	U	500	98.7		P
Copper	ug/L	75-125	483		3	U	500	96.7		P
Iron	ug/L	75-125	4710		30	U	5000	93.9		P
Magnesium	ug/L	75-125	8680		3780		5000	98		P
Manganese	ug/L	75-125	480		2	U	500	95.8		P
Potassium	ug/L	75-125	6280		1630		5000	93		P
Silica	ug/L		71900		62600		10700	86.6	N/A	P
Sodium	ug/L	75-125	15600		11600		5000	81.2		P
Strontium	ug/L	75-125	557		57.6		500	99.8		P
Tin	ug/L	75-125	498		2.61	J	500	99		P
Vanadium	ug/L	75-125	488		4.64	J	500	96.7		P
Zinc	ug/L	75-125	442		3.3	U	500	88.1		P

*Analytical Methods:

P

SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-510

Client ID: CAPA-18-147560S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 435630001

Spike ID: 1203901529

<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	47.6		1	U	50	94.5		MS
Arsenic	ug/L	75-125	49.4		2	U	50	95.1		MS
Cadmium	ug/L	75-125	49		0.3	U	50	97.9		MS
Chromium	ug/L	75-125	49		3	U	50	93.5		MS
Lead	ug/L	75-125	48.3		0.5	U	50	96.4		MS
Molybdenum	ug/L	75-125	51.2		1.69		50	99.1		MS
Nickel	ug/L	75-125	48.3		0.954	J	50	94.7		MS
Selenium	ug/L	75-125	49.9		2	U	50	98		MS
Silver	ug/L	75-125	50		0.3	U	50	100		MS
Thallium	ug/L	75-125	46.8		0.6	U	50	93.5		MS
Uranium	ug/L	75-125	47.5		0.537		50	94		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-510

Client ID: CAPA-18-147560S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 435630001

Spike ID: 1203913627

<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	2.07		0.067	U	2	103		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 2018-510

Lab Code: GEL

Contract: ESHL00114

Client ID: CAPA-18-147560D

Matrix: WATER

Level: Low

Sample ID: 435630001

Duplicate ID: 1203901499

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	16.6		16.7		.774		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	12400		12500		.627		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	3780		3770		.381		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1630		1690		3.53		P
Silica	ug/L	+/-20%	62600		63400		1.29		P
Sodium	ug/L	+/-20%	11600		10500		9.54		P
Strontium	ug/L	+/-20%	57.6		57.3		.482		P
Tin	ug/L		2.61 J		2.5 U		200		P
Vanadium	ug/L	+/-5	4.64 J		4.45 J		4.16		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
–6–
Duplicate Sample Summary

SDG No.: 2018–510

Lab Code: GEL

Contract: ESHL00114

Client ID: CAPA–18–147560D

Matrix: WATER

Level: Low

Sample ID: 435630001

Duplicate ID: 1203901528

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		2 U		2 U				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	+/- .5	1.69		1.88		10.8		MS
Nickel	ug/L	+/- 2	0.954 J		1.01 J		5.7		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	0.537		0.603		11.6		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
–6–
Duplicate Sample Summary

SDG No.: 2018–510**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAPA–18–147560D**Matrix:** WATER**Level:** Low**Sample ID:** 435630001**Duplicate ID:** 1203913626**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. 2018-510

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>
1203901498								
	Aluminum	ug/L	5000	4790		95.8	80-120	P
	Barium	ug/L	500	486		97.2	80-120	P
	Beryllium	ug/L	500	486		97.2	80-120	P
	Boron	ug/L	500	496		99.3	80-120	P
	Calcium	ug/L	5000	4910		98.1	80-120	P
	Cobalt	ug/L	500	497		99.3	80-120	P
	Copper	ug/L	500	475		95.1	80-120	P
	Iron	ug/L	5000	4700		94	80-120	P
	Magnesium	ug/L	5000	5080		102	80-120	P
	Manganese	ug/L	500	486		97.2	80-120	P
	Potassium	ug/L	5000	4780		95.6	80-120	P
	Silica	ug/L	10700	9780		91.4	80-120	P
	Sodium	ug/L	5000	4770		95.3	80-120	P
	Strontium	ug/L	500	498		99.5	80-120	P
	Tin	ug/L	500	490		98	80-120	P
	Vanadium	ug/L	500	482		96.3	80-120	P
	Zinc	ug/L	500	446		89.2	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2018-510

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>
1203901527								
	Thallium	ug/L	50	50.2		100	80-120	MS
	Uranium	ug/L	50	49.7		99.5	80-120	MS
	Antimony	ug/L	50	49		98.1	80-120	MS
	Arsenic	ug/L	50	51.1		102	80-120	MS
	Cadmium	ug/L	50	53.5		107	80-120	MS
	Chromium	ug/L	50	48.2		96.4	80-120	MS
	Lead	ug/L	50	52		104	80-120	MS
	Molybdenum	ug/L	50	52		104	80-120	MS
	Nickel	ug/L	50	49.1		98.2	80-120	MS
	Selenium	ug/L	50	54.2		108	80-120	MS
	Silver	ug/L	50	52.8		106	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2018-510

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>
1203913625	Mercury	ug/L	2	2.04		102	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2018-510

Client ID: CAPA-18-147560L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 435630001

Serial Dilution ID: 1203901501

<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	16.6		17.9	J	7.86			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	12400		12800		3.457		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3780		3980		5.162			P
Manganese	2	U	10	U				P
Potassium	1630		1700		3.787			P
Silica	62600		63400		1.169		10	P
Sodium	11600		11000		5.113		10	P
Strontium	57.6		60.5		5.146		10	P
Tin	2.61	J	12.5	U	41.427			P
Vanadium	4.64	J	6.55	J	41.139			P
Zinc	3.3	U	32.8	J				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2018-510

Client ID: CAPA-18-147560L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 435630001

Serial Dilution ID: 1203901530

<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	U	10	U				MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.69		1.59	J	5.991			MS
Nickel	.954	J	3	U	8.281			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.537		.52	J	3.166			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2018-510 **Client ID:** CAPA-18-147560L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 435630001 **Serial Dilution ID:** 1203913628

<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 #: 2018-510
Work Order #: 435630**

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:

Sample ID	Client ID
435630002	CAPA-18-147586
435630005	CAPA-18-147587
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

Product:	Cyanide and Total		
Analytical Batch:	1711667	Method:	WSP-CN(T)
Prep Batch :	1711666	Method:	EPA 335.4

Sample Analysis

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

Sample ID	Client ID
435630002	CAPA-18-147586
435630005	CAPA-18-147587
1203901839	Method Blank (MB)
1203901840	Laboratory Control Sample (LCS)
1203901841	435630002(CAPA-18-147586) Sample Duplicate (DUP)
1203901843	435630002(CAPA-18-147586) 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.

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 435630002 (CAPA-18-147586) 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

Samples 1203901840 (LCS) and 435630002 (CAPA-18-147586) were 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:

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Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1711920

Method: WSP-ANIONS

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:300.0:

Sample ID	Client ID
435630001	CAPA-18-147560
435630004	CAPA-18-147561
1203902540	Method Blank (MB)
1203902541	Laboratory Control Sample (LCS)
1203902542	435630001(CAPA-18-147560) Sample Duplicate (DUP)
1203902543	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-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 435630001 (CAPA-18-147560) 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
Fluoride	1203902543 (CAPA-18-147560PS)	128* (75%-125%)
Sulfate	1203902543 (CAPA-18-147560PS)	131* (75%-125%)

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 1203902542 (CAPA-18-147560DUP), 435630001 (CAPA-18-147560) and 435630004 (CAPA-18-147561) were manually integrated to correctly position the baseline as set in the calibration standards.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Ammonia Nitrogen
Analytical Batch: 1712962 **Method:** NH3
Prep Batch : 1712955 **Method:** EPA 350.1 Prep

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:350.1:

Sample ID	Client ID
435630001	CAPA-18-147560
435630004	CAPA-18-147561
1203904837	Method Blank (MB)
1203904838	Laboratory Control Sample (LCS)
1203904839	435584003(NonSDG) Sample Duplicate (DUP)
1203904841	435584003(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-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 435584003 (NonSDG) 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, Ammonia	1203904841 (Non SDG 435584003MS)	121* (90%-110%)

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1712660	Method:	TKN
Prep Batch :	1712656	Method:	EPA 351.2 Prep

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:351.2:

Sample ID	Client ID
435630002	CAPA-18-147586
435630005	CAPA-18-147587
1203904066	Method Blank (MB)
1203904067	Laboratory Control Sample (LCS)
1203904070	435429002(CAMO-18-147649) Sample Duplicate (DUP)
1203904071	435429002(CAMO-18-147649) 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 435429002 (CAMO-18-147649) 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	1203904071 (CAMO-18-147649MS)	83.9* (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

Samples 1203904070 (CAMO-18-147649DUP) and 1203904071 (CAMO-18-147649MS) were re-analyzed due to CCB failure. The reanalysis data with passing instrument QC was reported. Samples 435630002 (CAPA-18-147586) and 435630005 (CAPA-18-147587) were re-analyzed to verify the results.

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:

Sample ID	Client ID
435630001	CAPA-18-147560
435630004	CAPA-18-147561
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), 435630001 (CAPA-18-147560) and 435630004 (CAPA-18-147561) 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	435630	
	001	004
Nitrogen, Nitrate/Nitrite	5X	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

Product:	Total Phosphorus		
Analytical Batch:	1713122	Method:	PO4
Prep Batch :	1713121	Method:	EPA 365.4 Prep

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 365.4 1974:

Sample ID	Client ID
435630001	CAPA-18-147560
435630004	CAPA-18-147561
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: 1711941

Method: TDS

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:160.1:

Sample ID	Client ID
435630001	CAPA-18-147560
435630004	CAPA-18-147561
1203902617	Method Blank (MB)
1203902618	Laboratory Control Sample (LCS)
1203902620	435558001(CTUA-17-142763) 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 435558001 (CTUA-17-142763) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1713570

Method: EPA120.1 Specific Conductivity

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:120.1:

Sample ID	Client ID
435630001	CAPA-18-147560
435630004	CAPA-18-147561
1203906355	Laboratory Control Sample (LCS)
1203906356	435410001(CAMO-18-147637) Sample Duplicate (DUP)
1203906357	435722001(WST15-17-148253) 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

Samples 435410001 (CAMO-18-147637) and 435722001 (WST15-17-148253) 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

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: 1713720 **Method:** PH

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 150.1 1982:

Sample ID	Client ID
435630001	CAPA-18-147560
435630004	CAPA-18-147561
1203906747	Laboratory Control Sample (LCS)
1203906752	435630001(CAPA-18-147560) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-008 REV# 22.

Preparation/Analytical Method Verification

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

Calibration Information

The Titration and Ion analysis was performed on a Thermo Orion Star A111. Immediates

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435630001 (CAPA-18-147560) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1203906752 (CAPA-18-147560DUP)	pH	Received 20-OCT-17, out of holding 18-OCT-17
435630001 (CAPA-18-147560)	pH	Received 20-OCT-17, out of holding 18-OCT-17
435630004 (CAPA-18-147561)	pH	Received 20-OCT-17, out of holding 18-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:

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

Method/Analysis Information

Product: Alkalinity

Analytical Batch: 1713711 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:310.1:

Sample ID	Client ID
435630001	CAPA-18-147560
435630004	CAPA-18-147561
1203906737	Laboratory Control Sample (LCS)
1203906741	435630001(CAPA-18-147560) Sample Duplicate (DUP)
1203906745	435630001(CAPA-18-147560) 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 435630001 (CAPA-18-147560) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-510 GEL Work Order: 435630


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: Aubrey Kingsbury

Date: 10 NOV 2017

Title: Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 10, 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: 2018-510

Client Sample ID: CAPA-18-147560
Sample ID: 435630001
Matrix: W
Collect Date: 18-OCT-17 12:25
Receive Date: 20-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	10/23/17	1559	1711920	1
Chloride		2.91	0.067	0.200	mg/L		1					
Fluoride		0.270	0.033	0.100	mg/L		1					
Sulfate		4.37	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0238	0.017	0.050	mg/L	1.00	1	KLP1	10/27/17	0855	1712962	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.670	0.085	0.250	mg/L		5	KLP1	10/26/17	1320	1713174	3
PO4 "As Received"												
Phosphorus, Total as P		0.0714	0.020	0.050	mg/L	1.00	1	KLP1	10/26/17	1403	1713122	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		114	3.40	14.3	mg/L			KLP1	10/24/17	1520	1711941	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		74.5	1.45	4.00	mg/L			RXB5	10/31/17	1723	1713711	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		163	1.00	1.00	umhos/cm		1	VH1	11/07/17	1540	1713570	7
PH "As Received"												
pH at Temp 12.8C	H	8.11	0.010	0.100	SU		1	RXB5	10/31/17	1722	1713720	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	10/26/17	1154	1712955
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 10, 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: 2018-510

Client Sample ID: CAPA-18-147560
Sample ID: 435630001

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 10, 2017

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2018-510

Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147586

Project: ESHL00114

Sample ID: 435630002

Client ID: ARSL004

Matrix: W

Collect Date: 18-OCT-17 12:25

Receive Date: 20-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	U	ND	0.330	1.00	mg/L		1	TSM	11/01/17	2019	1711615	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	10/23/17	1226	1711667	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	10/25/17	1346	1712660	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	10/23/17	1106	1711666
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	10/25/17	1200	1712656

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 10, 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: 2018-510

Client Sample ID: CAPA-18-147561
Sample ID: 435630004
Matrix: W
Collect Date: 18-OCT-17 14:39
Receive Date: 20-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	10/23/17	1728	1711920	1
Chloride		2.63	0.067	0.200	mg/L		1					
Fluoride		0.342	0.033	0.100	mg/L		1					
Sulfate		3.78	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0638	0.017	0.050	mg/L	1.00	1	KLP1	10/27/17	0855	1712962	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.870	0.085	0.250	mg/L		5	KLP1	10/26/17	1328	1713174	3
PO4 "As Received"												
Phosphorus, Total as P		0.0827	0.020	0.050	mg/L	1.00	1	KLP1	10/26/17	1406	1713122	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		117	3.40	14.3	mg/L			KLP1	10/24/17	1520	1711941	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		62.5	1.45	4.00	mg/L			RXB5	10/31/17	1729	1713711	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		157	1.00	1.00	umhos/cm		1	VH1	11/07/17	1541	1713570	7
PH "As Received"												
pH at Temp 13.3C	H	8.14	0.010	0.100	SU		1	RXB5	10/31/17	1730	1713720	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	10/26/17	1154	1712955
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 10, 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: 2018-510

Client Sample ID: CAPA-18-147561
Sample ID: 435630004

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

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Certificate of Analysis

Report Date: November 10, 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: 2018-510

Client Sample ID: CAPA-18-147587
Sample ID: 435630005
Matrix: W
Collect Date: 18-OCT-17 14:39
Receive Date: 20-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	11/01/17	2106	1711615	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	10/23/17	1208	1711667	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	10/25/17	1347	1712660	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	10/23/17	1106	1711666
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	10/25/17	1200	1712656

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 10, 2017

Page 1 of 6

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

Contact: Ms. Nita Patel

Workorder: 435630

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
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
Flow Injection Analysis											
Batch	1711667										
QC1203901841	435630002	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A			AXH3	10/23/17 12:02
QC1203901840	LCS										
Cyanide, Total	50.0				50.1	ug/L			100	(90%-110%)	10/23/17 11:54
QC1203901839	MB										
Cyanide, Total			U		ND	ug/L					10/23/17 11:45
QC1203901843	435630002	MS									
Cyanide, Total	100	U	ND		106	ug/L			106	(90%-110%)	10/23/17 12:03
Ion Chromatography											
Batch	1711920										
QC1203902542	435630001	DUP									
Bromide		U	ND	U	ND	mg/L	N/A			JXH5	10/23/17 16:28

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1711920										
Chloride		2.91		2.89	mg/L	0.738		(0%-20%)	JXH5	10/23/17	16:28
Fluoride		0.270		0.231	mg/L	15.6	^	(+/-0.100)			
Sulfate		4.37		4.36	mg/L	0.135		(0%-20%)			
QC1203902541 LCS											
Bromide	1.25			1.21	mg/L		96.6	(80%-120%)		10/23/17	15:30
Chloride	5.00			4.97	mg/L		99.4	(80%-120%)			
Fluoride	2.50			2.58	mg/L		103	(80%-120%)			
Sulfate	10.0			10.1	mg/L		101	(80%-120%)			
QC1203902540 MB											
Bromide			U	ND	mg/L					10/23/17	15:01
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203902543 435630001 PS											
Bromide	1.25	U	ND	1.45	mg/L		112	(75%-125%)		10/23/17	16:59
Chloride	5.00		2.91	9.15	mg/L		125	(75%-125%)			
Fluoride	2.50		0.270	3.47	mg/L		128*	(75%-125%)			
Sulfate	10.0		4.37	17.5	mg/L		131*	(75%-125%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1712660										
QC1203904070	435429002	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	10/25/17	13:23
QC1203904067	LCS										
Nitrogen, Total Kjeldahl	1.00				1.00	mg/L	100	(90%-110%)		10/25/17	12:56
QC1203904066	MB										
Nitrogen, Total Kjeldahl			U		ND	mg/L				10/25/17	12:55
QC1203904071	435429002	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND		0.839	mg/L	83.9*	(90%-110%)		10/25/17	13:24
Batch	1712962										
QC1203904839	435584003	DUP									
Nitrogen, Ammonia			0.196		0.173	mg/L	12.5 ^	(+/-0.050)	KLP1	10/27/17	08:53
QC1203904838	LCS										
Nitrogen, Ammonia	1.00				0.980	mg/L	98	(90%-110%)		10/27/17	08:39
QC1203904837	MB										
Nitrogen, Ammonia			J		0.0354	mg/L				10/27/17	08:38
QC1203904841	435584003	MS									
Nitrogen, Ammonia	1.00		0.196		1.41	mg/L	121*	(90%-110%)		10/27/17	08:54
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

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1713122										
QC1203905249	MB										
Phosphorus, Total as P			J	0.0361	mg/L				KLP1	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
Solids Analysis											
Batch	1711941										
QC1203902620	435558001	DUP									
Total Dissolved Solids		249		260	mg/L	4.49		(0%-5%)	KLP1	10/24/17	15:20
QC1203902618	LCS										
Total Dissolved Solids	300			293	mg/L		97.6	(95%-105%)		10/24/17	15:20
QC1203902617	MB										
Total Dissolved Solids			U	ND	mg/L					10/24/17	15:20

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1713570										
QC1203906356	435410001	DUP									
Conductivity		151		152	umhos/cm	0.397		(0%-10%)	VH1	11/07/17	15:28
QC1203906357	435722001	DUP									
Conductivity		167		166	umhos/cm	0.3		(0%-10%)		11/07/17	15:54
QC1203906355	LCS										
Conductivity	1410			1410	umhos/cm		99.4	(95%-105%)		11/07/17	15:19
Batch	1713711										
QC1203906741	435630001	DUP									
Alkalinity, Total as CaCO3		74.5		76.8	mg/L	3.17		(0%-20%)	RXB5	10/31/17	17:24
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203906737	LCS										
Alkalinity, Total as CaCO3	100			106	mg/L		106	(90%-110%)		10/31/17	16:54
QC1203906745	435630001	MS									
Alkalinity, Total as CaCO3	100	74.5		172	mg/L		97.2	(80%-120%)		10/31/17	17:25
Batch	1713720										
QC1203906752	435630001	DUP									
pH	H	8.11	H	8.12	SU	0.123		(0%-5%)	RXB5	10/31/17	17:23
QC1203906747	LCS										
pH	7.00			7.00	SU		100	(99%-101%)		10/31/17	16:54

- 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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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 #: 2018-510
Work Order #: 435630**

Method/Analysis Information

Product: Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Batch Number: 1713388

Sample ID	Client ID
435630002	CAPA-18-147586
435630005	CAPA-18-147587
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 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 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

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 1203905946 (MB) 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: ISOPU
Analytical Method: HASL-300:ISOPU
Analytical Batch Number: 1713389

Sample ID	Client ID
435630002	CAPA-18-147586
435630005	CAPA-18-147587
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 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 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

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: 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

Sample (See Below) did not meet the detection limit 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 sample was 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

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 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

Sample 435630002 (CAPA-18-147586) did not meet the resolution requirement of having a full width half maximum of 100 keV or less for the tracer; however, the tracer yield requirement was met and the tracer peak is within the tracer region of interest.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: IsoU
Analytical Method: HASL-300:ISOU
Analytical Batch Number: 1713390

Sample ID	Client ID
435630002	CAPA-18-147586
435630005	CAPA-18-147587
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

None of the samples in this sample set were recounted.

Miscellaneous Information:**Manual Integration**

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: **GammaSpec**

Analytical Method: EPA:901.1

Analytical Batch Number: 1711850

Sample ID	Client ID
435630002	CAPA-18-147586
435630005	CAPA-18-147587
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, June 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: 1714181

Sample ID	Client ID
435630002	CAPA-18-147586
435630005	CAPA-18-147587
1203907990	Method Blank (MB)
1203907993	Laboratory Control Sample (LCS)
1203907991	435560005(CAPA-18-147591) Sample Duplicate (DUP)
1203907992	435560005(CAPA-18-147591) 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 1203907990 (MB) and 1203907993 (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: 435560005 (CAPA-18-147591). The QC was from ARSL work order 435560.

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

None of the samples in this sample set were recounted.

Miscellaneous Information:**Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

The matrix spike, 1203907992 (CAPA-18-147591MS), 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:	1714187

Sample ID	Client ID
435630002	CAPA-18-147586
435630005	CAPA-18-147587
1203907999	Method Blank (MB)
1203908003	Laboratory Control Sample (LCS)
1203908000	435566006(CAMO-18-147684) Sample Duplicate (DUP)
1203908001	435566006(CAMO-18-147684) Matrix Spike (MS)
1203908002	435566006(CAMO-18-147684) 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 1203907999 (MB) and 1203908003 (LCS) were changed to 1.0 per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 435566006 (CAMO-18-147684). The QC was from ARSL work order 435566.

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

None of the samples have been flamed.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:**Sample-Specific MDA/MDC**

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

The matrix spike and matrix spike duplicate, 1203908001 (CAMO-18-147684MS) and 1203908002 (CAMO-18-147684MSD), aliquots were 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:	1717894

Sample ID	Client ID
435630002	CAPA-18-147586
435630005	CAPA-18-147587
1203917214	Method Blank (MB)
1203917218	Laboratory Control Sample (LCS)
1203917215	435429002(CAMO-18-147649) Sample Duplicate (DUP)
1203917216	435429002(CAMO-18-147649) Matrix Spike (MS)
1203917217	435429002(CAMO-18-147649) 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 1203917214 (MB) and 1203917218 (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
1203917214 (MB)	ALPHA	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
1203917214 (MB)	ALPHA	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: 435429002 (CAMO-18-147649). The QC was from ARSL work order 435429.

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

Samples were reprepared due to low recovery. The re-analysis is being reported.

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.

Recounts

Sample 1203917217 (CAMO-18-147649MSD) was recounted due to low recovery. The recount is reported.

Sample 1203917215 (CAMO-18-147649DUP) was recounted due to high relative percent difference/relative error ratio. 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, 1203917216 (CAMO-18-147649MS) and 1203917217 (CAMO-18-147649MSD), aliquots were reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Certification Statement

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

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Qualifier Definition Report for

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

Client SDG: 2018-510 GEL Work Order: 435630

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: Kate Gellatly

Date: 16 NOV 2017

Title: Analyst I

Sample Data Summary

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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Report Date: November 16, 2017

Client Sample ID: CAPA-18-147586
Sample ID: 435630002
Matrix: W
Collect Date: 18-OCT-17
Receive Date: 20-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	-0.00202	+/-0.00729	0.0354	0.015	+/-0.00729	0.050	pCi/L			JXR5	11/05/17	1217	1713388	1
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ISOPU "As Received"

Plutonium-238	U	0.00204	+/-0.0054	0.0354	0.0149	+/-0.0054	0.050	pCi/L			JXR5	11/08/17	1346	1713389	2
Plutonium-239/240	U	-0.0265	+/-0.00935	0.0459	0.0202	+/-0.00935	0.050	pCi/L							

IsoU "As Received"

Uranium-234		0.500	+/-0.0377	0.0572	0.0249	+/-0.045	1.00	pCi/L			JXR5	11/05/17	1531	1713390	3
Uranium-235/236	U	0.0367	+/-0.0138	0.0608	0.0259	+/-0.0139	1.00	pCi/L							
Uranium-238		0.265	+/-0.0275	0.0553	0.024	+/-0.0305	0.500	pCi/L							

Rad Gamma Spec Analysis

Gammasespec "As Received"

Cesium-137	U	0.923	+/-1.06	4.21	1.85	+/-1.08	8.00	pCi/L			MXR1	11/03/17	1248	1711850	4
Cobalt-60	U	0.579	+/-1.05	4.14	1.69	+/-1.06	8.00	pCi/L							
Neptunium-237	U	0.196	+/-2.04	7.60	3.46	+/-2.04		pCi/L							
Potassium-40	U	19.0	+/-17.4	33.5	13.0	+/-17.4		pCi/L							
Sodium-22	U	-0.731	+/-1.03	3.83	1.55	+/-1.05		pCi/L							

Rad Gas Flow Proportional Counting

GFPC, Sr90, liquid "As Received"

Strontium-90	U	-0.0628	+/-0.120	0.448	0.203	+/-0.120	0.500	pCi/L			LXB3	11/09/17	0948	1714181	5
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WSP-GrossA/B "As Received"

Beta		4.29	+/-0.715	2.02	0.948	+/-0.801	3.00	pCi/L			AXH4	11/08/17	1207	1714187	6
Alpha		3.53	+/-1.09	2.44	0.824	+/-1.13	3.00	pCi/L			AXH4	11/11/17	1411	1717894	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	82	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1713389	83	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1713390	68.4	(50%-105%)

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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-18-147586

Sample ID: 435630002

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"							1714181	90.4	(50%-105%)				

Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 68% confidence level (1-sigma).

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

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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-18-147587

Sample ID: 435630005

Matrix: W

Collect Date: 18-OCT-17

Receive Date: 20-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.
Rad Alpha Spec Analysis															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241	U	0.0115	+/-0.0081	0.0502	0.0212	+/-0.00812	0.050	pCi/L			JXR5	11/05/17	1218	1713388	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	-0.00649	+/-0.00718	0.0375	0.0158	+/-0.00718	0.050	pCi/L			JXR5	11/08/17	1455	1713389	2
Plutonium-239/240	U	-0.0173	+/-0.00749	0.0486	0.0214	+/-0.00749	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.295	+/-0.0307	0.0638	0.0278	+/-0.0342	1.00	pCi/L			JXR5	11/05/17	1532	1713390	3
Uranium-235/236	U	0.0335	+/-0.0124	0.0679	0.0289	+/-0.0125	1.00	pCi/L							
Uranium-238		0.127	+/-0.0213	0.0617	0.0268	+/-0.0223	0.500	pCi/L							
Rad Gamma Spec Analysis															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	0.658	+/-1.06	4.11	1.83	+/-1.07	8.00	pCi/L			MXR1	11/03/17	1248	1711850	4
Cobalt-60	U	-1.05	+/-1.01	3.84	1.57	+/-1.04	8.00	pCi/L							
Neptunium-237	U	-0.25	+/-1.91	7.12	3.25	+/-1.91		pCi/L							
Potassium-40	U	-29	+/-15.7	59.8	26.5	+/-17.1		pCi/L							
Sodium-22	U	0.931	+/-0.619	3.22	1.28	+/-0.656		pCi/L							
Rad Gas Flow Proportional Counting															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	0.243	+/-0.137	0.451	0.212	+/-0.138	0.500	pCi/L			LXB3	11/09/17	0948	1714181	5
<i>WSP-GrossA/B "As Received"</i>															
Beta		4.35	+/-0.723	2.04	0.959	+/-0.814	3.00	pCi/L			AXH4	11/08/17	1208	1714187	6
Alpha	U	0.943	+/-0.730	2.52	0.852	+/-0.735	3.00	pCi/L			AXH4	11/11/17	1411	1717894	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	90	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1713389	76.1	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1713390	75.7	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1714181	90.4	(50%-105%)

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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-18-147587

Sample ID: 435630005

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
Page 1 of 6

Client : Los Alamos National Laboratory
TA-00, SM1237, Rm104C

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 435630

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
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: 435630

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1713389										
QC1203905949	MB										
Plutonium-238			U	0.00	pCi/L				JXR5	11/08/17	14:56
	Uncert:			+/-0.00617							
	TPU:			+/-0.00617							
Plutonium-239/240			U	0.00872	pCi/L						
	Uncert:			+/-0.00755							
	TPU:			+/-0.00757							
**Plutonium-242 Tracer	1.97			1.69	pCi/L		85.5	(50%-105%)			
	Uncert:			+/-0.0662							
	TPU:			+/-0.128							
Batch	1713390										
QC1203905953	435630002	DUP									
Uranium-234		0.500		0.567	pCi/L	0.351		(0-1)	JXR5	11/06/17	09:16
	Uncert:	+/-0.0377		+/-0.0414							
	TPU:	+/-0.045		+/-0.0503							
Uranium-235/236	U	0.0367	U	0.0623	pCi/L	0.413		(0-1)			
	Uncert:	+/-0.0138		+/-0.0168							
	TPU:	+/-0.0139		+/-0.0171							
Uranium-238		0.265		0.264	pCi/L	0.005		(0-1)			
	Uncert:	+/-0.0275		+/-0.0295							
	TPU:	+/-0.0305		+/-0.0324							
**Uranium-232 Tracer	2.62	1.79		1.89	pCi/L		72.1	(50%-105%)			
	Uncert:	+/-0.0851		+/-0.0894							
	TPU:	+/-0.155		+/-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: 435630

Page 3 of 6

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1713390										
**Uranium-232 Tracer	2.10			1.51	pCi/L		71.8	(50%-105%)			
	Uncert:			+/-0.0729							
	TPU:			+/-0.129							
Rad Gamma Spec											
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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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gamma Spec											
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							
Rad Gas Flow											
Batch	1714181										
QC1203907991	435560005	DUP									
Strontium-90	U	-0.00159	U	0.159	pCi/L	0.316		(0-1)	LXB3	11/09/17	11:11
	Uncert:	+/-0.121		+/-0.132							
	TPU:	+/-0.121		+/-0.133							
**Strontium Carrier	7.85	7.40		6.70	mg		85.4	(50%-105%)			
QC1203907993	LCS										
Strontium-90	23.7			24.2	pCi/L		102	(80%-120%)	LXB3	11/09/17	11:12
	Uncert:			+/-0.628							
	TPU:			+/-2.04							
**Strontium Carrier	7.85			6.80	mg		86.6	(50%-105%)			
QC1203907990	MB										
Strontium-90			U	0.029	pCi/L				LXB3	11/09/17	11:11
	Uncert:			+/-0.0611							
	TPU:			+/-0.0612							
**Strontium Carrier	7.85			7.20	mg		91.7	(50%-105%)			
QC1203907992	435560005	MS									
Strontium-90	237	U	-0.00159	219	pCi/L		92.3	(75%-125%)	LXB3	11/09/17	11:11
	Uncert:		+/-0.121	+/-5.81							
	TPU:		+/-0.121	+/-19.5							
**Strontium Carrier	7.85	7.40		7.20	mg		91.7	(50%-105%)			
Batch	1714187										
QC1203908000	435566006	DUP									
Beta		2.50		3.54	pCi/L	0.345		(0-1)	AXH4	11/08/17	12:08
	Uncert:	+/-0.679		+/-0.737							
	TPU:	+/-0.712		+/-0.796							
QC1203908003	LCS										
Beta	47.4			41.0	pCi/L		86.4	(80%-120%)	AXH4	11/08/17	12:08
	Uncert:			+/-0.792							
	TPU:			+/-3.48							
QC1203907999	MB										
Beta			U	0.0293	pCi/L				AXH4	11/08/17	12:15
	Uncert:			+/-0.0943							
	TPU:			+/-0.0943							

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1714187										
QC1203908001	435566006 MS										
Beta	1900	2.50		1730	pCi/L		90.9	(75%-125%)	AXH4	11/08/17	12:08
	Uncert:	+/-0.679		+/-33.1							
	TPU:	+/-0.712		+/-147							
QC1203908002	435566006 MSD										
Beta	1900	2.50		1750	pCi/L	0.0486	92.4	(0-1)	AXH4	11/08/17	12:08
	Uncert:	+/-0.679		+/-32.5							
	TPU:	+/-0.712		+/-148							
Batch	1717894										
QC1203917215	435429002 DUP										
Alpha	U	0.329	U	0.405	pCi/L	0.0299		(0-1)	AXH4	11/13/17	06:30
	Uncert:	+/-0.698		+/-0.563							
	TPU:	+/-0.698		+/-0.564							
QC1203917218	LCS										
Alpha	12.1			12.8	pCi/L		106	(80%-120%)	AXH4	11/11/17	14:12
	Uncert:			+/-0.585							
	TPU:			+/-1.21							
QC1203917214	MB										
Alpha			U	0.253	pCi/L				AXH4	11/11/17	14:11
	Uncert:			+/-0.126							
	TPU:			+/-0.128							
QC1203917216	435429002 MS										
Alpha	483	U	0.329	478	pCi/L		98.9	(75%-125%)	AXH4	11/11/17	14:11
	Uncert:		+/-0.698	+/-23.5							
	TPU:		+/-0.698	+/-46.2							
QC1203917217	435429002 MSD										
Alpha	483	U	0.329	472	pCi/L	0.0342	97.6	(0-1)	AXH4	11/13/17	07:51
	Uncert:		+/-0.698	+/-26.8							
	TPU:		+/-0.698	+/-47.9							

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 REMP Result > MDC/CL and < RDL
- N/A RPD or %Recovery limits do not apply.

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Parmname	NOM	Sample Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
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	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.