

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:

2018-518		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 		
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 Manta	10/19/17
(Signature)	3:00

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) S. Sherwood	10/19/17
(Signature)	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-18-147562

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-18-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1211		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-51 S1		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

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 _____ TV 10-18-17
 Dissolved Oxygen _____ Flow (in gpm) _____
 Oxidation-Reduction Potential _____ pH _____ Specific Conductance _____
 Temperature _____ Turbidity _____

COLLECTED BY (PRINT): A. Stanfield, T. Bonham

RELINQUISHED BY (Printed Name) Tanya Vander Vis (Signature) Tanya Vander Vis	Date/Time 10-18-17 1305	RECEIVED BY (Printed Name) S. Sherwood (Signature) S. Sherwood	Date/Time 10/18/17 13:05
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-18-147563

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-18-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1039		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-51 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): A. Stanfield, T. Bonham

RELINQUISHED BY (Printed Name) Tanya Vander Vis (Signature) <i>Tanya Vander Vis</i>	Date/Time 10-18-17 1305	RECEIVED BY <i>J. Sherwood</i> (Printed Name) J. Sherwood (Signature) <i>J. Sherwood</i>	Date/Time 10/18/17 1305
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147589

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-18-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1039		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-51 S2		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	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		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: Sampled with running diesel generator ~30 ft. away

LOCATION COMMENTS: none

FIELD PARAMETERS:

Sample Time	1039	HH:MM	Dissolved Oxygen	6.35 mg/L	Flow (in gpm)	3.75
Oxidation-Reduction Potential	187.3 mV		pH	8.09	Specific Conductance	121.2 μ S/cm
Temperature	21.4°C		Turbidity	0.26 NTU		

COLLECTED BY (PRINT): A. Stanfield, T. Bonham

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11508**EVENT NAME:** Pajarito (TA-54) & Chromium October
Monthly MY2018 Q1**SAMPLE ID:** CAPA-18-147589**WORK ORDER:**

RELINQUISHED BY (Printed Name) Tanya Vander Vis (Signature) <i>Tanya Vander Vis</i>	Date/Time 10-18-17 1305	RECEIVED BY (Printed Name) S. Sherwood (Signature) <i>S. Sherwood</i>	Date/Time 10/18/17 1305
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147614

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-18-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1039		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-51 S2		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	191817	HCL	Y	NA

SAMPLE COMMENTS: Sampled with TV 10-18-17

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time	1039	HH:MM	Dissolved Oxygen	6.35 mg/L	Flow (in gpm)	3.75
Oxidation-Reduction Potential	187.3mV		pH	8.09	Specific Conductance	121.2 μ S/cm
Temperature	21.4°C		Turbidity	0.26 NTU		

COLLECTED BY (PRINT): A. Stanfield, T. Bonham

RELINQUISHED BY (Printed Name) Tanya VanderVis (Signature) Tanya VanderVis	Date/Time 10-18-17 1305	RECEIVED BY (Printed Name) S. Sherwood (Signature) S. Sherwood	Date/Time
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-18-147588

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	10-18-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1211		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-51 S1		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	500 ML POLY	1	HNO3	Y	NA
	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	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		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: Sampled with running diesel generator ~30ft. away.
Breezy while sampling.

LOCATION COMMENTS: none.

FIELD PARAMETERS:

Sample Time	1211	HH:MM	Dissolved Oxygen	7.22 mg/L	Flow (in gpm)	3.80
Oxidation-Reduction Potential	194.9mV		pH	7.93	Specific Conductance	118.8 μ S/cm
Temperature	20.8°C		Turbidity	0.53 NTU		

COLLECTED BY (PRINT): A. Stanfield, T. Bonham

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11508**EVENT NAME:** Pajarito (TA-54) & Chromium October
Monthly MY2018 Q1**SAMPLE ID:** CAPA-18-147588**WORK ORDER:**

RELINQUISHED BY (Printed Name) Tanya VanderVis (Signature) <i>Tanya VanderVis</i>	Date/Time 10-18-17 1305	RECEIVED BY (Printed Name) S. Sherwood (Signature) <i>S. Sherwood</i>	Date/Time 10/18/17 1305
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147613

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-18-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1211		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-51 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	10/18/17	HC#	Y	NA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time _____ HH:MM Dissolved Oxygen _____ Flow (in gpm) _____
Oxidation-Reduction _____ pH _____ Specific _____
Potential _____ Conductance _____
Temperature _____ Turbidity _____

COLLECTED BY (PRINT): A. Stanfield, T. Bonham

RELINQUISHED BY (Printed Name) Tanya Vander Vis (Signature) Tanya Vander Vis	Date/Time 10-18-17 1305	RECEIVED BY (Printed Name) S. Sherwood (Signature) S. Sherwood	Date/Time 10/18/17 1305
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. 2018-518

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
435631	EPA:120.1	2				
435631	EPA:150.1	2				
435631	EPA:160.1	2				
435631	EPA:170.0	4		2		
435631	EPA:245.2	4				
435631	EPA:300.0	2				
435631	EPA:310.1	2				
435631	EPA:335.4	2				
435631	EPA:350.1	2				
435631	EPA:351.2	2				
435631	EPA:353.2	2				
435631	EPA:365.4	2				
435631	EPA:900	2				
435631	EPA:901.1	2				
435631	EPA:905.0	2				
435631	HASL-300:AM-241	2				
435631	HASL-300:ISOPU	2				
435631	HASL-300:ISOU	2				
435631	SM:A2340B	2				
435631	SW-846:6010C	2				
435631	SW-846:6020	2				
435631	SW-846:6850	2				
435631	SW-846:8260B	2		2		
435631	SW-846:8270D	2				
435631	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
435631	EPA:120.1	1713570	1713570	2										1				2			
435631	EPA:150.1	1713720	1713720	2										1				1			
435631	EPA:160.1	1711941	1711941	2					1					1				1			
435631	EPA:170.0	NA	NA	4		2															
435631	EPA:245.2	1716437	1716435	4					1	1				1				1			
435631	EPA:300.0	1711920	1711920	2					1					1				1			
435631	EPA:310.1	1713711	1713711	2						1				1				1			
435631	EPA:335.4	1711667	1711666	2					1	1				1				1			
435631	EPA:350.1	1712962	1712955	2					1	1				1				1			
435631	EPA:351.2	1712660	1712656	1					1	1				1				1			
435631	EPA:351.2	1714720	1714719	1					1	1				1				1			
435631	EPA:353.2	1713174	1713174	2					1					1				1			
435631	EPA:365.4	1713122	1713121	2					1	2				1				2			
435631	EPA:900	1714187	1714187	2					1	1	1			1				1			
435631	EPA:900	1717894	1717894	2					1	1	1			1				1			
435631	EPA:901.1	1711850	1711850	2					1					1				1			
435631	EPA:905.0	1714181	1714181	2					1	1				1				1			
435631	HASL-300:AM-241	1713388	1713388	2					1					1				1			
435631	HASL-300:ISOPU	1713389	1713389	2					1					1				1			
435631	HASL-300:ISOU	1713390	1713390	2					1					1				1			
435631	SM:A2340B	1719596	1719596	2																	
435631	SW-846:6010C	1711521	1711520	2					1	1				1				1			
435631	SW-846:6020	1711535	1711534	2					1	1				1				1			
435631	SW-846:6850	1713226	1713223	2					1	1	1			1							
435631	SW-846:8260B	1714469	1714469	2		2			1					2							
435631	SW-846:8270D	1711736	1711735	2					1	1	1			1							
435631	SW-846:9060	1711615	1711615	2					1					1				1			

2. Distribution Of Analytes In EDD.

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-18-147562	435631001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPA-18-147563	435631004	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-18-147562	435631001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147563	435631004	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203906747	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147562	435631001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147563	435631004	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-18-147562	435631001	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147563	435631004	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147588	435631002	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147589	435631005	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147613	435631003	FTB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147614	435631006	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-18-147562	435631001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147563	435631004	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147588	435631002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147589	435631005	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-18-147562	435631001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147563	435631004	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-18-147562	435631001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147563	435631004	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-18-147588	435631002	REG	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147589	435631005	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-18-147562	435631001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147563	435631004	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-18-147588	435631002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147589	1203909430	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147589	1203909431	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147589	435631005	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203904067	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203909429	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203904066	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203909428	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-18-147562	435631001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147563	435631004	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-18-147561	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-18-147562	435631001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147563	435631004	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-18-147588	435631002	REG	2	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	CAPA-18-147589	435631005	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
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-18-147588	435631002	REG	5	0	0	0
EPA:901.1	RAD	CAPA-18-147589	435631005	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-18-147588	435631002	REG	1	0	0	0
EPA:905.0	RAD	CAPA-18-147589	435631005	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-18-147588	435631002	REG	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147589	435631005	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-18-147588	435631002	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147589	435631005	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-18-147588	435631002	REG	3	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147589	435631005	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-18-147562	435631001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAPA-18-147563	435631004	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-18-147562	435631001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147563	435631004	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

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	CAPA-18-147560	1203901529	MS	0	0	11	0
SW-846:6020	INORGANIC	CAPA-18-147562	435631001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147563	435631004	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203901527	LCS	0	0	11	0
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-18-147562	435631001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147563	435631004	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-18-147588	435631002	REG	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147589	435631005	REG	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147613	435631003	FTB	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147614	435631006	FTB	80	3	0	0
SW-846:8260B	VOC	LCS	1203908830	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203908833	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203908829	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-18-147588	435631002	REG	80	6	0	0
SW-846:8270D	SVOC	CAPA-18-147589	435631005	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-18-147588	435631002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147589	435631005	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.

DATA VALIDATION REPORT

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	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-18-147613	435631003	TRIP BLANK	EPA:170.0	W	Temperature	2		Deg C	
CAPA-18-147614	435631006	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-18-147562	1203913624	METHOD BLANK	EPA:245.2	Mercury	-0.084	ug/L	0.067	U	0.200	N	5	100	Y
CAPA-18-147588	1203913624	METHOD BLANK	EPA:245.2	Mercury	-0.084	ug/L	0.067	U	0.200	N	5	100	Y
CAPA-18-147563	1203913624	METHOD BLANK	EPA:245.2	Mercury	-0.084	ug/L	0.067	U	0.200	N	5	100	Y
CAPA-18-147589	1203913624	METHOD BLANK	EPA:245.2	Mercury	-0.084	ug/L	0.067	U	0.200	N	5	100	Y
CAPA-18-147562	1203904837	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0354	mg/L	0.0449	J	0.050	Y	5	100	Y
CAPA-18-147563	1203904837	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0354	mg/L	0.0722		0.050	Y	5	100	Y
CAPA-18-147562	1203905249	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0361	mg/L	0.0897		0.050	Y	5	100	Y
CAPA-18-147563	1203905249	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0361	mg/L	0.0896		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		
CAPA-18-147589	1203909431		EPA:351.2	Total Kjeldahl Nitrogen	1714719	11-02-2017	W	111		110	90	10		
CAPA-18-147589	1203909431		EPA:351.2	Total Kjeldahl Nitrogen	1714719	11-02-2017	W	111		110	90	10		

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

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
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	Paramter 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-51 S1	2018-518	CAPA-18-147562	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J	U	I4	N	0.0449	mg/L	0.0449	mg/L			W	10/18/2017		1712962	VAL	Y
R-51 S1	2018-518	CAPA-18-147562	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.0897	mg/L	0.0897	mg/L			W	10/18/2017		1713122	VAL	Y
R-51 S2	2018-518	CAPA-18-147563	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	I4	N	0.0722	mg/L	0.0722	mg/L			W	10/18/2017		1712962	VAL	Y
R-51 S2	2018-518	CAPA-18-147563	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.0896	mg/L	0.0896	mg/L			W	10/18/2017		1713122	VAL	Y
R-51 S1	2018-518	CAPA-18-147588	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.0083	pCi/L	0.0083	pCi/L	0.0485	0.0083	W	10/18/2017		1713388	VAL	Y
R-51 S1	2018-518	CAPA-18-147588	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	2.42	pCi/L	2.42	pCi/L	3.96	1.24	W	10/18/2017		1711850	VAL	Y
R-51 S1	2018-518	CAPA-18-147588	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	0.916	pCi/L	0.916	pCi/L	5.31	1.23	W	10/18/2017		1711850	VAL	Y
R-51 S1	2018-518	CAPA-18-147588	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.56	pCi/L	0.56	pCi/L	2.82	0.736	W	10/18/2017		1717894	VAL	Y
R-51 S1	2018-518	CAPA-18-147588	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-3.5	pCi/L	-3.5	pCi/L	7.19	2.23	W	10/18/2017		1711850	VAL	Y
R-51 S1	2018-518	CAPA-18-147588	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.0103	pCi/L	-0.0103	pCi/L	0.0444	0.0131	W	10/18/2017		1713389	VAL	Y
R-51 S1	2018-518	CAPA-18-147588	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0128	pCi/L	-0.0128	pCi/L	0.0576	0.00768	W	10/18/2017		1713389	VAL	Y
R-51 S1	2018-518	CAPA-18-147588	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-9.97	pCi/L	-9.97	pCi/L	49.5	12.3	W	10/18/2017		1711850	VAL	Y
R-51 S1	2018-518	CAPA-18-147588	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-0.279	pCi/L	-0.279	pCi/L	4.65	1.17	W	10/18/2017		1711850	VAL	Y
R-51 S1	2018-518	CAPA-18-147588	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.166	pCi/L	0.166	pCi/L	0.434	0.130	W	10/18/2017		1714181	VAL	Y
R-51 S1	2018-518	CAPA-18-147588	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0335	pCi/L	0.0335	pCi/L	0.0764	0.0133	W	10/18/2017		1713390	VAL	Y
R-51 S1	2018-518	CAPA-18-147588	REG	INIT	RAD	HASL-300:ISOU	Uranium-238	U	U	R5	N	0.0577	pCi/L	0.0577	pCi/L	0.0694	0.0148	W	10/18/2017		1713390	VAL	Y
R-51 S2	2018-518	CAPA-18-147589	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.0106	pCi/L	0.0106	pCi/L	0.0464	0.00648	W	10/18/2017		1713388	VAL	Y
R-51 S2	2018-518	CAPA-18-147589	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	2.26	pCi/L	2.26	pCi/L	5.84	1.28	W	10/18/2017		1711850	VAL	Y
R-51 S2	2018-518	CAPA-18-147589	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	2.41	pCi/L	2.41	pCi/L	8.31	1.83	W	10/18/2017		1711850	VAL	Y
R-51 S2	2018-518	CAPA-18-147589	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.908	pCi/L	0.908	pCi/L	2.73	0.770	W	10/18/2017		1717894	VAL	Y
R-51 S2	2018-518	CAPA-18-147589	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	0.637	pCi/L	0.637	pCi/L	10.3	2.94	W	10/18/2017		1711850	VAL	Y
R-51 S2	2018-518	CAPA-18-147589	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.00000000	pCi/L	-0.000000001	pCi/L	0.0456	0.00745	W	10/18/2017		1713389	VAL	Y
R-51 S2	2018-518	CAPA-18-147589	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.00000000	pCi/L	-0.000000000	pCi/L	0.0592	0.00645	W	10/18/2017		1713389	VAL	Y
R-51 S2	2018-518	CAPA-18-147589	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	12.4	pCi/L	12.4	pCi/L	91.0	21.3	W	10/18/2017		1711850	VAL	Y
R-51 S2	2018-518	CAPA-18-147589	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-2.78	pCi/L	-2.78	pCi/L	6.98	2.12	W	10/18/2017		1711850	VAL	Y
R-51 S2	2018-518	CAPA-18-147589	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.0893	pCi/L	-0.0893	pCi/L	0.443	0.118	W	10/18/2017		1714181	VAL	Y
R-51 S2	2018-518	CAPA-18-147589	REG	INIT	GENERAL CHEMISTRY	EPA:351.2	Total Kjeldahl Nitrogen	U	UJ	I6b	N	0.033	mg/L	0.033	mg/L			W	10/18/2017		1714720	VAL	Y
R-51 S2	2018-518	CAPA-18-147589	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.00617	pCi/L	0.00617	pCi/L	0.0562	0.00872	W	10/18/2017		1713390	VAL	Y

DATA VALIDATION REPORT

Reason Code

Description

I4	the sample result is =<5x the concentration of related analyte in the method blank.
I6b	The associated matrix spike recovery was above the Upper Acceptance Limit (UAL). Follow the external laboratory limits located within the associated data package.
J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualifiy the analyte as not detected and/or any other standard qualifire. The analyte is detected in the sample.
R5	Analyte is not detected because the amount reported is less than the MDC.
U_LAB	The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147562	R-51 S1	REG	EPA:120.1	0	1
CAPA-18-147562	R-51 S1	REG	EPA:150.1	0	1
CAPA-18-147562	R-51 S1	REG	EPA:160.1	0	1
CAPA-18-147562	R-51 S1	REG	EPA:170.0	0	1
CAPA-18-147562	R-51 S1	REG	EPA:245.2	0	1
CAPA-18-147562	R-51 S1	REG	EPA:300.0	0	4
CAPA-18-147562	R-51 S1	REG	EPA:310.1	0	2
CAPA-18-147562	R-51 S1	REG	EPA:350.1	0	1
CAPA-18-147562	R-51 S1	REG	EPA:353.2	0	1
CAPA-18-147562	R-51 S1	REG	EPA:365.4	0	1
CAPA-18-147562	R-51 S1	REG	SM:A2340B	0	1
CAPA-18-147562	R-51 S1	REG	SW-846:6010C	0	17
CAPA-18-147562	R-51 S1	REG	SW-846:6020	0	11
CAPA-18-147562	R-51 S1	REG	SW-846:6850	0	1
CAPA-18-147563	R-51 S2	REG	EPA:120.1	0	1
CAPA-18-147563	R-51 S2	REG	EPA:150.1	0	1
CAPA-18-147563	R-51 S2	REG	EPA:160.1	0	1
CAPA-18-147563	R-51 S2	REG	EPA:170.0	0	1
CAPA-18-147563	R-51 S2	REG	EPA:245.2	0	1
CAPA-18-147563	R-51 S2	REG	EPA:300.0	0	4
CAPA-18-147563	R-51 S2	REG	EPA:310.1	0	2
CAPA-18-147563	R-51 S2	REG	EPA:350.1	0	1
CAPA-18-147563	R-51 S2	REG	EPA:353.2	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147563	R-51 S2	REG	EPA:365.4	0	1
CAPA-18-147563	R-51 S2	REG	SM:A2340B	0	1
CAPA-18-147563	R-51 S2	REG	SW-846:6010C	0	17
CAPA-18-147563	R-51 S2	REG	SW-846:6020	0	11
CAPA-18-147563	R-51 S2	REG	SW-846:6850	0	1
CAPA-18-147588	R-51 S1	REG	EPA:170.0	0	1
CAPA-18-147588	R-51 S1	REG	EPA:245.2	0	1
CAPA-18-147588	R-51 S1	REG	EPA:335.4	0	1
CAPA-18-147588	R-51 S1	REG	EPA:351.2	0	1
CAPA-18-147588	R-51 S1	REG	EPA:900	0	2
CAPA-18-147588	R-51 S1	REG	EPA:901.1	0	5
CAPA-18-147588	R-51 S1	REG	EPA:905.0	0	1
CAPA-18-147588	R-51 S1	REG	HASL-300:AM-241	0	1
CAPA-18-147588	R-51 S1	REG	HASL-300:ISOPU	0	2
CAPA-18-147588	R-51 S1	REG	HASL-300:ISOU	0	3
CAPA-18-147588	R-51 S1	REG	SW-846:8260B	0	80
CAPA-18-147588	R-51 S1	REG	SW-846:8270D	0	80
CAPA-18-147588	R-51 S1	REG	SW-846:9060	0	1
CAPA-18-147589	R-51 S2	REG	EPA:170.0	0	1
CAPA-18-147589	R-51 S2	REG	EPA:245.2	0	1
CAPA-18-147589	R-51 S2	REG	EPA:335.4	0	1
CAPA-18-147589	R-51 S2	REG	EPA:351.2	0	1
CAPA-18-147589	R-51 S2	REG	EPA:900	0	2
CAPA-18-147589	R-51 S2	REG	EPA:901.1	0	5
CAPA-18-147589	R-51 S2	REG	EPA:905.0	0	1
CAPA-18-147589	R-51 S2	REG	HASL-300:AM-241	0	1
CAPA-18-147589	R-51 S2	REG	HASL-300:ISOPU	0	2
CAPA-18-147589	R-51 S2	REG	HASL-300:ISOU	0	3
CAPA-18-147589	R-51 S2	REG	SW-846:8260B	0	80
CAPA-18-147589	R-51 S2	REG	SW-846:8270D	0	80
CAPA-18-147589	R-51 S2	REG	SW-846:9060	0	1
CAPA-18-147613	R-51 S1	FTB	EPA:170.0	0	1
CAPA-18-147613	R-51 S1	FTB	SW-846:8260B	0	80
CAPA-18-147614	R-51 S2	FTB	EPA:170.0	0	1
CAPA-18-147614	R-51 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: 435631
SDG: 2018-518

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: 2018-518
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 435631
SDG: 2018-518

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 435631
SDG # : 2018-518**

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>
435631001	CAPA-18-147562
435631002	CAPA-18-147588
435631003	CAPA-18-147613
435631004	CAPA-18-147563
435631005	CAPA-18-147589
435631006	CAPA-18-147614

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

2018-518		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 Manja	10/19/17
(Signature)	3:00

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



Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: ESHL		SDG/AR/COC/Work Order: 435631	
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 9950-2°C 5908 1783 0037-2°C 5908 1782 9971-2°C 5908 1783 0004-3°C 5908 1782 0026-2°C 5908 1782 9993-2°C 5908 1782 9982-2°C 5908 1783 0015-3°C 5908 1782 9949-3°C 5908 1782 9960-3°C	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 (CPM) / mR/Hr	
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's <input type="checkbox"/> Flammable <input type="checkbox"/> Foreign Soil <input type="checkbox"/> RCRA <input type="checkbox"/> Asbestos <input type="checkbox"/> Beryllium <input type="checkbox"/> Other: _____	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken <input type="checkbox"/> Damaged container <input type="checkbox"/> Leaking container <input type="checkbox"/> Other (describe) _____
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet ice <input type="checkbox"/> Ice Packs <input checked="" type="checkbox"/> Dry ice <input type="checkbox"/> None <input checked="" type="checkbox"/> Other: _____ *all temperatures are recorded in Celsius <div style="text-align: right;">TEMP: See Above & Below</div>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: IR3-16 Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken <input type="checkbox"/> Damaged container <input checked="" type="checkbox"/> Leaking container <input type="checkbox"/> Other (describe) _____ TKN cont. for -147589 rec'd broken
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Sample ID's and containers affected: _____
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____ See Below & Attached
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

5908 1782 9938 -21°C (rchem)
5908 1782 9927 -20°C (rchem)

***We didn't receive one vial for -148252**

PM (or PMA) review: Initials

KH10ff

Date

10/23/17

Page

of

GL-CHL-SR-001 Rev 5

LABORATORIES LLC SAMPLE RECEIPT & REVIEW CONTINUATION FORM

Client: EHL Received By: ZW Date Received: 10/20/17 SDG/AR/COC/Work Order: 435031

* 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 KWioH Date 10/23 Page of

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.
ACTL
CAD:

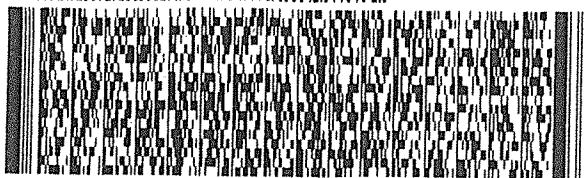
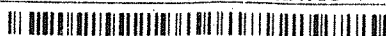
RT 257
ST F1

0 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BAGWS0



FedEx
Express

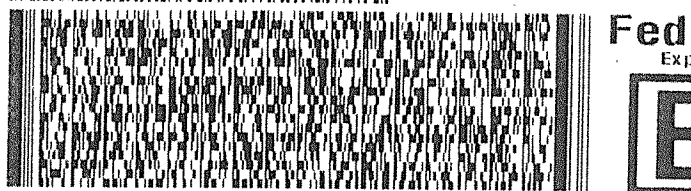


10 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 7E010AXU101020100



FedEx
Exp



1 of 3
TRK# 5908 1782 9971
0201

MASTER

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: 45.0 LB MAN
CAD: 0014176/CAFE2916

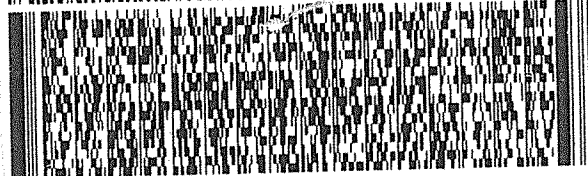
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BAGWS0



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Express



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

LOS ALAMOS, NM 87545
UNITED STATES US

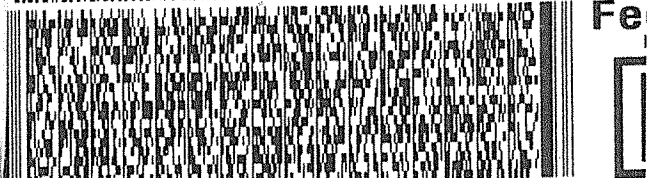
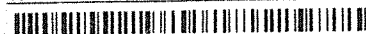
SHIP DATE: 19OCT17
ACTWGT: 44.0 LB MAN
CAD: 0014176/CAFE291

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GENERAL ENGINEERING I
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BAGWS0



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Exp



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PRIORITY OVERNIGHT

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2 of 2

MPS# 5908 1782 9950
0263

Mstr# 5908 1782 9949

0201

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PRIORITY OVERNIGHT

2
SC-US



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

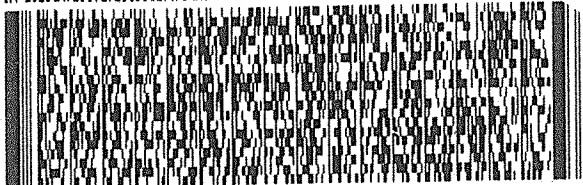
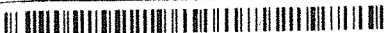
BILL SENDER

0 VALERIE DAVIS
GENERAL ENGINEERING
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRGW04BAGWS0



RT 257 2°C
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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

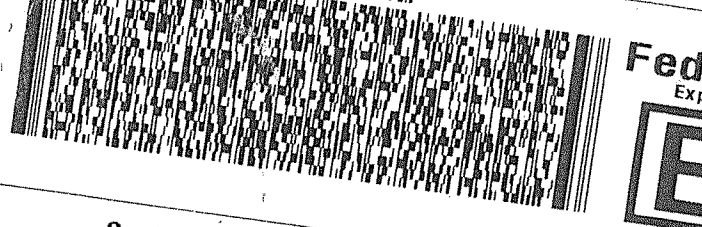
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 7E010AXU101020100



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Exp
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3 of 3

MPS# 5908 1782 9993

Mstr# 5908 1782 9971

0201

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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

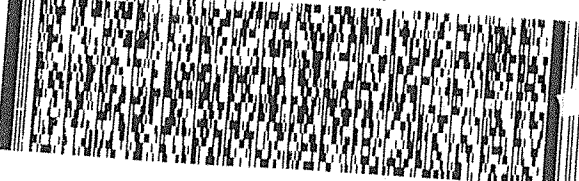
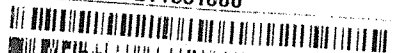
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: WE6L11551000



9927
10.20
VE
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

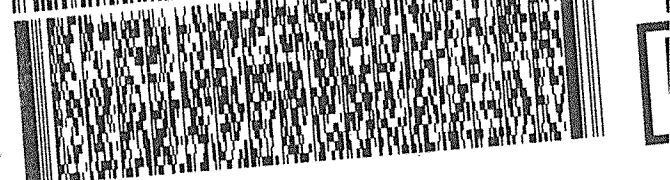
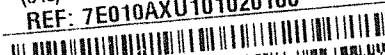
BILL SENDER

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GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 7E010AXU101020100



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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

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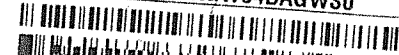
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TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWS0



2 of 2

MPS# 5908 1782 9938
0263

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FRI - 20 OCT 10:30
PRIORITY OVERNIGHT

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SC-US CH

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

LOS ALAMOS, NM 87545
UNITED STATES US

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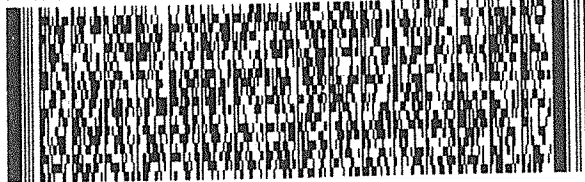
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GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWS0



2 of 3

MPS# 5908 1782 9982
0263

Mstr# 5908 1782 9971

X7 RBWA

0201

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

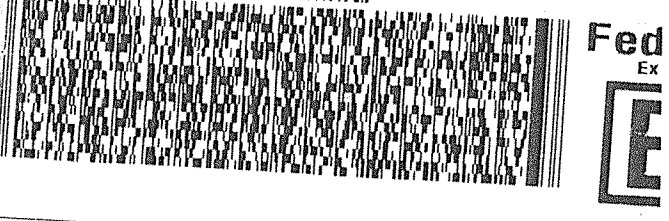
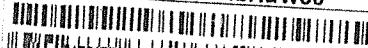
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GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWS0



1 of 2

TRK# 5908 1782 9949
0201

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/CAFE

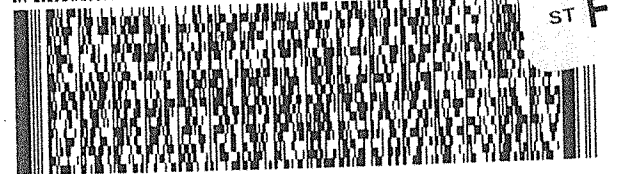
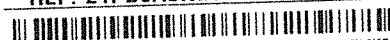
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

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REF: 21PD0ASRGW04BAGWS0



1 of 2

TRK# 5908 1782 9927
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MASTER

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FRI - 20 OCT
PRIORITY OVERNIGHT

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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 #: 2018-518
Work Order #: 435631**

Method/Analysis Information

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

Analytical Method: SW-846:8260B

Analytical Batch Number: 1714469

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
435631002	CAPA-18-147588
435631003	CAPA-18-147613
435631005	CAPA-18-147589
435631006	CAPA-18-147614
1203908829	Method Blank (MB)
1203908830	Laboratory Control Sample (LCS)
1203908831	435631002(CAPA-18-147588) Post Spike (PS)
1203908832	435631002(CAPA-18-147588) Post Spike Duplicate (PSD)
1203908833	Laboratory Control Sample (LCS)
1203908834	435631002(CAPA-18-147588) Post Spike (PS)
1203908835	435631002(CAPA-18-147588) 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 blank 1203908829 (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 spike recoveries met the acceptance limits.

QC Sample Designation

Sample 435631002 (CAPA-18-147588) 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
VOAA.I	Agilent 7890/5975 GC/MS w/ OI Eclipse/Archon Autosampler	HP7890A/HP5975C	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: 2018-518 GEL Work Order: 435631


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: 15 NOV 2017

Title: Data Validator

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-518

Lab Sample ID: 435631002

Date Collected: 10/18/2017 12:11

Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147588

Batch ID: 1714469

Run Date: 10/31/2017 12:26

Prep Date: 10/31/2017 12:26

Data File: 103117\AG209.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOAA.I

Analyst: JEB

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-518
Lab Sample ID: 435631002

Client ID: CAPA-18-147588
Batch ID: 1714469
Run Date: 10/31/2017 12:26
Prep Date: 10/31/2017 12:26
Data File: 103117\AG209.D

Date Collected: 10/18/2017 12:11
Date Received: 10/20/2017 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

Column: DB-624

Matrix: W

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

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-518
Lab Sample ID: 435631002

Date Collected: 10/18/2017 12:11
Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147588

Client: ARSL004

Project: ESHL00114

Batch ID: 1714469

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 10/31/2017 12:26

Inst: VOAA.I

Dilution: 1

Prep Date: 10/31/2017 12:26

Analyst: JEB

Purge Vol: 5 mL

Data File: 103117\AG209.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	55.1	50.0	ug/L 110	(71%-134%)
Bromofluorobenzene	48.7	50.0	ug/L 97	(70%-131%)
Toluene-d8	49.8	50.0	ug/L 100	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.413	7.94	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-518

Lab Sample ID: 435631003

Date Collected: 10/18/2017 12:11

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: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 12:50

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 12:50

Data File: 103117\AG210.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

Page 2 of 3

SDG Number: 2018-518

Lab Sample ID: 435631003

Date Collected: 10/18/2017 12:11

Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147613

Batch ID: 1714469

Run Date: 10/31/2017 12:50

Prep Date: 10/31/2017 12:50

Data File: 103117\AG210.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOAA.I

Analyst: JEB

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-518

Lab Sample ID: 435631003

Date Collected: 10/18/2017 12:11

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: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 12:50

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 12:50

Data File: 103117\AG210.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	54.3	50.0	ug/L 109	(71%-134%)
Bromofluorobenzene	48.6	50.0	ug/L 97	(70%-131%)
Toluene-d8	49.7	50.0	ug/L 99	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.423	6.51	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-518

Lab Sample ID: 435631005

Date Collected: 10/18/2017 10:39

Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147589

Batch ID: 1714469

Run Date: 10/31/2017 13:15

Prep Date: 10/31/2017 13:15

Data File: 103117\AG211.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOAA.I

Analyst: JEB

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-518

Lab Sample ID: 435631005

Date Collected: 10/18/2017 10:39

Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147589

Batch ID: 1714469

Run Date: 10/31/2017 13:15

Prep Date: 10/31/2017 13:15

Data File: 103117\AG211.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOAA.I

Analyst: JEB

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: 2018-518

Lab Sample ID: 435631005

Date Collected: 10/18/2017 10:39

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: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 13:15

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 13:15

Data File: 103117\AG211.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	54.0	50.0	ug/L 108	(71%-134%)
Bromofluorobenzene	49.1	50.0	ug/L 98	(70%-131%)
Toluene-d8	50.5	50.0	ug/L 101	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.413	7.48	ug/L	0	J
	unknown	13.732	5.66	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-518

Lab Sample ID: 435631006

Date Collected: 10/18/2017 10:39

Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147614

Batch ID: 1714469

Run Date: 10/31/2017 13:38

Prep Date: 10/31/2017 13:38

Data File: 103117\AG212.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOAA.I

Analyst: JEB

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-518

Lab Sample ID: 435631006

Date Collected: 10/18/2017 10:39

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: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 13:38

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 13:38

Data File: 103117\AG212.D

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-518

Lab Sample ID: 435631006

Date Collected: 10/18/2017 10:39

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: 1714469

Inst: VOAA.I

Dilution: 1

Run Date: 10/31/2017 13:38

Analyst: JEB

Purge Vol: 5 mL

Prep Date: 10/31/2017 13:38

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	54.6	50.0	ug/L 109	(71%-134%)
Bromofluorobenzene	49.8	50.0	ug/L 100	(70%-131%)
Toluene-d8	51.4	50.0	ug/L 103	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.423	8.1	ug/L	0	J

Quality Control Summary

Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-518**Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203908830	LCS for batch 1714469	106	99	95
1203908833	LCS for batch 1714469	105	101	101
1203908829	MB for batch 1714469	98	101	97
435631002	CAPA-18-147588	110	100	97
435631003	CAPA-18-147613	109	99	97
435631005	CAPA-18-147589	108	101	98
435631006	CAPA-18-147614	109	103	100
1203908831	CAPA-18-147588PS	106	101	99
1203908832	CAPA-18-147588PSD	105	99	97
1203908834	CAPA-18-147588PS	107	99	102
1203908835	CAPA-18-147588PSD	108	100	104

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: 2018-518

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714469

Matrix: WATER

Lab Sample ID 1203908830

Instrument: VOAA.I

Analysis Date: 10/31/2017 10:00

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	101	101	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1200	96	61-125
67-64-1	LCS Acetone	250	0.0	240	96	48-157
74-88-4	LCS Iodomethane	250	0.0	258	103	72-128
75-15-0	LCS Carbon disulfide	250	0.0	256	102	69-138
108-05-4	LCS Vinyl acetate	250	0.0	291	116	67-125
78-93-3	LCS 2-Butanone	250	0.0	225	90	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	257	103	66-124
591-78-6	LCS 2-Hexanone	250	0.0	252	101	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	59.8	120	40-160
74-87-3	LCS Chloromethane	50.0	0.0	55.2	110	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	56.1	112	65-137
74-83-9	LCS Bromomethane	50.0	0.0	37.5	75	63-137
75-00-3	LCS Chloroethane	50.0	0.0	52.9	106	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	57.1	114	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	53.8	108	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	52.2	104	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	50.6	101	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	53.0	106	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	52.1	104	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	50.2	100	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	50.7	101	75-123

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-518

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714469

Matrix: WATER

Lab Sample ID 1203908830

Instrument: VOAA.I

Analysis Date: 10/31/2017 10:00

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	56.7	113	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	52.2	104	76-125
67-66-3	LCS Chloroform	50.0	0.0	50.2	100	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	54.1	108	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	50.1	100	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	58.1	116	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	51.3	103	74-122
71-43-2	LCS Benzene	50.0	0.0	48.0	96	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	51.5	103	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	48.7	97	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	51.0	102	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	54.8	110	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	53.5	107	78-131
108-88-3	LCS Toluene	50.0	0.0	48.2	96	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	55.6	111	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	48.2	96	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	46.8	94	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	49.3	99	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	50.4	101	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	52.2	104	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	49.0	98	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: 2018-518

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714469

Matrix: WATER

Lab Sample ID 1203908830

Instrument: VOAA.I

Analysis Date: 10/31/2017 10:00

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	51.2	102	74-126
100-42-5	LCS Styrene	50.0	0.0	55.1	110	72-130
75-25-2	LCS Bromoform	50.0	0.0	60.4	121	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	50.4	101	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	47.6	95	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	48.8	98	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	48.7	97	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	48.2	96	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	51.1	102	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	49.4	99	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	47.6	95	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	52.2	104	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	50.7	101	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	51.0	102	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	52.7	105	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	48.1	96	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	47.9	96	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	51.3	103	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	61.7	123	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	53.6	107	72-136
91-20-3	LCS Naphthalene	50.0	0.0	55.1	110	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	53.1	106	70-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-518

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714469

Matrix: WATER

Lab Sample ID 1203908830

Instrument: VOAA.I

Analysis Date: 10/31/2017 10:00

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	54.7	109	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	57.0	114	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	49.0	98	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5170	103	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-518

Sample Type: Post Spike

Client ID: CAPA-18-147588PS

Matrix: W

Lab Sample ID 1203908831

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:33

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	76.3	76	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1010	81	56-131
67-64-1	PS Acetone	250	0.00 U	99.1	40	25-155
74-88-4	PS Iodomethane	250	0.00 U	227	91	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	227	91	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	253	101	48-133
78-93-3	PS 2-Butanone	250	0.00 U	138	55	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	209	83	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	173	69	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	51.2	102	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	58.2	116	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	58.8	118	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	44.4	89	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	49.6	99	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	52.5	105	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	50.0	100	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	43.7	87	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	45.0	90	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	45.0	90	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	44.4	89	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	45.2	90	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	44.7	89	69-127

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-518

Sample Type: Post Spike

Client ID: CAPA-18-147588PS

Matrix: W

Lab Sample ID 1203908831

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:33

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	45.5	91	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	45.3	91	71-130
67-66-3	PS Chloroform	50.0	0.00 U	44.2	88	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	44.3	89	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	41.0	82	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	47.4	95	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	47.0	94	69-130
71-43-2	PS Benzene	50.0	0.00 U	41.4	83	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	43.0	86	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	43.3	87	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	46.4	93	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	48.0	96	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	44.0	88	70-134
108-88-3	PS Toluene	50.0	0.00 U	39.7	79	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	45.5	91	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	42.8	86	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	43.5	87	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	36.0	72	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	42.5	85	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	45.4	91	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	39.0	78	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	38.0	76	61-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 8

SDG Number: 2018-518

Sample Type: Post Spike

Client ID: CAPA-18-147588PS

Matrix: W

Lab Sample ID 1203908831

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:33

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	39.2	78	62-131
100-42-5	PS Styrene	50.0	0.00 U	42.8	86	59-135
75-25-2	PS Bromoform	50.0	0.00 U	48.5	97	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	37.1	74	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	42.9	86	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	43.9	88	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	38.1	76	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	34.5	69	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	37.0	74	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	37.2	74	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	35.0	70	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	36.4	73	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	36.5	73	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	34.9	70	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	34.4	69	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	34.8	70	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	34.3	69	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	31.4	63	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	46.7	93	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	26.7	53	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	43.7	87	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	35.8	72	52-135

Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 8

SDG Number: 2018-518

Sample Type: Post Spike

Client ID: CAPA-18-147588PS

Matrix: W

Lab Sample ID 1203908831

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:33

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	33.9	68	50-133
630-20-6	PS	1,1,1,2-Tetrachloroethane	50.0	0.00	U	46.2	92	71-133
95-50-1	PS	1,2-Dichlorobenzene	50.0	0.00	U	36.9	74	60-125
71-36-3	PS	n-Butyl alcohol	5000	0.00	U	4000	80	60-140

Volatile
Quality Control Summary
Spike Recovery Report

Page 5 of 8

SDG Number: 2018-518

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147588PSD

Matrix: W

Lab Sample ID 1203908832

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:57

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	80.1	80	59-132	5	0-20
75-05-8	PSD Acetonitrile	1250	0.00 U	1100	88	56-131	9	0-20
67-64-1	PSD Acetone	250	0.00 U	108	43	25-155	9	0-20
74-88-4	PSD Iodomethane	250	0.00 U	236	95	66-133	4	0-20
75-15-0	PSD Carbon disulfide	250	0.00 U	235	94	61-141	3	0-20
108-05-4	PSD Vinyl acetate	250	0.00 U	264	106	48-133	4	0-20
78-93-3	PSD 2-Butanone	250	0.00 U	151	60	25-143	9	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00 U	225	90	61-127	8	0-20
591-78-6	PSD 2-Hexanone	250	0.00 U	189	76	33-138	9	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00 U	54.3	109	33-164	6	0-20
74-87-3	PSD Chloromethane	50.0	0.00 U	58.2	116	53-139	0	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00 U	58.6	117	58-140	0	0-20
74-83-9	PSD Bromomethane	50.0	0.00 U	43.3	87	59-146	3	0-20
75-00-3	PSD Chloroethane	50.0	0.00 U	50.2	100	65-129	1	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00 U	53.2	106	65-141	1	0-20
60-29-7	PSD Ethyl ether	50.0	0.00 U	53.1	106	69-127	6	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00 U	46.1	92	59-130	5	0-20
75-09-2	PSD Methylene chloride	50.0	0.00 U	47.4	95	62-123	5	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00 U	48.6	97	69-132	8	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00 U	47.0	94	65-127	6	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00 U	47.6	95	67-127	5	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00 U	46.9	94	69-127	5	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-518

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147588PSD

Matrix: W

Lab Sample ID 1203908832

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:57

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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 47.6	95	66-137	4	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00	U 47.8	96	71-130	5	0-20
67-66-3	PSD Chloroform	50.0	0.00	U 46.3	93	71-129	5	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00	U 46.3	93	69-139	4	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00	U 42.7	85	67-130	4	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00	U 49.5	99	66-143	4	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00	U 49.6	99	69-130	5	0-20
71-43-2	PSD Benzene	50.0	0.00	U 43.2	86	66-125	4	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00	U 44.7	89	65-131	4	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00	U 45.0	90	67-127	4	0-20
74-95-3	PSD Dibromomethane	50.0	0.00	U 47.7	95	72-129	3	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00	U 50.2	100	70-138	5	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00	U 46.4	93	70-134	5	0-20
108-88-3	PSD Toluene	50.0	0.00	U 41.2	82	60-126	4	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00	U 48.2	96	69-135	6	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00	U 44.6	89	66-125	4	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00	U 45.4	91	67-124	4	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00	U 37.7	75	60-130	5	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00	U 44.8	90	68-143	5	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00	U 47.7	95	71-127	5	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00	U 40.8	82	64-124	5	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00	U 39.9	80	61-130	5	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-518

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147588PSD

Matrix: W

Lab Sample ID 1203908832

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:57

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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 41.1	82	62-131	5	0-20
100-42-5	PSD Styrene	50.0	0.00	U 44.7	89	59-135	4	0-20
75-25-2	PSD Bromoform	50.0	0.00	U 52.5	105	64-138	8	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00	U 38.8	78	55-133	4	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00	U 44.9	90	62-129	4	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00	U 46.0	92	70-124	5	0-20
108-86-1	PSD Bromobenzene	50.0	0.00	U 40.1	80	62-124	5	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00	U 36.2	72	50-133	5	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00	U 38.7	77	53-135	5	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00	U 38.9	78	56-128	4	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00	U 36.8	74	53-130	5	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00	U 38.0	76	55-135	4	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00	U 38.1	76	53-132	4	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00	U 36.4	73	50-138	4	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00	U 35.4	71	49-138	3	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00	U 36.3	73	56-126	4	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00	U 35.7	71	55-125	4	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00	U 31.6	63	43-142	1	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00	U 51.0	102	62-141	9	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00	U 25.2	50	40-147	6	0-20
91-20-3	PSD Naphthalene	50.0	0.00	U 45.9	92	62-134	5	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00	U 36.2	72	52-135	1	0-20

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-518

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147588PSD

Matrix: W

Lab Sample ID 1203908832

Instrument: VOAA.I

Analysis Date: 10/31/2017 19:57

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	34.0	68	50-133	0	0-20
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00 U	48.5	97	71-133	5	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00 U	38.5	77	60-125	4	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00 U	4410	88	60-140	10	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-518

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714469

Matrix: WATER

Lab Sample ID 1203908833

Instrument: VOAA.I

Analysis Date: 10/31/2017 11:12

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	271	108	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	217	87	61-148
107-05-1	LCS	Allyl chloride	250	0.0	217	87	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	219	87	65-122
107-12-0	LCS	Propionitrile	250	0.0	220	88	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	236	95	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	249	99	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	234	94	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2400	96	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	44.5	89	66-147

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-518

Sample Type: Post Spike

Client ID: CAPA-18-147588PS

Matrix: W

Lab Sample ID 1203908834

Instrument: VOAA.I

Analysis Date: 10/31/2017 20:20

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	273	109	49-141
76-13-1	PS Trichlorotrifluoroethane	250	0.00 U	264	106	57-149
107-05-1	PS Allyl chloride	250	0.00 U	263	105	54-128
107-13-1	PS Acrylonitrile	250	0.00 U	265	106	59-129
107-12-0	PS Propionitrile	250	0.00 U	257	103	58-131
126-98-7	PS Methacrylonitrile	250	0.00 U	281	112	59-134
80-62-6	PS Methyl methacrylate	250	0.00 U	283	113	62-135
97-63-2	PS Ethyl methacrylate	250	0.00 U	265	106	60-136
78-83-1	PS Isobutyl alcohol	2500	0.00 U	2600	104	60-143
126-99-8	PS 2-Chloro-1,3-butadiene	50.0	0.00 U	51.1	102	63-146

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-518

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147588PSD

Matrix: W

Lab Sample ID 1203908835

Instrument: VOAA.I

Analysis Date: 10/31/2017 20:44

Dilution: 1

Analyst: JEB

Purge Vol: 5 mL

Batch ID: 1714469

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	250	100	49-141	9	0-20
76-13-1	PSD	Trichlorotrifluoroethane	250	0.00	U	251	101	57-149	5	0-20
107-05-1	PSD	Allyl chloride	250	0.00	U	255	102	54-128	3	0-20
107-13-1	PSD	Acrylonitrile	250	0.00	U	248	99	59-129	7	0-20
107-12-0	PSD	Propionitrile	250	0.00	U	239	95	58-131	7	0-20
126-98-7	PSD	Methacrylonitrile	250	0.00	U	267	107	59-134	5	0-20
80-62-6	PSD	Methyl methacrylate	250	0.00	U	273	109	62-135	3	0-20
97-63-2	PSD	Ethyl methacrylate	250	0.00	U	258	103	60-136	3	0-20
78-83-1	PSD	Isobutyl alcohol	2500	0.00	U	2360	95	60-143	9	0-20
126-99-8	PSD	2-Chloro-1,3-butadiene	50.0	0.00	U	49.0	98	63-146	4	0-20

Method Blank Summary

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SDG Number:	2018-518	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1714469	Instrument ID:	VOAA.I	Data File:	103117\AG207AR.D
Lab Sample ID:	1203908829	Prep Date:	10/31/2017 11:36	Analyzed:	10/31/17 11:36
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 1714469	1203908830	103117\AG203AR.D	10/31/17	1000
02 LCS for batch 1714469	1203908833	103117\AG206AR.D	10/31/17	1112
03 CAPA-18-147588	435631002	103117\AG209.D	10/31/17	1226
04 CAPA-18-147613	435631003	103117\AG210.D	10/31/17	1250
05 CAPA-18-147589	435631005	103117\AG211.D	10/31/17	1315
06 CAPA-18-147614	435631006	103117\AG212.D	10/31/17	1338
07 CAPA-18-147588PS	1203908831	103117\AG227.D	10/31/17	1933
08 CAPA-18-147588PSD	1203908832	103117\AG228.D	10/31/17	1957
09 CAPA-18-147588PS	1203908834	103117\AG229.D	10/31/17	2020
10 CAPA-18-147588PSD	1203908835	103117\AG230.D	10/31/17	2044

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-518
Lab Sample ID: 1203908829
Client Sample: QC for batch 1714469
Client ID: MB for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 11:36
Prep Date: 10/31/2017 11:36
Data File: 103117\AG207AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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	0.340	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number: 2018-518
Lab Sample ID: 1203908829
Client Sample: QC for batch 1714469
Client ID: MB for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 11:36
Prep Date: 10/31/2017 11:36
Data File: 103117\AG207AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

Column: DB-624

Matrix: WATER

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

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

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Certificate of Analysis
Sample Summary

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SDG Number:	2018-518	Matrix:	WATER
Lab Sample ID:	1203908829		
Client Sample:	QC for batch 1714469	Client:	ARSL004
Client ID:	MB for batch 1714469	Method:	SW-846:8260B
Batch ID:	1714469	Inst:	VOAA.I
Run Date:	10/31/2017 11:36	Analyst:	JEB
Prep Date:	10/31/2017 11:36		
Data File:	103117\AG207AR.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	48.8	50.0	ug/L 98	(71%-134%)
Bromofluorobenzene	48.4	50.0	ug/L 97	(70%-131%)
Toluene-d8	50.5	50.0	ug/L 101	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.423	5.16	ug/L	0	J

Volatile
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Sample Summary

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SDG Number: 2018-518
Lab Sample ID: 1203908830
Client Sample: QC for batch 1714469
Client ID: LCS for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 10:00
Prep Date: 10/31/2017 10:00
Data File: 103117\AG203AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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		57.0	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		54.1	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		47.6	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		48.2	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		50.2	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		52.2	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		50.1	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	53.1	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		48.8	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		54.7	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		50.7	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		61.7	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		52.2	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		49.0	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		51.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		48.7	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		51.1	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		48.1	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		46.8	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		47.9	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		56.7	ug/L	0.300	1.00
78-93-3	2-Butanone		225	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		49.4	ug/L	0.300	1.00
591-78-6	2-Hexanone		252	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		47.6	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		52.7	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		257	ug/L	1.50	5.00
67-64-1	Acetone		240	ug/L	1.50	10.0
75-05-8	Acetonitrile		1200	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		48.0	ug/L	0.300	1.00
108-86-1	Bromobenzene		48.7	ug/L	0.300	1.00
74-97-5	Bromochloromethane		52.2	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		54.8	ug/L	0.300	1.00
75-25-2	Bromoform		60.4	ug/L	0.300	1.00

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Sample Summary

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SDG Number: 2018-518
Lab Sample ID: 1203908830
Client Sample: QC for batch 1714469
Client ID: LCS for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 10:00
Prep Date: 10/31/2017 10:00
Data File: 103117\AG203AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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		37.5	ug/L	0.300	1.00
75-15-0	Carbon disulfide		256	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		58.1	ug/L	0.300	1.00
108-90-7	Chlorobenzene		49.0	ug/L	0.300	1.00
75-00-3	Chloroethane		52.9	ug/L	0.300	1.00
67-66-3	Chloroform		50.2	ug/L	0.300	1.00
74-87-3	Chloromethane		55.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		50.4	ug/L	0.300	1.00
74-95-3	Dibromomethane		51.0	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		59.8	ug/L	0.300	1.00
60-29-7	Ethyl ether		53.8	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		49.3	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		53.6	ug/L	0.300	1.00
74-88-4	Iodomethane		258	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		50.4	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		50.6	ug/L	1.00	10.0
91-20-3	Naphthalene		55.1	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		55.1	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		49.3	ug/L	0.300	1.00
108-88-3	Toluene		48.2	ug/L	0.300	1.00
79-01-6	Trichloroethylene		51.5	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		57.1	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		291	ug/L	1.50	5.00
75-01-4	Vinyl chloride		56.1	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		50.7	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		53.5	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		101	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5170	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		51.3	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		48.2	ug/L	0.300	1.00
95-47-6	o-Xylene		51.2	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		51.0	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-518	Matrix: WATER
Lab Sample ID: 1203908830	
Client Sample: QC for batch 1714469	Client: ARSL004
Client ID: LCS for batch 1714469	Method: SW-846:8260B
Batch ID: 1714469	Inst: VOAA.I
Run Date: 10/31/2017 10:00	Analyst: JEB
Prep Date: 10/31/2017 10:00	Column: DB-624
Data File: 103117\AG203AR.D	
	Project: QC
	SOP Ref: GL-OA-E-038
	Dilution: 1
	Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		53.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		52.2	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		52.1	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		55.6	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.2	50.0	ug/L	106	(71%-134%)
Bromofluorobenzene	47.7	50.0	ug/L	95	(70%-131%)
Toluene-d8	49.5	50.0	ug/L	99	(74%-124%)

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Sample Summary

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SDG Number: 2018-518
Lab Sample ID: 1203908831
Client Sample: QC for batch 1714469
Client ID: CAPA-18-147588PS
Batch ID: 1714469
Run Date: 10/31/2017 19:33
Prep Date: 10/31/2017 19:33
Data File: 103117\AG227.D

Date Collected: 10/18/2017 12:11
Date Received: 10/20/2017 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

Column: DB-624

Matrix: W

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		46.2	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		44.3	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		42.9	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		42.8	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		45.2	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		43.7	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		41.0	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	35.8	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		43.9	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		33.9	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		36.5	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		46.7	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		45.4	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		36.9	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		47.0	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		43.3	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		37.0	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		34.8	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		43.5	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		34.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		45.5	ug/L	0.300	1.00
78-93-3	2-Butanone		138	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		37.2	ug/L	0.300	1.00
591-78-6	2-Hexanone		173	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		35.0	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		34.4	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		209	ug/L	1.50	5.00
67-64-1	Acetone		99.1	ug/L	1.50	10.0
75-05-8	Acetonitrile		1010	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		41.4	ug/L	0.300	1.00
108-86-1	Bromobenzene		38.1	ug/L	0.300	1.00
74-97-5	Bromochloromethane		45.3	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		48.0	ug/L	0.300	1.00
75-25-2	Bromoform		48.5	ug/L	0.300	1.00

Volatile
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Sample Summary

SDG Number: 2018-518	Date Collected: 10/18/2017 12:11	Matrix: W
Lab Sample ID: 1203908831	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714469	Client: ARSL004	Project: QC
Client ID: CAPA-18-147588PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714469	Inst: VOAA.I	Dilution: 1
Run Date: 10/31/2017 19:33	Analyst: JEB	Purge Vol: 5 mL
Prep Date: 10/31/2017 19:33		
Data File: 103117\AG227.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		44.4	ug/L	0.300	1.00
75-15-0	Carbon disulfide		227	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		47.4	ug/L	0.300	1.00
108-90-7	Chlorobenzene		39.0	ug/L	0.300	1.00
75-00-3	Chloroethane		49.6	ug/L	0.300	1.00
67-66-3	Chloroform		44.2	ug/L	0.300	1.00
74-87-3	Chloromethane		58.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		42.5	ug/L	0.300	1.00
74-95-3	Dibromomethane		46.4	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		51.2	ug/L	0.300	1.00
60-29-7	Ethyl ether		50.0	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		38.0	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		26.7	ug/L	0.300	1.00
74-88-4	Iodomethane		227	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		37.1	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		45.0	ug/L	1.00	10.0
91-20-3	Naphthalene		43.7	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		42.8	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		36.0	ug/L	0.300	1.00
108-88-3	Toluene		39.7	ug/L	0.300	1.00
79-01-6	Trichloroethylene		43.0	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		52.5	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		253	ug/L	1.50	5.00
75-01-4	Vinyl chloride		58.8	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		44.7	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		44.0	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		76.3	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4000	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		31.4	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		34.5	ug/L	0.300	1.00
95-47-6	o-Xylene		39.2	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		34.9	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-518	Date Collected:	10/18/2017 12:11	Matrix:	W
Lab Sample ID:	1203908831	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714469	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147588PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714469	Inst:	VOAA.I	Dilution:	1
Run Date:	10/31/2017 19:33	Analyst:	JEB	Purge Vol:	5 mL
Prep Date:	10/31/2017 19:33				
Data File:	103117\AG227.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		45.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		36.4	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		44.4	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		45.5	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.1	50.0	ug/L	106	(71%-134%)
Bromofluorobenzene	49.7	50.0	ug/L	99	(70%-131%)
Toluene-d8	50.7	50.0	ug/L	101	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-518
Lab Sample ID: 1203908832
Client Sample: QC for batch 1714469
Client ID: CAPA-18-147588PSD
Batch ID: 1714469
Run Date: 10/31/2017 19:57
Prep Date: 10/31/2017 19:57
Data File: 103117\AG228.D

Date Collected: 10/18/2017 12:11
Date Received: 10/20/2017 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

Column: DB-624

Matrix: W

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		48.5	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		46.3	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		44.9	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		44.6	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		47.6	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		46.1	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		42.7	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	36.2	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		46.0	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		34.0	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		38.1	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		51.0	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		47.7	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		38.5	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		49.6	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		45.0	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		38.7	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		36.3	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		45.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		35.7	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		47.6	ug/L	0.300	1.00
78-93-3	2-Butanone		151	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		38.9	ug/L	0.300	1.00
591-78-6	2-Hexanone		189	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		36.8	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		35.4	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		225	ug/L	1.50	5.00
67-64-1	Acetone		108	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		43.2	ug/L	0.300	1.00
108-86-1	Bromobenzene		40.1	ug/L	0.300	1.00
74-97-5	Bromochloromethane		47.8	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		50.2	ug/L	0.300	1.00
75-25-2	Bromoform		52.5	ug/L	0.300	1.00

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Sample Summary

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SDG Number: 2018-518	Date Collected: 10/18/2017 12:11	Matrix: W
Lab Sample ID: 1203908832	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714469	Client: ARSL004	Project: QC
Client ID: CAPA-18-147588PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714469	Inst: VOAA.I	Dilution: 1
Run Date: 10/31/2017 19:57	Analyst: JEB	Purge Vol: 5 mL
Prep Date: 10/31/2017 19:57		
Data File: 103117\AG228.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		43.3	ug/L	0.300	1.00
75-15-0	Carbon disulfide		235	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		49.5	ug/L	0.300	1.00
108-90-7	Chlorobenzene		40.8	ug/L	0.300	1.00
75-00-3	Chloroethane		50.2	ug/L	0.300	1.00
67-66-3	Chloroform		46.3	ug/L	0.300	1.00
74-87-3	Chloromethane		58.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		44.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		47.7	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		54.3	ug/L	0.300	1.00
60-29-7	Ethyl ether		53.1	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		39.9	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		25.2	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		38.8	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		47.4	ug/L	1.00	10.0
91-20-3	Naphthalene		45.9	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		44.7	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		37.7	ug/L	0.300	1.00
108-88-3	Toluene		41.2	ug/L	0.300	1.00
79-01-6	Trichloroethylene		44.7	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		53.2	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		264	ug/L	1.50	5.00
75-01-4	Vinyl chloride		58.6	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		46.9	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		46.4	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		80.1	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4410	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		31.6	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		36.2	ug/L	0.300	1.00
95-47-6	o-Xylene		41.1	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		36.4	ug/L	0.300	1.00

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Sample Summary

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SDG Number:	2018-518	Date Collected:	10/18/2017 12:11	Matrix:	W
Lab Sample ID:	1203908832	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714469	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147588PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714469	Inst:	VOAA.I	Dilution:	1
Run Date:	10/31/2017 19:57	Analyst:	JEB	Purge Vol:	5 mL
Prep Date:	10/31/2017 19:57				
Data File:	103117\AG228.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		38.0	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		47.0	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		48.2	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.4	50.0	ug/L	105	(71%-134%)
Bromofluorobenzene	48.5	50.0	ug/L	97	(70%-131%)
Toluene-d8	49.5	50.0	ug/L	99	(74%-124%)

Volatile
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Sample Summary

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SDG Number: 2018-518
Lab Sample ID: 1203908833
Client Sample: QC for batch 1714469
Client ID: LCS for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 11:12
Prep Date: 10/31/2017 11:12
Data File: 103117\AG206AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

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		44.5	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		271	ug/L	1.50	5.00
107-13-1	Acrylonitrile		219	ug/L	1.50	5.00
107-05-1	Allyl chloride		217	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

**Volatile
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Sample Summary**

SDG Number: 2018-518
Lab Sample ID: 1203908833
Client Sample: QC for batch 1714469
Client ID: LCS for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 11:12
Prep Date: 10/31/2017 11:12
Data File: 103117\AG206AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		234	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2400	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		236	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		249	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		220	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		217	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: 2018-518
Lab Sample ID: 1203908833
Client Sample: QC for batch 1714469
Client ID: LCS for batch 1714469
Batch ID: 1714469
Run Date: 10/31/2017 11:12
Prep Date: 10/31/2017 11:12
Data File: 103117\AG206AR.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

Column: DB-624

Matrix: WATER

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.7	50.0	ug/L 105	(71%-134%)
Bromofluorobenzene	50.3	50.0	ug/L 101	(70%-131%)
Toluene-d8	50.5	50.0	ug/L 101	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-518
Lab Sample ID: 1203908834
Client Sample: QC for batch 1714469
Client ID: CAPA-18-147588PS
Batch ID: 1714469
Run Date: 10/31/2017 20:20
Prep Date: 10/31/2017 20:20
Data File: 103117\AG229.D

Date Collected: 10/18/2017 12:11
Date Received: 10/20/2017 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

Column: DB-624

Matrix: W

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		51.1	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		273	ug/L	1.50	5.00
107-13-1	Acrylonitrile		265	ug/L	1.50	5.00
107-05-1	Allyl chloride		263	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: 2018-518
Lab Sample ID: 1203908834
Client Sample: QC for batch 1714469
Client ID: CAPA-18-147588PS
Batch ID: 1714469
Run Date: 10/31/2017 20:20
Prep Date: 10/31/2017 20:20
Data File: 103117\AG229.D

Date Collected: 10/18/2017 12:11
Date Received: 10/20/2017 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

Column: DB-624

Matrix: W

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
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		265	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		2600	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		281	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		283	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		257	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:	2018-518	Date Collected:	10/18/2017 12:11	Matrix:	W
Lab Sample ID:	1203908834	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714469	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147588PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714469	Inst:	VOAA.I	Dilution:	1
Run Date:	10/31/2017 20:20	Analyst:	JEB	Purge Vol:	5 mL
Prep Date:	10/31/2017 20:20				
Data File:	103117\AG229.D	Column:	DB-624		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.7	50.0	ug/L	107	(71%-134%)
Bromofluorobenzene	50.9	50.0	ug/L	102	(70%-131%)
Toluene-d8	49.3	50.0	ug/L	99	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-518
Lab Sample ID: 1203908835
Client Sample: QC for batch 1714469
Client ID: CAPA-18-147588PSD
Batch ID: 1714469
Run Date: 10/31/2017 20:44
Prep Date: 10/31/2017 20:44
Data File: 103117\AG230.D

Date Collected: 10/18/2017 12:11
Date Received: 10/20/2017 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: JEB

Column: DB-624

Matrix: W

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		49.0	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		250	ug/L	1.50	5.00
107-13-1	Acrylonitrile		248	ug/L	1.50	5.00
107-05-1	Allyl chloride		255	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: 2018-518	Date Collected: 10/18/2017 12:11	Matrix: W
Lab Sample ID: 1203908835	Date Received: 10/20/2017 08:55	
Client Sample: QC for batch 1714469	Client: ARSL004	Project: QC
Client ID: CAPA-18-147588PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714469	Inst: VOAA.I	Dilution: 1
Run Date: 10/31/2017 20:44	Analyst: JEB	Purge Vol: 5 mL
Prep Date: 10/31/2017 20:44		
Data File: 103117\AG230.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		258	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		2360	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		267	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		273	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		239	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		251	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:	2018-518	Date Collected:	10/18/2017 12:11	Matrix:	W
Lab Sample ID:	1203908835	Date Received:	10/20/2017 08:55		
Client Sample:	QC for batch 1714469	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147588PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714469	Inst:	VOAA.I	Dilution:	1
Run Date:	10/31/2017 20:44	Analyst:	JEB	Purge Vol:	5 mL
Prep Date:	10/31/2017 20:44				
Data File:	103117\AG230.D	Column:	DB-624		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.9	50.0	ug/L	108	(71%-134%)
Bromofluorobenzene	51.8	50.0	ug/L	104	(70%-131%)
Toluene-d8	50.2	50.0	ug/L	100	(74%-124%)

Semi-Volatile Analysis

Case Narrative

**GC/MS Semivolatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-518
Work Order #: 435631**

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
435631002	CAPA-18-147588
435631005	CAPA-18-147589
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 435631002 (CAPA-18-147588) and 435631005 (CAPA-18-147589) 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 435631002 (CAPA-18-147588) and 435631005 (CAPA-18-147589) 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: 2018-518 GEL Work Order: 435631

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: 2018-518

Lab Sample ID: 435631002

Date Collected: 10/18/2017 12:11

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 22:04

Analyst: JLD1

Inj. Vol: 1 uL

Prep Date: 10/24/2017 06:59

Aliquot: 940 mL

Final Volume: 1 mL

Data File: s102417a.s\s3j2427.D

Column: DB-5ms

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

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

SDG Number: 2018-518
Lab Sample ID: 435631002

Date Collected: 10/18/2017 12:11
Date Received: 10/20/2017 08:55
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD3.I
Analyst: JLD1
Aliquot: 940 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-18-147588
Batch ID: 1711736
Run Date: 10/24/2017 22:04
Prep Date: 10/24/2017 06:59
Data File: s102417a.s\sj2427.D

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

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

Page 3 of 3

SDG Number: 2018-518

Lab Sample ID: 435631002

Date Collected: 10/18/2017 12:11

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 22:04

Analyst: JLD1

Inj. Vol: 1 uL

Prep Date: 10/24/2017 06:59

Aliquot: 940 mL

Final Volume: 1 mL

Data File: s102417a.s\s3j2427.D

Column: DB-5ms

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	75.1	106	ug/L	71 (32%-124%)
2-Fluorobiphenyl	39.0	53.2	ug/L	73 (32%-112%)
2-Fluorophenol	36.9	106	ug/L	35 (15%-88%)
Nitrobenzene-d5	42.0	53.2	ug/L	79 (36%-115%)
Phenol-d5	24.2	106	ug/L	23 (15%-91%)
p-Terphenyl-d14	45.1	53.2	ug/L	85 (36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000067-66-3	Trichloromethane	2.221	74.1	ug/L	97	NJ
000056-23-5	Carbon Tetrachloride	2.462	6.54	ug/L	90	NJ

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

Page 1 of 3

SDG Number: 2018-518

Lab Sample ID: 435631005

Date Collected: 10/18/2017 10:39

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 22:33

Analyst: JLD1

Inj. Vol: 1 uL

Prep Date: 10/24/2017 06:59

Aliquot: 880 mL

Final Volume: 1 mL

Data File: s102417a.s\sj2428.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.41	ug/L	3.41	11.4
120-82-1	1,2,4-Trichlorobenzene	U	3.41	ug/L	3.41	11.4
95-50-1	1,2-Dichlorobenzene	U	3.41	ug/L	3.41	11.4
122-66-7	Azobenzene	U	3.41	ug/L	3.41	11.4
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.41	ug/L	3.41	11.4
106-46-7	1,4-Dichlorobenzene	U	3.41	ug/L	3.41	11.4
123-91-1	1,4-Dioxane	U	3.41	ug/L	3.41	11.4
90-12-0	1-Methylnaphthalene	U	0.341	ug/L	0.341	1.14
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.41	ug/L	3.41	11.4
95-95-4	2,4,5-Trichlorophenol	U	3.41	ug/L	3.41	11.4
88-06-2	2,4,6-Trichlorophenol	U	3.41	ug/L	3.41	11.4
120-83-2	2,4-Dichlorophenol	U	3.41	ug/L	3.41	11.4
105-67-9	2,4-Dimethylphenol	U	3.41	ug/L	3.41	11.4
51-28-5	2,4-Dinitrophenol	U	5.68	ug/L	5.68	22.7
121-14-2	2,4-Dinitrotoluene	U	3.41	ug/L	3.41	11.4
606-20-2	2,6-Dinitrotoluene	U	3.41	ug/L	3.41	11.4
91-58-7	2-Chloronaphthalene	U	0.466	ug/L	0.466	1.14
95-57-8	2-Chlorophenol	U	3.41	ug/L	3.41	11.4
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.41	ug/L	3.41	11.4
91-57-6	2-Methylnaphthalene	U	0.341	ug/L	0.341	1.14
88-75-5	2-Nitrophenol	U	3.41	ug/L	3.41	11.4
91-94-1	3,3'-Dichlorobenzidine	U	3.41	ug/L	3.41	11.4
101-55-3	4-Bromophenylphenylether	U	3.41	ug/L	3.41	11.4
59-50-7	Parachlorometa cresol	U	3.41	ug/L	3.41	11.4
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.75	ug/L	3.75	11.4
7005-72-3	4-Chlorophenylphenylether	U	3.41	ug/L	3.41	11.4
100-02-7	4-Nitrophenol	U	3.41	ug/L	3.41	11.4
83-32-9	Acenaphthene	U	0.341	ug/L	0.341	1.14
208-96-8	Acenaphthylene	U	0.341	ug/L	0.341	1.14
62-53-3	Aniline	U	4.77	ug/L	4.77	11.4
120-12-7	Anthracene	U	0.341	ug/L	0.341	1.14
1912-24-9	Atrazine	U	3.41	ug/L	3.41	11.4
92-87-5	Benzidine	U	4.43	ug/L	4.43	11.4
56-55-3	Benzo(a)anthracene	U	0.341	ug/L	0.341	1.14
50-32-8	Benzo(a)pyrene	U	0.341	ug/L	0.341	1.14
205-99-2	Benzo(b)fluoranthene	U	0.341	ug/L	0.341	1.14
191-24-2	Benzo(ghi)perylene	U	0.341	ug/L	0.341	1.14

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

SDG Number: 2018-518

Lab Sample ID: 435631005

Date Collected: 10/18/2017 10:39

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 22:33

Analyst: JLD1

Inj. Vol: 1 uL

Prep Date: 10/24/2017 06:59

Aliquot: 880 mL

Final Volume: 1 mL

Data File: s102417a.s\sj2428.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.341	ug/L	0.341	1.14
65-85-0	Benzoic acid	U	6.82	ug/L	6.82	22.7
100-51-6	Benzyl alcohol	U	3.41	ug/L	3.41	11.4
85-68-7	Butylbenzylphthalate	U	3.41	ug/L	3.41	11.4
218-01-9	Chrysene	U	0.341	ug/L	0.341	1.14
84-74-2	Di-n-butylphthalate	U	3.41	ug/L	3.41	11.4
117-84-0	Di-n-octylphthalate	U	3.41	ug/L	3.41	11.4
53-70-3	Dibenzo(a,h)anthracene	U	0.341	ug/L	0.341	1.14
132-64-9	Dibenzofuran	U	3.41	ug/L	3.41	11.4
84-66-2	Diethylphthalate	U	3.41	ug/L	3.41	11.4
131-11-3	Dimethylphthalate	U	3.41	ug/L	3.41	11.4
88-85-7	Dinoseb	U	3.41	ug/L	3.41	11.4
122-39-4	Diphenylamine	U	3.41	ug/L	3.41	11.4
206-44-0	Fluoranthene	U	0.341	ug/L	0.341	1.14
86-73-7	Fluorene	U	0.341	ug/L	0.341	1.14
118-74-1	Hexachlorobenzene	U	3.41	ug/L	3.41	11.4
87-68-3	Hexachlorobutadiene	U	3.41	ug/L	3.41	11.4
77-47-4	Hexachlorocyclopentadiene	U	3.41	ug/L	3.41	11.4
67-72-1	Hexachloroethane	U	3.41	ug/L	3.41	11.4
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.341	ug/L	0.341	1.14
78-59-1	Isophorone	U	3.98	ug/L	3.98	11.4
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.41	ug/L	3.41	11.4
924-16-3	N-Nitrosodi-n-butylamine	U	3.41	ug/L	3.41	11.4
55-18-5	N-Nitrosodiethylamine	U	3.41	ug/L	3.41	11.4
621-64-7	N-Nitrosodi--n-propylamine	U	3.41	ug/L	3.41	11.4
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.41	ug/L	3.41	11.4
91-20-3	Naphthalene	U	0.341	ug/L	0.341	1.14
98-95-3	Nitrobenzene	U	3.41	ug/L	3.41	11.4
608-93-5	Pentachlorobenzene	U	3.41	ug/L	3.41	11.4
87-86-5	Pentachlorophenol	U	3.41	ug/L	3.41	11.4
85-01-8	Phenanthrene	U	0.341	ug/L	0.341	1.14
108-95-2	Phenol	U	3.41	ug/L	3.41	11.4
129-00-0	Pyrene	U	0.341	ug/L	0.341	1.14
110-86-1	Pyridine	U	3.41	ug/L	3.41	11.4
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.41	ug/L	3.41	11.4
111-91-1	bis(2-Chloroethoxy)methane	U	3.41	ug/L	3.41	11.4
111-44-4	bis(2-Chloroethyl) ether	U	3.41	ug/L	3.41	11.4
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.41	ug/L	3.41	11.4

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

Page 3 of 3

SDG Number: 2018-518

Lab Sample ID: 435631005

Date Collected: 10/18/2017 10:39

Date Received: 10/20/2017 08:55

Matrix: W

Client ID: CAPA-18-147589

Batch ID: 1711736

Run Date: 10/24/2017 22:33

Prep Date: 10/24/2017 06:59

Data File: s102417a.s\s3j2428.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD3.I

Analyst: JLD1

Aliquot: 880 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	4.20	ug/L	4.20	11.4
99-09-2	3-Nitroaniline	U	3.41	ug/L	3.41	11.4
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol	U	3.41	ug/L	3.41	11.4
88-74-4	2-Nitroaniline	U	3.41	ug/L	3.41	11.4
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline	U	3.41	ug/L	3.41	11.4
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	78.3	114	ug/L	69	(32%-124%)
2-Fluorobiphenyl	42.4	56.8	ug/L	75	(32%-112%)
2-Fluorophenol	42.4	114	ug/L	37	(15%-88%)
Nitrobenzene-d5	46.1	56.8	ug/L	81	(36%-115%)
Phenol-d5	28.7	114	ug/L	25	(15%-91%)
p-Terphenyl-d14	49.8	56.8	ug/L	88	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000067-66-3	Trichloromethane	2.216	80	ug/L	96	NJ
004124-31-6	Acetic acid, trichloro-, anhydride	2.457	7.28	ug/L	90	NJ

Quality Control Summary

Semi-Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-518

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
435631002	CAPA-18-147588	35	23	79	73	71	85
435631005	CAPA-18-147589	37	25	81	75	69	88

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: 2018-518

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: 2018-518

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

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SDG Number: 2018-518

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

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SDG Number: 2018-518

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

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SDG Number: 2018-518

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

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SDG Number: 2018-518

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: 2018-518

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: 2018-518

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: 2018-518

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 <i>N-Nitrosodipropylamine</i>	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: 2018-518

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: 2018-518

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</i> -Nitroaniline	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: 2018-518

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

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SDG Number:	2018-518	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-18-147588	435631002	s102417a.s\s3j2427.D	10/24/17	2204
05 CAPA-18-147589	435631005	s102417a.s\s3j2428.D	10/24/17	2233

Quality Control Data

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

Page 1 of 3

SDG Number: 2018-518

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**

Page 2 of 3

SDG Number: 2018-518

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: 2018-518	Matrix: WATER
Lab Sample ID: 1203901986	
Client Sample: QC for batch 1711735	Client: ARSL004
Client ID: MB for batch 1711735	Method: SW846 3510C/8270D
Batch ID: 1711736	Inst: MSD3.I
Run Date: 10/24/2017 15:40	Analyst: JLD1
Prep Date: 10/24/2017 06:59	Aliquot: 1000 mL
Data File: s102417a.s\s3j2414.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	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**

Page 1 of 3

SDG Number: 2018-518

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
Certificate of Analysis
Sample Summary**

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SDG Number: 2018-518

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
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
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SDG Number: 2018-518	Matrix: WATER	
Lab Sample ID: 1203901987		
Client Sample: QC for batch 1711735	Client: ARSL004	Project: QC
Client ID: LCS for batch 1711735	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1711736	Inst: MSD3.I	Dilution: 1
Run Date: 10/24/2017 16:09	Analyst: JLD1	Inj. Vol: 1 uL
Prep Date: 10/24/2017 06:59	Aliquot: 1000 mL	Final Volume: 1 mL
Data File: s102417a.s\s3j2415.D	Column: DB-5ms	

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%)

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SDG Number: 2018-518
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

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Sample Summary**

SDG Number: 2018-518	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\sj2421.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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SDG Number: 2018-518	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%)

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SDG Number: 2018-518	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
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

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Sample Summary**

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SDG Number: 2018-518	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

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-518	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 #: 2018-518
Work Order #: 435631**

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
435631001	435631001 (CAPA-18-147562)
435631004	435631004 (CAPA-18-147563)
1203905528	Interference Check Sample (ICS)
1203905524	Method Blank (MB)
1203905525	Laboratory Control Sample (LCS)
1203905526	435630001(CAPA-18-147560) Matrix Spike (MS)
1203905527	435630001(CAPA-18-147560) Matrix Spike Duplicate (MSD)

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

Preparation/Analytical Method Verification

SOP Reference

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

Calibration Information

Initial Calibration

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

ICV Requirements

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

CCB Requirements

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

CCV Requirements

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

Low Level Standard (CRI) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Interference Check Sample (ICS)

The ICS spike recoveries met the acceptance criteria.

QC Sample Designation

Client sample 435630001 (CAPA-18-147560) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

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

Internal Standard Area Acceptance

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

Retention Time

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

Technical Information

Holding Time Specifications

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

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Manual Integrations

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

Method Comments

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

Additional Comments

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

Perchlorate Isotope Ratio

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

System Configuration

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

Electronic Packaging Comment

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

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

Chromatographic Columns

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

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

Dionex: IonPac AG-16 2 x 50 mm.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-518 GEL Work Order: 435631

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-18-147562Date Received: 20-OCT-17GEL Job No (SDG): 2018-518GEL Sample ID: 435631001Date 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	0.285	ug/L		1	26-OCT-17 19:36	per1026022a
	Perchlorate Isotope Ratio			3.13			1	26-OCT-17 19:36	per1026022a
14797-73-0	Perchlorate-101	.05	.2	0.275	ug/L		1	26-OCT-17 19:36	per1026022a
	Perchlorate-O(18)			0.515	ug/L		1	26-OCT-17 19:36	per1026022a

^ 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-18-147563Date Received: 20-OCT-17GEL Job No (SDG): 2018-518GEL Sample ID: 435631004Date 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	0.287	ug/L		1	26-OCT-17 20:17	per1026026a
	Perchlorate Isotope Ratio			3.16			1	26-OCT-17 20:17	per1026026a
14797-73-0	Perchlorate-101	.05	.2	0.274	ug/L		1	26-OCT-17 20:17	per1026026a
	Perchlorate-O(18)			0.474	ug/L		1	26-OCT-17 20:17	per1026026a

^ 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): 2018-518

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): 2018-518

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): 2018-518GEL 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): 2018-518GEL 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): 2018-518GEL 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): 2018-518GEL 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): 2018-518GEL 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 #: 2018-518
Work Order #: 435631

Sample ID	Client ID
435631001	CAPA-18-147562
435631002	CAPA-18-147588
435631004	CAPA-18-147563
435631005	CAPA-18-147589
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 435631001,002,004 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

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: 2018-518 GEL Work Order: 435631

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: 2018-518**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435631001**BASIS:** As Received**DATE COLLECTED** 18-OCT-17**CLIENT ID:** CAPA-18-147562**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 11:24	110817W2-6	1716437

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-518

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 435631001

BASIS: As Received

DATE COLLECTED 18-OCT-17

CLIENT ID: CAPA-18-147562

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 18:27	111317-1	1711521
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/24/17 08:47	171023-4	1711535
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	10/24/17 08:47	171023-4	1711535
7440-39-3	Barium	22.8	ug/L		1	5	5	1	P	HSC	11/13/17 18:27	111317-1	1711521
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/13/17 18:27	111317-1	1711521
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	11/13/17 18:27	111317-1	1711521
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/24/17 08:47	171023-4	1711535
7440-70-2	Calcium	10600	ug/L		50	200	200	1	P	HSC	11/13/17 18:27	111317-1	1711521
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/24/17 13:45	171024-5	1711535
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/13/17 18:27	111317-1	1711521
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/13/17 18:27	111317-1	1711521
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	11/13/17 18:27	111317-1	1711521
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/24/17 08:47	171023-4	1711535
7439-95-4	Magnesium	2650	ug/L		110	300	300	1	P	HSC	11/13/17 18:27	111317-1	1711521
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	11/13/17 18:27	111317-1	1711521
7439-98-7	Molybdenum	1.24	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/24/17 08:47	171023-4	1711535
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/24/17 13:45	171024-5	1711535
7440-09-7	Potassium	1250	ug/L		50	150	150	1	P	HSC	11/15/17 15:43	111517-3	1711521
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/24/17 08:47	171023-4	1711535
7631-86-9	Silica	65600	ug/L		53	213	213	1	P	HSC	11/13/17 18:27	111317-1	1711521
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/24/17 08:47	171023-4	1711535
7440-23-5	Sodium	8790	ug/L		100	300	300	1	P	HSC	11/15/17 15:43	111517-3	1711521
7440-24-6	Strontium	46.7	ug/L		1	5	5	1	P	HSC	11/15/17 12:26	111517-2	1711521
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/24/17 08:47	171023-4	1711535
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	11/13/17 18:27	111317-1	1711521
7440-61-1	Uranium	0.186	ug/L	J	0.067	0.2	0.2	1	MS	BAJ	10/24/17 08:47	171023-4	1711535
7440-62-2	Vanadium	5.83	ug/L		1	5	5	1	P	HSC	11/13/17 18:27	111317-1	1711521
7440-66-6	Zinc	3.92	ug/L	J	3.3	10	10	1	P	HSC	11/15/17 12:26	111517-2	1711521

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-518**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 435631001**BASIS:** As Received**DATE COLLECTED** 18-OCT-17**CLIENT ID:** CAPA-18-147562**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	37.4	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: 2018-518**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435631002**BASIS:** As Received**DATE COLLECTED** 18-OCT-17**CLIENT ID:** CAPA-18-147588**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 11:26	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: 2018-518**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435631004**BASIS:** As Received**DATE COLLECTED** 18-OCT-17**CLIENT ID:** CAPA-18-147563**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 11:28	110817W2-6	1716437

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-518

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 435631004

BASIS: As Received

DATE COLLECTED 18-OCT-17

CLIENT ID: CAPA-18-147563

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 18:30	111317-1	1711521
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/24/17 08:51	171023-4	1711535
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	10/24/17 08:51	171023-4	1711535
7440-39-3	Barium	24.5	ug/L		1	5	5	1	P	HSC	11/13/17 18:30	111317-1	1711521
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/13/17 18:30	111317-1	1711521
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	11/13/17 18:30	111317-1	1711521
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/24/17 08:51	171023-4	1711535
7440-70-2	Calcium	10300	ug/L		50	200	200	1	P	HSC	11/13/17 18:30	111317-1	1711521
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/24/17 13:47	171024-5	1711535
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/13/17 18:30	111317-1	1711521
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/13/17 18:30	111317-1	1711521
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	11/13/17 18:30	111317-1	1711521
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/24/17 08:51	171023-4	1711535
7439-95-4	Magnesium	2820	ug/L		110	300	300	1	P	HSC	11/13/17 18:30	111317-1	1711521
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	11/13/17 18:30	111317-1	1711521
7439-98-7	Molybdenum	0.920	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/24/17 08:51	171023-4	1711535
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/24/17 13:47	171024-5	1711535
7440-09-7	Potassium	1400	ug/L		50	150	150	1	P	HSC	11/15/17 15:46	111517-3	1711521
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/24/17 08:51	171023-4	1711535
7631-86-9	Silica	67200	ug/L		53	213	213	1	P	HSC	11/13/17 18:30	111317-1	1711521
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/24/17 08:51	171023-4	1711535
7440-23-5	Sodium	9270	ug/L		100	300	300	1	P	HSC	11/15/17 15:46	111517-3	1711521
7440-24-6	Strontium	46.9	ug/L		1	5	5	1	P	HSC	11/15/17 12:29	111517-2	1711521
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/24/17 08:51	171023-4	1711535
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	11/13/17 18:30	111317-1	1711521
7440-61-1	Uranium	0.229	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/24/17 08:51	171023-4	1711535
7440-62-2	Vanadium	5.03	ug/L		1	5	5	1	P	HSC	11/13/17 18:30	111317-1	1711521
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	11/15/17 12:29	111517-2	1711521

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-518**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 435631004**BASIS:** As Received**DATE COLLECTED** 18-OCT-17**CLIENT ID:** CAPA-18-147563**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	37.3	mg/L		0.453	1.24	1.24	1		TXT1	11/16/17 10:06		1719596

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
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: 2018-518**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 435631005**BASIS:** As Received**DATE COLLECTED** 18-OCT-17**CLIENT ID:** CAPA-18-147589**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 11:30	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. 2018-518
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	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Calcium	50	ug/L	+/-200	U	P	50	200
	Copper	3	ug/L	+/-10	U	P	3	10
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Potassium	50	ug/L	+/-150	U	P	50	150
	Sodium	165	ug/L	+/-300	J	P	100	300
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Strontium	1	ug/L	+/-5	U	P	1	5
	Silica	53	ug/L	+/-213	U	P	53	213
	Manganese	2	ug/L	+/-10	U	P	2	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Cobalt	1	ug/L	+/-5	U	P	1	5
1203901526	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	2	ug/L	+/-5	U	MS	2	5
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	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. 2018-518

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>
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
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

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-518

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. 2018-518

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.: 2018-518

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.: 2018-518

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
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Duplicate Sample Summary

SDG No.: 2018–518**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

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Laboratory Control Sample Summary

SDG NO. 2018-518

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

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Laboratory Control Sample Summary

SDG NO. 2018-518

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								
	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
	Silver	ug/L	50	52.8		106	80-120	MS
	Thallium	ug/L	50	50.2		100	80-120	MS
	Uranium	ug/L	50	49.7		99.5	80-120	MS
	Selenium	ug/L	50	54.2		108	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-518

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

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Serial Dilution Sample Summary

SDG NO. 2018-518

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

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Serial Dilution Sample Summary

SDG NO. 2018-518

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

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Serial Dilution Sample Summary

SDG NO. 2018-518 **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 #: 2018-518
Work Order #: 435631**

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
435631002	CAPA-18-147588
435631005	CAPA-18-147589
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
435631002	CAPA-18-147588
435631005	CAPA-18-147589
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

Sample 1203901840 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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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
435631001	CAPA-18-147562
435631004	CAPA-18-147563
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), 435631001 (CAPA-18-147562) and 435631004 (CAPA-18-147563) were manually integrated to correctly position the baseline as set in the calibration standards.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product:	Ammonia Nitrogen		
Analytical Batch:	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
435631001	CAPA-18-147562
435631004	CAPA-18-147563
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 and 1714720	Method:	TKN
Prep Batch :	1712656 and 1714719	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
435631002	CAPA-18-147588
435631005	CAPA-18-147589
1203904066	Method Blank (MB)
1203909428	Method Blank (MB)
1203904067	Laboratory Control Sample (LCS)
1203909429	Laboratory Control Sample (LCS)
1203904070	435429002(CAMO-18-147649) Sample Duplicate (DUP)
1203909430	435631005(CAPA-18-147589) Sample Duplicate (DUP)
1203904071	435429002(CAMO-18-147649) Matrix Spike (MS)
1203909431	435631005(CAPA-18-147589) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-104 REV# 14.

Preparation/Analytical Method Verification

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

Calibration Information

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8000 Series.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information

Method Blank (MB) Statement

The 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) Designation

Samples 435429002 (CAMO-18-147649) and 435631005 (CAPA-18-147589) were 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%)
	1203909431 (CAPA-18-147589MS)	111* (90%-110%)

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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. Sample 1203909429 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1713174

Method: NO3NO2

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:353.2:

Sample ID	Client ID
435631001	CAPA-18-147562
435631004	CAPA-18-147563
1203905376	Method Blank (MB)
1203905377	Laboratory Control Sample (LCS)
1203905379	435630001(CAPA-18-147560) Sample Duplicate (DUP)
1203905383	435630001(CAPA-18-147560) Post Spike (PS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-128 REV# 9.

Preparation/Analytical Method Verification

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

Calibration Information

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8500 Series.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The following samples 1203905379 (CAPA-18-147560DUP), 1203905383 (CAPA-18-147560PS) and 435631001 (CAPA-18-147562) 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	435631
	001
Nitrogen, Nitrate/Nitrite	5X

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

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
435631001	CAPA-18-147562
435631004	CAPA-18-147563
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
435631001	CAPA-18-147562
435631004	CAPA-18-147563
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
435631001	CAPA-18-147562
435631004	CAPA-18-147563
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
435631001	CAPA-18-147562
435631004	CAPA-18-147563
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
435631001 (CAPA-18-147562)	pH	Received 20-OCT-17, out of holding 18-OCT-17
435631004 (CAPA-18-147563)	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
435631001	CAPA-18-147562
435631004	CAPA-18-147563
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: 2018-518 GEL Work Order: 435631


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: 2018-518

Client Sample ID: CAPA-18-147562
Sample ID: 435631001
Matrix: W
Collect Date: 18-OCT-17 12:11
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	1757	1711920	1
Chloride		1.98	0.067	0.200	mg/L		1					
Fluoride		0.286	0.033	0.100	mg/L		1					
Sulfate		1.95	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0449	0.017	0.050	mg/L	1.00	1	KLP1	10/27/17	0856	1712962	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.368	0.085	0.250	mg/L		5	KLP1	10/26/17	1329	1713174	3
PO4 "As Received"												
Phosphorus, Total as P		0.0897	0.020	0.050	mg/L	1.00	1	KLP1	10/26/17	1408	1713122	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		113	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		55.9	1.45	4.00	mg/L			RXB5	10/31/17	1732	1713711	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		133	1.00	1.00	umhos/cm		1	VH1	11/07/17	1542	1713570	7
PH "As Received"												
pH at Temp 12.1C	H	8.02	0.010	0.100	SU		1	RXB5	10/31/17	1731	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: 2018-518

Client Sample ID: CAPA-18-147562
Sample ID: 435631001

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
Project: LANL- WQH Water Samples

Client SDG: 2018-518

Client Sample ID: CAPA-18-147588
Sample ID: 435631002
Matrix: W
Collect Date: 18-OCT-17 12:11
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	2153	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	1209	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	1337	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: 2018-518

Client Sample ID: CAPA-18-147563
Sample ID: 435631004
Matrix: W
Collect Date: 18-OCT-17 10:39
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	1826	1711920	1
Chloride		1.85	0.067	0.200	mg/L		1					
Fluoride		0.139	0.033	0.100	mg/L		1					
Sulfate		1.92	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0722	0.017	0.050	mg/L	1.00	1	KLP1	10/27/17	0857	1712962	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.265	0.017	0.050	mg/L		1	KLP1	10/26/17	1330	1713174	3
PO4 "As Received"												
Phosphorus, Total as P		0.0896	0.020	0.050	mg/L	1.00	1	KLP1	10/26/17	1409	1713122	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		124	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		58.7	1.45	4.00	mg/L			RXB5	10/31/17	1738	1713711	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		134	1.00	1.00	umhos/cm		1	VH1	11/07/17	1543	1713570	7
PH "As Received"												
pH at Temp 13.1C	H	8.16	0.010	0.100	SU		1	RXB5	10/31/17	1732	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: 2018-518

Client Sample ID: CAPA-18-147563
Sample ID: 435631004

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: 2018-518

Client Sample ID: CAPA-18-147589
Sample ID: 435631005
Matrix: W
Collect Date: 18-OCT-17 10:39
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	2240	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	1210	1711667	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	11/02/17	0903	1714720	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	10/23/17	1106	1711666
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	11/01/17	1600	1714719

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Quality Control Summary

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QC Summary

Report Date: November 10, 2017

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

Contact: Ms. Nita Patel

Workorder: 435631

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

Workorder: 435631

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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

Workorder: 435631

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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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QC Summary

Workorder: 435631

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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
Batch	1714720										
QC1203909430	435631005	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	11/02/17	09:04
QC1203909429	LCS										
Nitrogen, Total Kjeldahl	1.00			0.967	mg/L		96.7	(90%-110%)		11/02/17	09:51
QC1203909428	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					11/02/17	09:00
QC1203909431	435631005	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	1.11	mg/L		111 *	(90%-110%)		11/02/17	09:05

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QC Summary

Workorder: 435631

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

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QC Summary

Workorder: 435631

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
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
- 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 #: 2018-518
Work Order #: 435631**

Method/Analysis Information

Product: Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Batch Number: 1713388

Sample ID	Client ID
435631002	CAPA-18-147588
435631005	CAPA-18-147589
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

Samples 1203905946 (MB) and 435631002 (CAPA-18-147588) were recounted due to a peak shift. The recounts are reported.

Miscellaneous Information:

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: ISOPU
Analytical Method: HASL-300:ISOPU
Analytical Batch Number: 1713389

Sample ID	Client ID
435631002	CAPA-18-147588
435631005	CAPA-18-147589
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

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

Sample	Analyte	Value
1203905950 (CAPA-18-147578DUP)	Plutonium-239/240	Result 0.00248 < MDA 0.0557 > RDL 0.05 pCi/L
435631002 (CAPA-18-147588)	Plutonium-239/240	Result -0.0128 < MDA 0.0576 > RDL 0.05 pCi/L
435631005 (CAPA-18-147589)	Plutonium-239/240	Result -0.000000000878 < MDA 0.0592 > 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

Additional comments were not required for this sample set.

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
435631002	CAPA-18-147588
435631005	CAPA-18-147589
1203905952	Method Blank (MB)
1203905954	Laboratory Control Sample (LCS)
1203905953	435630002(CAPA-18-147586) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 26.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244. The initial Calibrations were performed in November 2017 and October 2017.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

Aliquots for samples 1203905952 (MB) and 1203905954 (LCS) were changed to 1.0, and the MDCs (and Lc if requested) for all samples are calculated using a blank population per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank (See Below) result is greater than 1.65 times the CSU but less than the MDC.

Sample	Analyte	Value
1203905952 (MB)	Uranium-233/234	Blank result > 1.65 CSU

Blank Decision Level

The blank (See Below) result is greater than the decision level but less than the MDC.

Sample	Analyte	Value
1203905952 (MB)	Uranium-233/234	Blank result > DL

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

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

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Negative > 3 sigma TPU

Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

Sample 435631005 (CAPA-18-147589) was recounted due to a peak shift. The recount is reported.

Miscellaneous Information:

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: **Gammasec**
Analytical Method: EPA:901.1
Analytical Batch Number: 1711850

Sample ID	Client ID
435631002	CAPA-18-147588
435631005	CAPA-18-147589
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 August 2017, July 2017, May 2017 and September 2017.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 435410002 (CAMO-18-147652). The QC was from ARSL work order 435410.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

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

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: GFPC, Sr90, liquid

Analytical Method: EPA:905.0

Analytical Batch Number: 1714181

Sample ID	Client ID
435631002	CAPA-18-147588
435631005	CAPA-18-147589
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 prep 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
435631002	CAPA-18-147588
435631005	CAPA-18-147589
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

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
435631002	CAPA-18-147588
435631005	CAPA-18-147589
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: 2018-518 GEL Work Order: 435631

The Qualifiers in this report are defined as follows:

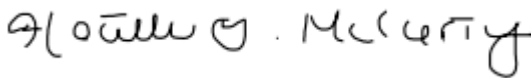
- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Review/Validation

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

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

Signature:



Name: Heather McCarty

Date: 16 NOV 2017

Title: Analyst II

Sample Data Summary

GEL LABORATORIES LLC

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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-18-147588
Sample ID: 435631002
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.
Rad Alpha Spec Analysis															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241	U	0.0083	+/-0.0083	0.0485	0.0205	+/-0.00831	0.050	pCi/L			JXR5	11/06/17	1716	1713388	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	-0.0103	+/-0.0131	0.0444	0.0187	+/-0.0131	0.050	pCi/L			JXR5	11/08/17	1455	1713389	2
Plutonium-239/240	U	-0.0128	+/-0.00768	0.0576	0.0253	+/-0.00769	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.248	+/-0.0302	0.0718	0.0313	+/-0.0328	1.00	pCi/L			JXR5	11/05/17	1532	1713390	3
Uranium-235/236	U	0.0335	+/-0.0133	0.0764	0.0325	+/-0.0134	1.00	pCi/L							
Uranium-238	U	0.0577	+/-0.0148	0.0694	0.0301	+/-0.0151	0.500	pCi/L							
Rad Gamma Spec Analysis															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	2.42	+/-1.24	3.96	1.70	+/-1.25	8.00	pCi/L			MXR1	11/03/17	1333	1711850	4
Cobalt-60	U	0.916	+/-1.23	5.31	2.23	+/-1.25	8.00	pCi/L							
Neptunium-237	U	-3.5	+/-2.23	7.19	3.22	+/-2.38		pCi/L							
Potassium-40	U	-9.97	+/-12.3	49.5	20.5	+/-12.6		pCi/L							
Sodium-22	U	-0.279	+/-1.17	4.65	1.92	+/-1.18		pCi/L							
Rad Gas Flow Proportional Counting															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	0.166	+/-0.130	0.434	0.204	+/-0.130	0.500	pCi/L			LXB3	11/09/17	0948	1714181	5
<i>WSP-GrossA/B "As Received"</i>															
Beta		5.30	+/-0.718	1.93	0.908	+/-0.849	3.00	pCi/L			AXH4	11/08/17	1207	1714187	6
Alpha	U	0.560	+/-0.736	2.82	1.05	+/-0.737	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	91.5	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1713389	72.3	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1713390	73.9	(50%-105%)

GEL LABORATORIES LLC

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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147588

Sample ID: 435631002

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	95.5	(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

GEL LABORATORIES LLC

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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147589

Sample ID: 435631005

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	0.0106	+/-0.00648	0.0464	0.0196	+/-0.0065	0.050	pCi/L			JXR5	11/05/17	1218	1713388	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	-1.32E-09	+/-0.00745	0.0456	0.0193	+/-0.00745	0.050	pCi/L			JXR5	11/08/17	1455	1713389	2
Plutonium-239/240	U	-8.78E-10	+/-0.00645	0.0592	0.026	+/-0.00645	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.254	+/-0.0262	0.0528	0.023	+/-0.029	1.00	pCi/L			JXR5	11/08/17	1322	1713390	3
Uranium-235/236	U	0.00617	+/-0.00872	0.0562	0.0239	+/-0.00873	1.00	pCi/L							
Uranium-238		0.125	+/-0.019	0.0511	0.0221	+/-0.0199	0.500	pCi/L							
Rad Gamma Spec Analysis															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	2.26	+/-1.28	5.84	2.51	+/-1.39	8.00	pCi/L			MXR1	11/03/17	1333	1711850	4
Cobalt-60	U	2.41	+/-1.83	8.31	3.51	+/-1.91	8.00	pCi/L							
Neptunium-237	U	0.637	+/-2.94	10.3	4.68	+/-2.95		pCi/L							
Potassium-40	U	12.4	+/-21.3	91.0	39.0	+/-21.5		pCi/L							
Sodium-22	U	-2.78	+/-2.12	6.98	2.86	+/-2.22		pCi/L							
Rad Gas Flow Proportional Counting															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	-0.0893	+/-0.118	0.443	0.202	+/-0.118	0.500	pCi/L			LXB3	11/09/17	1110	1714181	5
<i>WSP-GrossA/B "As Received"</i>															
Beta		4.35	+/-0.745	2.13	1.00	+/-0.832	3.00	pCi/L			AXH4	11/08/17	1208	1714187	6
Alpha	U	0.908	+/-0.770	2.73	1.01	+/-0.773	3.00	pCi/L			AXH4	11/11/17	1412	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	92.6	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1713389	74.5	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1713390	74.1	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1714181	96.8	(50%-105%)

GEL LABORATORIES LLC

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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147589

Sample ID: 435631005

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: 435631

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							

GEL LABORATORIES LLC

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QC Summary

Workorder: 435631

Page 2 of 6

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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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.