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:

General Engineering

Charleston SC

Chain of Custody/Analysis Request

COC/Lab Request #: 2018-565

Client Contact:

Lab Agreement #:

Project Number: ADEP

Site Name: Los Alamos National Laboratory

Analysis Turnaround Time:

24 Hour - ☐ Other - ☐

7 Days - ☐

14 Days - ☐

21 Days - ☐

28 Days - ☒

Rad Screening Info: Location ND

Lab Reporting Limit Type: Method Detection Limit

Field Sample ID	Sample Date	Sample Time	Sample Matrix	MSGP-Hg	WSP-8260B-VOA	WSP-8270C-SVOA	WSP-All Metals	WSP-CN(T)	WSP-GENINORG+PerChlorate	WSP-GrossA/B	WSP-NH3+NO3/NO2+PO4	WSP-RAD	WSP-TKN+TOC
CAPA-18-147551	Oct 24 2017	10:20	W				1		1		1		
CAPA-18-147577	Oct 24 2017	10:20	W	1	2	2		1		1		1	1
CAPA-18-147600	Oct 24 2017	10:20	W		~~2~~ 1								
CAPA-18-147552	Oct 24 2017	12:56	W				1		1		1		
CAPA-18-147578	Oct 24 2017	12:56	W	1	2	2		1		1		1	1
CAPA-18-147601	Oct 24 2017	12:56	W		~~2~~ 1								

Special Instructions:

Relinquished by:	Print Name: Melissa Montoya	Date/Time: 10/24/17 3:00	Received by:	Print Name:	Date/Time:
Relinquished by:	Print Name:	Date/Time:	Received by:	Print Name:	Date/Time:
Relinquished by:	Print Name:	Date/Time:	Received by:	Print Name:	Date/Time:

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147551

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):	10/24/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1020		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	RSP	
LOCATION ID:	R-23i S1		FIELD PREP:	F	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
MA	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	Y	MA
	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: 10/24/2017

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

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) (Signature) T. Bonham	**Date/Time** 10/24/2017 1350 ~~1450~~	**RECEIVED BY** (Printed Name) (Signature)	**Date/Time** 10/24/17 1350
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-18-147552

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):	10/24/2017	OR	FIELD MATRIX:	WG	OR
TIME COLLECTED (HH:MM):	1256		MEDIA:	OR	
PRS ID:	OR		SAMPLE TECH CODE:	RSP	
LOCATION ID:	R-23i S2		FIELD PREP:	F	
LOCATION TYPE:	OR		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

10-24-2017

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time
Tamar Bonham	10/24/2017 1350	M. Martin	10/24/17 1350
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147577

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):	10/24/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1020		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	RSP	
LOCATION ID:	R-23i S1		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
MA	MSGP-Hg	500 ML POLY	1	HNO3	Y	MA
	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: MA

LOCATION COMMENTS: MA

FIELD PARAMETERS:

Sample Time	1020	HH:MM	Dissolved Oxygen	5.53	Flow (in gpm)	1.35
Oxidation-Reduction Potential	16.9		pH	7.54	Specific Conductance	301.8
Temperature	14.6		Turbidity	13.2		

COLLECTED BY (PRINT): 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-18-147577

WORK ORDER:

RELINQUISHED BY **(Printed Name)** Tynner Barham **(Signature)**	**Date/Time** 10/24/2017 1350	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time** 10/24/17 1350
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-18-147578

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):	10/24/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1256		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	~~GS-RSP~~ 10/24/17 TTB	
LOCATION ID:	R-23i S2		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
MA	MSGP-Hg	500 ML POLY	1	HNO3	Y	MA
	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: MA

LOCATION COMMENTS: MA

FIELD PARAMETERS:

Sample Time	1256	HH:MM	Dissolved Oxygen	6.19	Flow (in gpm)	1.03
Oxidation-Reduction Potential	182.5		pH	8.13	Specific Conductance	201.3
Temperature	15.4		Turbidity	1.20		

COLLECTED BY (PRINT): 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-18-147578

WORK ORDER:

RELINQUISHED BY **(Printed Name)** Teresa Bonham **(Signature)**	**Date/Time** 10/24/2017 1350	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time** 10/24/17 1350
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-18-147600 **WORK ORDER:**

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):	10/24/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1020		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-23i S1		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
MA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	1/2	HCL 10/24/17	Y	MA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS: 10-24-2017

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

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) (Signature) Tanner Bonham	Date/Time 10/24/2017 1450 1350	RECEIVED BY (Printed Name) (Signature) M. Martin	Date/Time 10/24/17 1350
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-18-147601

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):	10/24/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1256		MEDIA:	OK	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-23i S2		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	4	HCL 10/24/17	Y	NA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS: 10-24-2017

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

COLLECTED BY (PRINT): T. Barham

RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time
Tanner Barham	10/24/2017 1350	M. Martinez	10/24/17 13:50
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

2018-565 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
• Am-241 > 27	• Am-241 > 270,000			
• Cs-137 > 270	• Cs-137 > 270,000			
• Pu-238 > 27	• Pu-238 > 270,000			
• Pu-239/240 > 27	• Pu-239/240 > 270,000			
• Th-228 > 27	• Th-228 > 270,000			
• U-234 > 270	• U-234 > 1,600,000,000			
• U-238 > 270	• U-238 > unlimited		X	
• H-3 > 27,000,000	• 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 Martin	10/25/17
(Signature)	30

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) MATT ENGLERT	10-25-17
(Signature)	

DATA VALIDATION REPORT

Chain Of Custody No. 2018-565

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
436322	EPA:120.1	2				
436322	EPA:150.1	2				
436322	EPA:160.1	2				
436322	EPA:170.0	4		2		
436322	EPA:245.2	4				
436322	EPA:300.0	2				
436322	EPA:310.1	2				
436322	EPA:335.4	2				
436322	EPA:350.1	2				
436322	EPA:351.2	2				
436322	EPA:353.2	2				
436322	EPA:365.4	2				
436322	EPA:900	2				
436322	EPA:901.1	2				
436322	EPA:905.0	2				
436322	HASL-300:AM-241	2				
436322	HASL-300:ISOPU	2				
436322	HASL-300:ISOU	2				
436322	SM:A2340B	2				
436322	SW-846:6010C	2				
436322	SW-846:6020	2				
436322	SW-846:6850	2				
436322	SW-846:8260B	2		2		
436322	SW-846:8270D	2				
436322	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
436322	EPA:120.1	1714428	1714428	2										1				1			
436322	EPA:150.1	1714511	1714511	2										1				1			
436322	EPA:160.1	1714068	1714068	2					1					1				1			
436322	EPA:170.0	NA	NA	4		2															
436322	EPA:245.2	1717920	1717917	4					1	1				1				1			
436322	EPA:300.0	1715567	1715567	2					1					1				1			
436322	EPA:310.1	1714485	1714485	2						1				1				1			
436322	EPA:335.4	1712934	1712933	2					1	1				1				1			
436322	EPA:350.1	1714362	1714361	2					1	1				1				1			
436322	EPA:351.2	1714720	1714719	2					1	1				1				1			
436322	EPA:353.2	1714065	1714065	2					1					1				1			
436322	EPA:365.4	1714064	1714063	2					1	1				1				1			
436322	EPA:900	1716449	1716449	2					1	1	1			1				1			
436322	EPA:901.1	1713592	1713592	2					1					1				1			
436322	EPA:905.0	1714184	1714184	2					1	1				1				1			
436322	HASL-300:AM-241	1713388	1713388	2					1					1				1			
436322	HASL-300:ISOPU	1713389	1713389	2					1					1				1			
436322	HASL-300:ISOU	1713390	1713390	2					1					1				1			
436322	SM:A2340B	1720822	1720822	2																	
436322	SW-846:6010C	1713303	1713302	2					1	1				1				1			
436322	SW-846:6020	1713329	1713328	2					1	1				1				1			
436322	SW-846:6850	1714762	1714758	2					1	1	1			1							
436322	SW-846:8260B	1714932	1714932	2		2			2					4							
436322	SW-846:8270D	1713403	1713402	2					1	1	1			1							
436322	SW-846:9060	1714357	1714357	2					1					1				1			

2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAPA-18-147551	436322001	REG	1	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAPA-18-147552	436322005	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPA-18-147558	1203908703	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203908702	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147551	436322001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147552	436322005	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147554	1203908950	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203908949	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147551	436322001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147552	436322005	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147554	1203907669	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203907668	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203907667	MB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147551	436322001	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147552	436322005	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147577	436322002	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147578	436322006	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147600	436322004	FTB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147601	436322008	FTB	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147551	436322001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147552	436322005	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147569	1203917284	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147569	1203917286	MS	0	0	1	0
EPA:245.2	INORGANIC	CAPA-18-147577	436322002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147578	436322006	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203917283	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203917282	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147551	436322001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147552	436322005	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147570	1203911415	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203911414	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203911413	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147551	436322001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147552	436322005	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147554	1203908889	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147554	1203908891	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203908862	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAPA-18-147574	1203904784	DUP	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147574	1203904786	MS	0	0	1	0
EPA:335.4	INORGANIC	CAPA-18-147577	436322002	REG	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147578	436322006	REG	1	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:335.4	INORGANIC	LCS	1203904783	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203904782	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147551	436322001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147552	436322005	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147558	1203908497	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147558	1203908498	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203908496	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203908495	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147577	436322002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147578	436322006	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	LCS	1203909429	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203909428	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147551	1203907656	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147551	436322001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147552	436322005	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203907655	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203907654	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147551	1203907648	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147551	1203907649	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147551	436322001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147552	436322005	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203907647	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203907646	MB	1	0	0	0
EPA:900	RAD	CAPA-18-147577	436322002	REG	2	0	0	0
EPA:900	RAD	CAPA-18-147578	436322006	REG	2	0	0	0
EPA:900	RAD	CAPA-18-147631	1203913665	DUP	2	0	0	0
EPA:900	RAD	CAPA-18-147631	1203913666	MS	0	0	2	0
EPA:900	RAD	CAPA-18-147631	1203913667	MSD	0	0	2	0
EPA:900	RAD	LCS	1203913668	LCS	0	0	2	0
EPA:900	RAD	MB	1203913664	MB	2	0	0	0
EPA:901.1	RAD	CAPA-18-147574	1203906423	DUP	5	0	0	0
EPA:901.1	RAD	CAPA-18-147577	436322002	REG	5	0	0	0
EPA:901.1	RAD	CAPA-18-147578	436322006	REG	5	0	0	0
EPA:901.1	RAD	LCS	1203906424	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203906422	MB	5	0	0	0
EPA:905.0	RAD	CAPA-18-147574	1203907995	DUP	1	0	0	0
EPA:905.0	RAD	CAPA-18-147574	1203907996	MS	0	0	1	0
EPA:905.0	RAD	CAPA-18-147577	436322002	REG	1	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:905.0	RAD	CAPA-18-147578	436322006	REG	1	0	0	0
EPA:905.0	RAD	LCS	1203907997	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203907994	MB	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147577	436322002	REG	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147578	436322006	REG	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147586	1203905947	DUP	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-18-147577	436322002	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147578	1203905950	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147578	436322006	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-18-147577	436322002	REG	3	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147578	436322006	REG	3	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147586	1203905953	DUP	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-18-147551	436322001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAPA-18-147552	436322005	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147551	1203905704	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147551	1203905705	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAPA-18-147551	436322001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147552	436322005	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203905703	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203905702	MB	17	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147551	1203905770	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147551	1203905771	MS	0	0	11	0
SW-846:6020	INORGANIC	CAPA-18-147551	436322001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147552	436322005	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203905769	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203905768	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147551	1203909515	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147551	1203909516	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147551	436322001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147552	436322005	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203909514	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203909513	MB	1	0	0	0
SW-846:8260B	VOC	CAPA-18-147577	436322003	REG	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147578	436322007	REG	80	3	0	0

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:8260B	VOC	CAPA-18-147600	436322004	FTB	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147601	436322008	FTB	80	3	0	0
SW-846:8260B	VOC	LCS	1203909913	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203909914	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203910785	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203910786	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203909912	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203910784	MB	80	3	0	0
SW-846:8270D	SVOC	CAPA-18-147577	436322003	REG	80	6	0	0
SW-846:8270D	SVOC	CAPA-18-147578	436322007	REG	80	6	0	0
SW-846:8270D	SVOC	CAPA-18-147580	1203905984	MS	0	6	76	0
SW-846:8270D	SVOC	CAPA-18-147580	1203905986	MSD	0	6	76	0
SW-846:8270D	SVOC	LCS	1203905983	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203905982	MB	80	6	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147577	436322002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147578	1203908474	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147578	436322006	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203908473	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203908472	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203905702	METHOD BLANK	SW-846:6010C	W	Potassium	-50.5	J	ug/L	150

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
CAPA-18-147600	436322004	TRIP BLANK	EPA:170.0	W	Temperature	1		Deg C	
CAPA-18-147601	436322008	TRIP BLANK	EPA:170.0	W	Temperature	1		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-18-147551	1203905702	METHOD BLANK	SW-846:6010C	Potassium	-50.5	ug/L	3470		150	Y			
CAPA-18-147552	1203905702	METHOD BLANK	SW-846:6010C	Potassium	-50.5	ug/L	2450		150	Y			

6. Any surrogate recoveries outside the control limits?

No.

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

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CAPA-18-147589	1203909431		EPA:351.2	Total Kjeldahl Nitrogen	1714719	11-02-2017	W	111		110	90	10		

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

Field Sample ID	Lab Sample ID	LD Lab Sample ID	Analytical Method	Parameter Name	Sample Matrix	Lab Result	LD Lab Result	Lab Units	Detect Flag	LD Detect Flag	RPD	RPD Limit
CAPA-18-147551	436322001	1203905704	SW-846:6010C	Zinc	W	29.4	22.7	ug/L	Y	Y	25.9	20

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	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-23i S1	2018-565	CAPA-18-147577	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0	pCi/L	0	pCi/L	0.0424	0.00683	W	10/24/2017		1713388	VAL	Y
R-23i S1	2018-565	CAPA-18-147577	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	0.627	pCi/L	0.627	pCi/L	4.96	1.31	W	10/24/2017		1713592	VAL	Y
R-23i S1	2018-565	CAPA-18-147577	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	0.738	pCi/L	0.738	pCi/L	5.63	1.37	W	10/24/2017		1713592	VAL	Y
R-23i S1	2018-565	CAPA-18-147577	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	1.7	pCi/L	1.7	pCi/L	2.39	0.845	W	10/24/2017		1716449	VAL	Y
R-23i S1	2018-565	CAPA-18-147577	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-0.302	pCi/L	-0.302	pCi/L	8.50	2.29	W	10/24/2017		1713592	VAL	Y
R-23i S1	2018-565	CAPA-18-147577	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0	pCi/L	0	pCi/L	0.0337	0.00476	W	10/24/2017		1713389	VAL	Y
R-23i S1	2018-565	CAPA-18-147577	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.00582	pCi/L	-0.00582	pCi/L	0.0436	0.0101	W	10/24/2017		1713389	VAL	Y
R-23i S1	2018-565	CAPA-18-147577	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-13.9	pCi/L	-13.9	pCi/L	62.6	17.3	W	10/24/2017		1713592	VAL	Y
R-23i S1	2018-565	CAPA-18-147577	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-0.653	pCi/L	-0.653	pCi/L	5.34	1.44	W	10/24/2017		1713592	VAL	Y
R-23i S1	2018-565	CAPA-18-147577	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.0847	pCi/L	0.0847	pCi/L	0.449	0.125	W	10/24/2017		1714184	VAL	Y
R-23i S1	2018-565	CAPA-18-147577	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0272	pCi/L	0.0272	pCi/L	0.0495	0.0102	W	10/24/2017		1713390	VAL	Y
R-23i S2	2018-565	CAPA-18-147578	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00828	pCi/L	0.00828	pCi/L	0.0363	0.00717	W	10/24/2017		1713388	VAL	Y

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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-23i S2	2018-565	CAPA-18-147578	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	-0.658	pCi/L	-0.658	pCi/L	4.02	1.13	W	10/24/2017		1713592	VAL	Y
R-23i S2	2018-565	CAPA-18-147578	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-0.901	pCi/L	-0.901	pCi/L	2.94	0.820	W	10/24/2017		1713592	VAL	Y
R-23i S2	2018-565	CAPA-18-147578	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.331	pCi/L	0.331	pCi/L	2.59	0.646	W	10/24/2017		1716449	VAL	Y
R-23i S2	2018-565	CAPA-18-147578	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-1.1	pCi/L	-1.1	pCi/L	7.60	2.32	W	10/24/2017		1713592	VAL	Y
R-23i S2	2018-565	CAPA-18-147578	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.0122	pCi/L	-0.0122	pCi/L	0.053	0.00968	W	10/24/2017		1713389	VAL	Y
R-23i S2	2018-565	CAPA-18-147578	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0184	pCi/L	-0.0184	pCi/L	0.0688	0.0122	W	10/24/2017		1713389	VAL	Y
R-23i S2	2018-565	CAPA-18-147578	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-24	pCi/L	-24	pCi/L	59.4	16.2	W	10/24/2017		1713592	VAL	Y
R-23i S2	2018-565	CAPA-18-147578	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-0.236	pCi/L	-0.236	pCi/L	4.60	1.16	W	10/24/2017		1713592	VAL	Y
R-23i S2	2018-565	CAPA-18-147578	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.286	pCi/L	0.286	pCi/L	0.435	0.137	W	10/24/2017		1714184	VAL	Y
R-23i S2	2018-565	CAPA-18-147578	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0636	pCi/L	0.0636	pCi/L	0.0644	0.0158	W	10/24/2017		1713390	VAL	Y

Reason Code	Description
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-18-147551	R-23i S1	REG	EPA:120.1	0	1
CAPA-18-147551	R-23i S1	REG	EPA:150.1	0	1
CAPA-18-147551	R-23i S1	REG	EPA:160.1	0	1
CAPA-18-147551	R-23i S1	REG	EPA:170.0	0	1
CAPA-18-147551	R-23i S1	REG	EPA:245.2	0	1
CAPA-18-147551	R-23i S1	REG	EPA:300.0	0	4
CAPA-18-147551	R-23i S1	REG	EPA:310.1	0	2
CAPA-18-147551	R-23i S1	REG	EPA:350.1	0	1
CAPA-18-147551	R-23i S1	REG	EPA:353.2	0	1
CAPA-18-147551	R-23i S1	REG	EPA:365.4	0	1

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Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147551	R-23i S1	REG	SM:A2340B	0	1
CAPA-18-147551	R-23i S1	REG	SW-846:6010C	0	17
CAPA-18-147551	R-23i S1	REG	SW-846:6020	0	11
CAPA-18-147551	R-23i S1	REG	SW-846:6850	0	1
CAPA-18-147552	R-23i S2	REG	EPA:120.1	0	1
CAPA-18-147552	R-23i S2	REG	EPA:150.1	0	1
CAPA-18-147552	R-23i S2	REG	EPA:160.1	0	1
CAPA-18-147552	R-23i S2	REG	EPA:170.0	0	1
CAPA-18-147552	R-23i S2	REG	EPA:245.2	0	1
CAPA-18-147552	R-23i S2	REG	EPA:300.0	0	4
CAPA-18-147552	R-23i S2	REG	EPA:310.1	0	2
CAPA-18-147552	R-23i S2	REG	EPA:350.1	0	1
CAPA-18-147552	R-23i S2	REG	EPA:353.2	0	1
CAPA-18-147552	R-23i S2	REG	EPA:365.4	0	1
CAPA-18-147552	R-23i S2	REG	SM:A2340B	0	1
CAPA-18-147552	R-23i S2	REG	SW-846:6010C	0	17
CAPA-18-147552	R-23i S2	REG	SW-846:6020	0	11
CAPA-18-147552	R-23i S2	REG	SW-846:6850	0	1
CAPA-18-147577	R-23i S1	REG	EPA:170.0	0	1
CAPA-18-147577	R-23i S1	REG	EPA:245.2	0	1
CAPA-18-147577	R-23i S1	REG	EPA:335.4	0	1
CAPA-18-147577	R-23i S1	REG	EPA:351.2	0	1
CAPA-18-147577	R-23i S1	REG	EPA:900	0	2
CAPA-18-147577	R-23i S1	REG	EPA:901.1	0	5
CAPA-18-147577	R-23i S1	REG	EPA:905.0	0	1
CAPA-18-147577	R-23i S1	REG	HASL-300:AM-241	0	1
CAPA-18-147577	R-23i S1	REG	HASL-300:ISOPU	0	2
CAPA-18-147577	R-23i S1	REG	HASL-300:ISOU	0	3
CAPA-18-147577	R-23i S1	REG	SW-846:8260B	0	80
CAPA-18-147577	R-23i S1	REG	SW-846:8270D	0	80
CAPA-18-147577	R-23i S1	REG	SW-846:9060	0	1
CAPA-18-147578	R-23i S2	REG	EPA:170.0	0	1
CAPA-18-147578	R-23i S2	REG	EPA:245.2	0	1
CAPA-18-147578	R-23i S2	REG	EPA:335.4	0	1
CAPA-18-147578	R-23i S2	REG	EPA:351.2	0	1
CAPA-18-147578	R-23i S2	REG	EPA:900	0	2
CAPA-18-147578	R-23i S2	REG	EPA:901.1	0	5

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147578	R-23i S2	REG	EPA:905.0	0	1
CAPA-18-147578	R-23i S2	REG	HASL-300:AM-241	0	1
CAPA-18-147578	R-23i S2	REG	HASL-300:ISOPU	0	2
CAPA-18-147578	R-23i S2	REG	HASL-300:ISOU	0	3
CAPA-18-147578	R-23i S2	REG	SW-846:8260B	0	80
CAPA-18-147578	R-23i S2	REG	SW-846:8270D	0	80
CAPA-18-147578	R-23i S2	REG	SW-846:9060	0	1
CAPA-18-147600	R-23i S1	FTB	EPA:170.0	0	1
CAPA-18-147600	R-23i S1	FTB	SW-846:8260B	0	80
CAPA-18-147601	R-23i S2	FTB	EPA:170.0	0	1
CAPA-18-147601	R-23i S2	FTB	SW-846:8260B	0	80

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
F 843.766.1178

gel.com

November 17, 2017

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

Re: LANL- WQH Water Samples
Work Order: 436322
SDG: 2018-565

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on October 26, 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: 2018-565
Enclosures

ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 436322
SDG: 2018-565

Table of Contents

Case Narrative

Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 436322
SDG # : 2018-565

November 17, 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 26, 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:

Laboratory ID	Client ID
436322001	CAPA-18-147551
436322002	CAPA-18-147577
436322003	CAPA-18-147577
436322004	CAPA-18-147600
436322005	CAPA-18-147552
436322006	CAPA-18-147578
436322007	CAPA-18-147578
436322008	CAPA-18-147601

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 17 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

436322

General Engineering Charleston SC	Chain of Custody/Analysis Request	COC/Lab Request #: 2018-565 Page 1 of 1

Client Contact:

Lab Agreement #:

Project Number: ADEP

Analysis Turnaround Time:
24 Hour - ☐ Other - ☐
7 Days - ☐
14 Days - ☐
21 Days - ☐
28 Days - ☒

Site Name: Los Alamos National Laboratory

Rad Screening Info: Location ND

Lab Reporting Limit Type: Method Detection Limit

Field Sample ID	Sample Date	Sample Time	Sample Matrix	MSGP-Hg	WSP-8260B-VOA	WSP-8270C-SVOA	WSP-All Metals	WSP-CN(T)	WSP-GENINORG+PerChlorate	WSP-GrossA/B	WSP-NH3+NO3/NO2+PO4	WSP-RAD	WSP-TKN+TOC
CAPA-18-147551	Oct 24 2017	10:20	W				1		1		1		
CAPA-18-147577	Oct 24 2017	10:20	W	1	2	2		1		1		1	1
CAPA-18-147600	Oct 24 2017	10:20	W		2								
CAPA-18-147552	Oct 24 2017	12:56	W				1		1		1		
CAPA-18-147578	Oct 24 2017	12:56	W	1	2	2		1		1		1	1
CAPA-18-147601	Oct 24 2017	12:56	W		2								

Special Instructions:

Relinquished by:	**Print Name:** Rebecca Montoya	**Date/Time:** 10/24/17 3:00	**Received by:**	**Print Name:** Traci Worsham	**Date/Time:** 10/25/17 8:58
Relinquished by:	**Print Name:**	**Date/Time:**	**Received by:**	**Print Name:**	**Date/Time:**
Relinquished by:	**Print Name:**	**Date/Time:**	**Received by:**	**Print Name:**	**Date/Time:**

2018-565 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
• Am-241 > 27	• Am-241 > 270,000			
• Cs-137 > 270	• Cs-137 > 270,000			
• Pu-238 > 27	• Pu-238 > 270,000			
• Pu-239/240 > 27	• Pu-239/240 > 270,000			
• Th-228 > 27	• Th-228 > 270,000			
• U-234 > 270	• U-234 > 1,600,000,000			
• U-238 > 270	• U-238 > unlimited			
• H-3 > 27,000,000	• 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 Martinez	10/25/17 3w
(Signature)	

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) MATT ENGLERT	10-25-17
(Signature)	

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: ESHC	SDG/AR/COC/Work Order: 436322
Received By: ZKW	Date Received: 10/26/17
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 5908 1783 0519 - 1°C 5908 1783 0508 - 1°C 5908 1783 0493 - 18°C (rchem)

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
COC/Samples marked or classified as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
Is package, COC, and/or Samples marked HAZ?		✓	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

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

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials JB Date 10-27-2017 Page 1 of 1

GL-CHL-SR-001 Rev 5

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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 25OCT17
ACTWGT: 47.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407
(843) 556-8171
REF: 21PDOARSGW04BAGWSO

1 of 3

FedEx Express

2 of 3
MPS# 0263 5908 1783 0508
Mstr# 5908 1783 0493
0201

THU - 26 OCT 10:30A
PRIORITY OVERNIGHT

X7 RBWA

29407
SC-US CHS

Part # 156148V-434 RIT2 06/15

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: 25OCT17
ACTWGT: 36.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407
(843) 556-8171
REF: 21PDOARSGW04BAGWSO

FedEx Express

3 of 3
MPS# 0263 5908 1783 0519
Mstr# 5908 1783 0493
0201

THU - 26 OCT 10:30
PRIORITY OVERNIGH

X7 RBWA

2940
SC-US CH

Part # 156148V-434 RIT2 06/15

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: 25OCT17
ACTWGT: 0 LB MAN
CAD: 3/CAFE2916

BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407
(843) 556-8171
REF: 21PDOARSGW04BAGWSO

Data Review Qualifier Flag Definition Sheet

Data Review Qualifier Definitions

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

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

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

Volatile Analysis

Case Narrative

GC/MS Volatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-565
Work Order #: 436322

Method/Analysis Information

Procedure:	**Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer**
Analytical Method:	SW-846:8260B
Analytical Batch Number:	1714932

Sample Analysis

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

Sample ID	Client ID
436322003	CAPA-18-147577
436322004	CAPA-18-147600
436322007	CAPA-18-147578
436322008	CAPA-18-147601
1203909912	Method Blank (MB)
1203909913	Laboratory Control Sample (LCS)
1203909914	Laboratory Control Sample (LCS)
1203909915	436322007(CAPA-18-147578) Post Spike (PS)
1203909916	436322007(CAPA-18-147578) Post Spike (PS)
1203909917	436322007(CAPA-18-147578) Post Spike Duplicate (PSD)
1203909918	436322007(CAPA-18-147578) Post Spike Duplicate (PSD)
1203910784	Method Blank (MB)
1203910785	Laboratory Control Sample (LCS)
1203910786	Laboratory Control Sample (LCS)

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

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

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

Calibration Information

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

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

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

Continuing Calibration Verification Requirements
All associated calibration verification standard(s) (CCV) met the acceptance criteria.

Quality Control (QC) Information

Blank (MB) Statement
The blanks analyzed with this SDG met the acceptance criteria.

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

Laboratory Control Sample (LCS) Recovery
The LCS spike recoveries met the acceptance limits.

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

Matrix Spike/Matrix Spike Duplicate Recovery Statement
The spike and/or spike duplicate (See Below) recoveries were not all within the acceptance limits.

Sample	Analyte	Value
1203909917 (CAPA-18-147578PSD)	Acetonitrile	134* (56%-131%)

Relative Percent Difference (RPD) Statement
The RPDs between the matrix spike pair met the acceptance limits.

Internal Standard (ISTD) Acceptance
The internal standard responses in all client and quality control samples met the required acceptance criteria.

Technical Information

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

Sample Preservation and Integrity
All samples met the sample preservation and integrity requirements.

Sample Dilutions/Methanol Dilutions
The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis
Re-analyses were not required for samples in this SDG.

Miscellaneous Information

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

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

Additional Comments
Additional comments were not required for this SDG.

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

Electronic Package Comment

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

System Configuration

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

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOA9.I	Agilent 6890/5973 GC/MS w/ OI Eclipse/Archon Autosampler	HP6890/HP5973	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10
VOA4.I	Hewlett Packard 6890/5973 GC/MS w/ OI 4560/Archon Autosampler	HP6890/HP5973	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

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

Client SDG: 2018-565 GEL Work Order: 436322

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: Erin Haubert **Name: Erin Haubert**

Date: 17 NOV 2017 **Title: Data Validator**

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 10:20**	**Matrix:**	**W**
Lab Sample ID:	**436322003**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**VOA,SVOA**	**Client:**	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147577**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 20:37**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 20:37**				
Data File:	**110117V9\9Q322.D**	**Column:**	**DB-624**		

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 10:20**	**Matrix:**	**W**
Lab Sample ID:	**436322003**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**VOA,SVOA**	**Client:**	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147577**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 20:37**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 20:37**				
Data File:	**110117V9\9Q322.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:	**2018-565**	**Date Collected:**	**10/24/2017 10:20**	**Matrix:**	**W**
Lab Sample ID:	**436322003**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**VOA,SVOA**	**Client:**	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147577**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 20:37**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 20:37**				
Data File:	**110117V9\9Q322.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	51.8	50.0	ug/L	104	(70%-131%)
Toluene-d8	51.0	50.0	ug/L	102	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	12.291	7.81	ug/L	0	J
	unknown siloxane	14.651	23.9	ug/L	0	J
	unknown siloxane	16.62	6.1	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 10:20**	**Matrix:**	**W**
Lab Sample ID:	**436322004**	**Date Received:**	**10/26/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147600**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 17:22**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 17:22**				
Data File:	**110117V9\9Q315.D**	**Column:**	**DB-624**		

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 10:20**	**Matrix:**	**W**
Lab Sample ID:	**436322004**	**Date Received:**	**10/26/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147600**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 17:22**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 17:22**				
Data File:	**110117V9\9Q315.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:	**2018-565**	**Date Collected:**	**10/24/2017 10:20**	**Matrix:**	**W**
Lab Sample ID:	**436322004**	**Date Received:**	**10/26/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147600**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 17:22**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 17:22**				
Data File:	**110117V9\9Q315.D**	**Column:**	**DB-624**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.7	50.0	ug/L	105	(71%-134%)
Bromofluorobenzene	49.7	50.0	ug/L	99	(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
No Tentatively Identified Compounds Found				ug/L		

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**436322007**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**VOA,SVOA**	**Client:**	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147578**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 12:03**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 12:03**				
Data File:	**110717V4\4H208.D**	**Column:**	**DB-624**		

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**436322007**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**VOA,SVOA**	**Client:**	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147578**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 12:03**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 12:03**				
Data File:	**110717V4\4H208.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:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**436322007**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**VOA,SVOA**	**Client:**	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147578**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 12:03**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 12:03**				
Data File:	**110717V4\4H208.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	56.7	50.0	ug/L	113	(71%-134%)
Bromofluorobenzene	48.3	50.0	ug/L	97	(70%-131%)
Toluene-d8	54.2	50.0	ug/L	108	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	4.277	10.8	ug/L	0	J
	unknown siloxane	14.497	5.22	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**436322008**	**Date Received:**	**10/26/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147601**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 17:50**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 17:50**				
Data File:	**110117V9\9Q316.D**	**Column:**	**DB-624**		

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**436322008**	**Date Received:**	**10/26/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147601**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 17:50**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 17:50**				
Data File:	**110117V9\9Q316.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:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**436322008**	**Date Received:**	**10/26/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147601**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 17:50**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 17:50**				
Data File:	**110117V9\9Q316.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	54.5	50.0	ug/L	109	(71%-134%)
Bromofluorobenzene	49.9	50.0	ug/L	100	(70%-131%)
Toluene-d8	50.2	50.0	ug/L	100	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	14.651	7.93	ug/L	0	J

Quality Control Summary

Volatile

Surrogate Recovery Report

SDG Number: 2018-565

Matrix Type: LIQUID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203909913	LCS for batch 1714932	97	101	98
1203909914	LCS for batch 1714932	96	100	96
1203909912	MB for batch 1714932	99	99	101
436322004	CAPA-18-147600	105	101	99
436322008	CAPA-18-147601	109	100	100
436322003	CAPA-18-147577	109	102	104
1203910785	LCS for batch 1714932	101	106	100
1203910786	LCS for batch 1714932	107	105	98
1203910784	MB for batch 1714932	109	108	101
436322007	CAPA-18-147578	113	108	97
1203909915	CAPA-18-147578PS	119	109	104
1203909917	CAPA-18-147578PSD	118	104	103
1203909916	CAPA-18-147578PS	110	108	98
1203909918	CAPA-18-147578PSD	112	107	96

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

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1714932
Matrix: WATER
Lab Sample ID 1203909913
Instrument: VOA9.I
Analysis Date: 11/01/2017 12:44
Dilution: 1
Analyst: RXY1
Purge Vol: 5 mL
Batch ID: 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	LCS	m,p-Xylenes	100	0.0	108	108	71-127
75-05-8	LCS	Acetonitrile	1250	0.0	1030	83	61-125
67-64-1	LCS	Acetone	250	0.0	308	123	48-157
74-88-4	LCS	Iodomethane	250	0.0	245	98	72-128
75-15-0	LCS	Carbon disulfide	250	0.0	245	98	69-138
108-05-4	LCS	Vinyl acetate	250	0.0	249	100	67-125
78-93-3	LCS	2-Butanone	250	0.0	300	120	55-138
108-10-1	LCS	4-Methyl-2-pentanone	250	0.0	268	107	66-124
591-78-6	LCS	2-Hexanone	250	0.0	313	125	56-140
75-71-8	LCS	Dichlorodifluoromethane	50.0	0.0	56.9	114	40-160
74-87-3	LCS	Chloromethane	50.0	0.0	52.5	105	58-135
75-01-4	LCS	Vinyl chloride	50.0	0.0	54.6	109	65-137
74-83-9	LCS	Bromomethane	50.0	0.0	50.1	100	63-137
75-00-3	LCS	Chloroethane	50.0	0.0	50.6	101	69-129
75-69-4	LCS	Trichlorofluoromethane	50.0	0.0	53.2	106	69-138
60-29-7	LCS	Ethyl ether	50.0	0.0	49.8	100	72-125
75-35-4	LCS	1,1-Dichloroethylene	50.0	0.0	52.2	104	66-126
75-09-2	LCS	Methylene chloride	50.0	0.0	46.9	94	68-119
1634-04-4	LCS	tert-Butyl methyl ether	50.0	0.0	49.1	98	76-128
156-60-5	LCS	trans-1,2-Dichloroethylene	50.0	0.0	52.5	105	71-124
75-34-3	LCS	1,1-Dichloroethane	50.0	0.0	51.1	102	73-123
156-59-2	LCS	cis-1,2-Dichloroethylene	50.0	0.0	50.5	101	75-123

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1714932
Matrix: WATER
Lab Sample ID 1203909913
Instrument: VOA9.I
Analysis Date: 11/01/2017 12:44
Dilution: 1
Analyst: RXY1
Purge Vol: 5 mL
Batch ID: 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	LCS	2,2-Dichloropropane	50.0	0.0	56.9	114	72-138
74-97-5	LCS	Bromochloromethane	50.0	0.0	50.0	100	76-125
67-66-3	LCS	Chloroform	50.0	0.0	49.4	99	76-123
71-55-6	LCS	1,1,1-Trichloroethane	50.0	0.0	51.9	104	74-136
563-58-6	LCS	1,1-Dichloropropene	50.0	0.0	52.1	104	72-129
56-23-5	LCS	Carbon tetrachloride	50.0	0.0	54.3	109	72-140
107-06-2	LCS	1,2-Dichloroethane	50.0	0.0	47.1	94	74-122
71-43-2	LCS	Benzene	50.0	0.0	50.6	101	72-121
79-01-6	LCS	Trichloroethylene	50.0	0.0	53.6	107	74-125
78-87-5	LCS	1,2-Dichloropropane	50.0	0.0	48.0	96	73-121
74-95-3	LCS	Dibromomethane	50.0	0.0	49.2	98	78-123
75-27-4	LCS	Bromodichloromethane	50.0	0.0	53.5	107	77-131
10061-01-5	LCS	cis-1,3-Dichloropropylene	50.0	0.0	52.9	106	78-131
108-88-3	LCS	Toluene	50.0	0.0	50.9	102	71-121
10061-02-6	LCS	trans-1,3-Dichloropropylene	50.0	0.0	55.1	110	78-131
79-00-5	LCS	1,1,2-Trichloroethane	50.0	0.0	49.8	100	74-118
142-28-9	LCS	1,3-Dichloropropane	50.0	0.0	46.1	92	74-118
127-18-4	LCS	Tetrachloroethylene	50.0	0.0	54.3	109	69-129
124-48-1	LCS	Dibromochloromethane	50.0	0.0	57.8	116	76-137
106-93-4	LCS	1,2-Dibromoethane	50.0	0.0	51.8	104	78-122
108-90-7	LCS	Chlorobenzene	50.0	0.0	50.3	101	74-120
100-41-4	LCS	Ethylbenzene	50.0	0.0	50.0	100	73-125

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1714932
Matrix: WATER
Lab Sample ID 1203909913
Instrument: VOA9.I
Analysis Date: 11/01/2017 12:44
Dilution: 1
Analyst: RXY1
Purge Vol: 5 mL
Batch ID: 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS	o-Xylene	50.0	0.0	52.0	104	74-126
100-42-5	LCS	Styrene	50.0	0.0	53.1	106	72-130
75-25-2	LCS	Bromoform	50.0	0.0	58.6	117	72-136
98-82-8	LCS	Isopropylbenzene	50.0	0.0	52.3	105	70-130
79-34-5	LCS	1,1,2,2-Tetrachloroethane	50.0	0.0	48.3	97	70-126
96-18-4	LCS	1,2,3-Trichloropropane	50.0	0.0	48.3	97	74-122
108-86-1	LCS	Bromobenzene	50.0	0.0	48.4	97	74-120
103-65-1	LCS	n-Propylbenzene	50.0	0.0	50.0	100	67-128
108-67-8	LCS	1,3,5-Trimethylbenzene	50.0	0.0	52.2	104	70-129
95-49-8	LCS	2-Chlorotoluene	50.0	0.0	51.1	102	71-124
106-43-4	LCS	4-Chlorotoluene	50.0	0.0	49.1	98	69-125
98-06-6	LCS	tert-Butylbenzene	50.0	0.0	55.3	111	72-130
95-63-6	LCS	1,2,4-Trimethylbenzene	50.0	0.0	50.9	102	70-126
135-98-8	LCS	sec-Butylbenzene	50.0	0.0	52.4	105	70-131
99-87-6	LCS	4-Isopropyltoluene	50.0	0.0	53.5	107	71-131
541-73-1	LCS	1,3-Dichlorobenzene	50.0	0.0	48.5	97	72-121
106-46-7	LCS	1,4-Dichlorobenzene	50.0	0.0	49.2	98	71-120
104-51-8	LCS	n-Butylbenzene	50.0	0.0	51.7	103	68-134
96-12-8	LCS	1,2-Dibromo-3-chloropropane	50.0	0.0	47.8	96	68-141
87-68-3	LCS	Hexachlorobutadiene	50.0	0.0	55.8	112	72-136
91-20-3	LCS	Naphthalene	50.0	0.0	51.9	104	72-132
87-61-6	LCS	1,2,3-Trichlorobenzene	50.0	0.0	53.9	108	70-130

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1714932
Matrix: WATER
Lab Sample ID 1203909913
Instrument: VOA9.I
Analysis Date: 11/01/2017 12:44
Dilution: 1
Analyst: RXY1
Purge Vol: 5 mL
Batch ID: 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	LCS	1,2,4-Trichlorobenzene	50.0	0.0	56.2	112	71-129
630-20-6	LCS	1,1,1,2-Tetrachloroethane	50.0	0.0	55.9	112	79-127
95-50-1	LCS	1,2-Dichlorobenzene	50.0	0.0	47.5	95	74-120
71-36-3	LCS	n-Butyl alcohol	5000	0.0	4540	91	63-138

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1714932
Matrix: WATER
Lab Sample ID 1203909914
Instrument: VOA9.I
Analysis Date: 11/01/2017 13:11
Dilution: 1
Analyst: RXY1
Purge Vol: 5 mL
Batch ID: 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	LCS	Acrolein	250	0.0	250	100	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	216	86	61-148
107-05-1	LCS	Allyl chloride	250	0.0	213	85	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	230	92	65-122
107-12-0	LCS	Propionitrile	250	0.0	227	91	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	221	88	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	232	93	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	223	89	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2160	86	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	43.1	86	66-147

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565 **Sample Type:** Post Spike

Client ID: CAPA-18-147578PS **Matrix:** W

Lab Sample ID 1203909915

Instrument: VOA4.I **Analysis Date:** 11/07/2017 13:02 **Dilution:** 1

Analyst: VXY1

Purge Vol: 5 mL **Batch ID:** 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	PS	m,p-Xylenes	100	0.00	U	92.4	92	59-132
75-05-8	PS	Acetonitrile	1250	0.00	U	1550	124	56-131
67-64-1	PS	Acetone	250	0.00	U	129	52	25-155
74-88-4	PS	Iodomethane	250	0.00	U	208	83	66-133
75-15-0	PS	Carbon disulfide	250	0.00	U	223	89	61-141
108-05-4	PS	Vinyl acetate	250	0.00	U	295	118	48-133
78-93-3	PS	2-Butanone	250	0.00	U	187	75	25-143
108-10-1	PS	4-Methyl-2-pentanone	250	0.00	U	262	105	61-127
591-78-6	PS	2-Hexanone	250	0.00	U	219	87	33-138
75-71-8	PS	Dichlorodifluoromethane	50.0	0.00	U	61.8	124	33-164
74-87-3	PS	Chloromethane	50.0	0.00	U	61.3	123	53-139
75-01-4	PS	Vinyl chloride	50.0	0.00	U	51.7	103	58-140
74-83-9	PS	Bromomethane	50.0	0.00	U	50.3	101	59-146
75-00-3	PS	Chloroethane	50.0	0.00	U	54.2	108	65-129
75-69-4	PS	Trichlorofluoromethane	50.0	0.00	U	49.0	98	65-141
60-29-7	PS	Ethyl ether	50.0	0.00	U	55.1	110	69-127
75-35-4	PS	1,1-Dichloroethylene	50.0	0.00	U	52.2	104	59-130
75-09-2	PS	Methylene chloride	50.0	0.00	U	43.2	86	62-123
1634-04-4	PS	tert-Butyl methyl ether	50.0	0.00	U	45.0	90	69-132
156-60-5	PS	trans-1,2-Dichloroethylene	50.0	0.00	U	54.3	109	65-127
75-34-3	PS	1,1-Dichloroethane	50.0	0.00	U	52.7	105	67-127
156-59-2	PS	cis-1,2-Dichloroethylene	50.0	0.00	U	45.5	91	69-127

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565 **Sample Type:** Post Spike

Client ID: CAPA-18-147578PS **Matrix:** W

Lab Sample ID 1203909915

Instrument: VOA4.I **Analysis Date:** 11/07/2017 13:02 **Dilution:** 1

Analyst: VXY1

Purge Vol: 5 mL **Batch ID:** 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	PS	2,2-Dichloropropane	50.0	0.00	U	47.7	95	66-137
74-97-5	PS	Bromochloromethane	50.0	0.00	U	46.4	93	71-130
67-66-3	PS	Chloroform	50.0	0.00	U	46.7	93	71-129
71-55-6	PS	1,1,1-Trichloroethane	50.0	0.00	U	46.4	93	69-139
563-58-6	PS	1,1-Dichloropropene	50.0	0.00	U	44.5	89	67-130
56-23-5	PS	Carbon tetrachloride	50.0	0.00	U	46.3	93	66-143
107-06-2	PS	1,2-Dichloroethane	50.0	0.00	U	52.4	105	69-130
71-43-2	PS	Benzene	50.0	0.00	U	44.2	88	66-125
79-01-6	PS	Trichloroethylene	50.0	0.00	U	46.2	92	65-131
78-87-5	PS	1,2-Dichloropropane	50.0	0.00	U	52.4	105	67-127
74-95-3	PS	Dibromomethane	50.0	0.00	U	46.9	94	72-129
75-27-4	PS	Bromodichloromethane	50.0	0.00	U	48.5	97	70-138
10061-01-5	PS	cis-1,3-Dichloropropylene	50.0	0.00	U	46.9	94	70-134
108-88-3	PS	Toluene	50.0	0.00	U	48.0	96	60-126
10061-02-6	PS	trans-1,3-Dichloropropylene	50.0	0.00	U	52.4	105	69-135
79-00-5	PS	1,1,2-Trichloroethane	50.0	0.00	U	52.1	104	66-125
142-28-9	PS	1,3-Dichloropropane	50.0	0.00	U	49.5	99	67-124
127-18-4	PS	Tetrachloroethylene	50.0	0.00	U	46.9	94	60-130
124-48-1	PS	Dibromochloromethane	50.0	0.00	U	49.1	98	68-143
106-93-4	PS	1,2-Dibromoethane	50.0	0.00	U	51.2	102	71-127
108-90-7	PS	Chlorobenzene	50.0	0.00	U	47.1	94	64-124
100-41-4	PS	Ethylbenzene	50.0	0.00	U	47.6	95	61-130

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565 **Sample Type:** Post Spike

Client ID: CAPA-18-147578PS **Matrix:** W

Lab Sample ID 1203909915

Instrument: VOA4.I **Analysis Date:** 11/07/2017 13:02 **Dilution:** 1

Analyst: VXY1

Purge Vol: 5 mL **Batch ID:** 1714932

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

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565 **Sample Type:** Post Spike

Client ID: CAPA-18-147578PS **Matrix:** W

Lab Sample ID 1203909915

Instrument: VOA4.I **Analysis Date:** 11/07/2017 13:02 **Dilution:** 1

Analyst: VXY1

Purge Vol: 5 mL **Batch ID:** 1714932

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

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565 **Sample Type:** Post Spike Duplicate

Client ID: CAPA-18-147578PSD **Matrix:** W

Lab Sample ID 1203909917

Instrument: VOA4.I **Analysis Date:** 11/07/2017 13:31 **Dilution:** 1

Analyst: VXY1

Purge Vol: 5 mL **Batch ID:** 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
179601-23-1	PSD	m,p-Xylenes	100	0.00	U	97.1	97	59-132	5	0-20
75-05-8	PSD	Acetonitrile	1250	0.00	U	1680	134 *	56-131	8	0-20
67-64-1	PSD	Acetone	250	0.00	U	138	55	25-155	7	0-20
74-88-4	PSD	Iodomethane	250	0.00	U	221	88	66-133	6	0-20
75-15-0	PSD	Carbon disulfide	250	0.00	U	239	96	61-141	7	0-20
108-05-4	PSD	Vinyl acetate	250	0.00	U	317	127	48-133	7	0-20
78-93-3	PSD	2-Butanone	250	0.00	U	204	81	25-143	9	0-20
108-10-1	PSD	4-Methyl-2-pentanone	250	0.00	U	279	112	61-127	6	0-20
591-78-6	PSD	2-Hexanone	250	0.00	U	232	93	33-138	6	0-20
75-71-8	PSD	Dichlorodifluoromethane	50.0	0.00	U	65.9	132	33-164	6	0-20
74-87-3	PSD	Chloromethane	50.0	0.00	U	68.1	136	53-139	10	0-20
75-01-4	PSD	Vinyl chloride	50.0	0.00	U	56.3	113	58-140	9	0-20
74-83-9	PSD	Bromomethane	50.0	0.00	U	55.5	111	59-146	10	0-20
75-00-3	PSD	Chloroethane	50.0	0.00	U	57.6	115	65-129	6	0-20
75-69-4	PSD	Trichlorofluoromethane	50.0	0.00	U	53.0	106	65-141	8	0-20
60-29-7	PSD	Ethyl ether	50.0	0.00	U	60.4	121	69-127	9	0-20
75-35-4	PSD	1,1-Dichloroethylene	50.0	0.00	U	56.4	113	59-130	8	0-20
75-09-2	PSD	Methylene chloride	50.0	0.00	U	45.9	92	62-123	6	0-20
1634-04-4	PSD	tert-Butyl methyl ether	50.0	0.00	U	49.6	99	69-132	10	0-20
156-60-5	PSD	trans-1,2-Dichloroethylene	50.0	0.00	U	57.8	116	65-127	6	0-20
75-34-3	PSD	1,1-Dichloroethane	50.0	0.00	U	55.6	111	67-127	5	0-20
156-59-2	PSD	cis-1,2-Dichloroethylene	50.0	0.00	U	48.5	97	69-127	6	0-20

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565 **Sample Type:** Post Spike Duplicate

Client ID: CAPA-18-147578PSD **Matrix:** W

Lab Sample ID 1203909917

Instrument: VOA4.I **Analysis Date:** 11/07/2017 13:31 **Dilution:** 1

Analyst: VXY1

Purge Vol: 5 mL **Batch ID:** 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
594-20-7	PSD	2,2-Dichloropropane	50.0	0.00	U	50.0	100	66-137	5	0-20
74-97-5	PSD	Bromochloromethane	50.0	0.00	U	51.0	102	71-130	9	0-20
67-66-3	PSD	Chloroform	50.0	0.00	U	49.9	100	71-129	7	0-20
71-55-6	PSD	1,1,1-Trichloroethane	50.0	0.00	U	50.6	101	69-139	9	0-20
563-58-6	PSD	1,1-Dichloropropene	50.0	0.00	U	47.5	95	67-130	6	0-20
56-23-5	PSD	Carbon tetrachloride	50.0	0.00	U	49.8	100	66-143	7	0-20
107-06-2	PSD	1,2-Dichloroethane	50.0	0.00	U	56.3	113	69-130	7	0-20
71-43-2	PSD	Benzene	50.0	0.00	U	47.5	95	66-125	7	0-20
79-01-6	PSD	Trichloroethylene	50.0	0.00	U	49.1	98	65-131	6	0-20
78-87-5	PSD	1,2-Dichloropropane	50.0	0.00	U	55.2	110	67-127	5	0-20
74-95-3	PSD	Dibromomethane	50.0	0.00	U	50.9	102	72-129	8	0-20
75-27-4	PSD	Bromodichloromethane	50.0	0.00	U	51.6	103	70-138	6	0-20
10061-01-5	PSD	cis-1,3-Dichloropropylene	50.0	0.00	U	50.2	100	70-134	7	0-20
108-88-3	PSD	Toluene	50.0	0.00	U	49.3	99	60-126	3	0-20
10061-02-6	PSD	trans-1,3-Dichloropropylene	50.0	0.00	U	53.4	107	69-135	2	0-20
79-00-5	PSD	1,1,2-Trichloroethane	50.0	0.00	U	52.2	104	66-125	0	0-20
142-28-9	PSD	1,3-Dichloropropane	50.0	0.00	U	52.4	105	67-124	6	0-20
127-18-4	PSD	Tetrachloroethylene	50.0	0.00	U	47.4	95	60-130	1	0-20
124-48-1	PSD	Dibromochloromethane	50.0	0.00	U	51.8	104	68-143	5	0-20
106-93-4	PSD	1,2-Dibromoethane	50.0	0.00	U	53.2	106	71-127	4	0-20
108-90-7	PSD	Chlorobenzene	50.0	0.00	U	49.1	98	64-124	4	0-20
100-41-4	PSD	Ethylbenzene	50.0	0.00	U	50.6	101	61-130	6	0-20

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565 **Sample Type:** Post Spike Duplicate

Client ID: CAPA-18-147578PSD **Matrix:** W

Lab Sample ID 1203909917

Instrument: VOA4.I **Analysis Date:** 11/07/2017 13:31 **Dilution:** 1

Analyst: VXY1

Purge Vol: 5 mL **Batch ID:** 1714932

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

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565 **Sample Type:** Post Spike Duplicate

Client ID: CAPA-18-147578PSD **Matrix:** W

Lab Sample ID 1203909917

Instrument: VOA4.I **Analysis Date:** 11/07/2017 13:31 **Dilution:** 1

Analyst: VXY1

Purge Vol: 5 mL **Batch ID:** 1714932

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

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Post Spike
Client ID: CAPA-18-147578PS
Matrix: W
Lab Sample ID 1203909916
Instrument: VOA4.I
Analysis Date: 11/07/2017 14:01
Dilution: 1
Analyst: VXY1
Purge Vol: 5 mL
Batch ID: 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	PS	Acrolein	250	0.00	U	263	105	49-141
76-13-1	PS	Trichlorotrifluoroethane	250	0.00	U	208	83	57-149
107-05-1	PS	Allyl chloride	250	0.00	U	261	104	54-128
107-13-1	PS	Acrylonitrile	250	0.00	U	270	108	59-129
107-12-0	PS	Propionitrile	250	0.00	U	252	101	58-131
126-98-7	PS	Methacrylonitrile	250	0.00	U	262	105	59-134
80-62-6	PS	Methyl methacrylate	250	0.00	U	200	80	62-135
97-63-2	PS	Ethyl methacrylate	250	0.00	U	214	86	60-136
78-83-1	PS	Isobutyl alcohol	2500	0.00	U	2650	106	60-143
126-99-8	PS	2-Chloro-1,3-butadiene	50.0	0.00	U	44.5	89	63-146

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565 **Sample Type:** Post Spike Duplicate

Client ID: CAPA-18-147578PSD **Matrix:** W

Lab Sample ID 1203909918

Instrument: VOA4.I **Analysis Date:** 11/07/2017 14:30 **Dilution:** 1

Analyst: VXY1

Purge Vol: 5 mL **Batch ID:** 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
107-02-8	PSD	Acrolein	250	0.00	U	299	120	49-141	13	0-20
76-13-1	PSD	Trichlorotrifluoroethane	250	0.00	U	228	91	57-149	9	0-20
107-05-1	PSD	Allyl chloride	250	0.00	U	282	113	54-128	8	0-20
107-13-1	PSD	Acrylonitrile	250	0.00	U	304	121	59-129	12	0-20
107-12-0	PSD	Propionitrile	250	0.00	U	278	111	58-131	10	0-20
126-98-7	PSD	Methacrylonitrile	250	0.00	U	291	116	59-134	10	0-20
80-62-6	PSD	Methyl methacrylate	250	0.00	U	218	87	62-135	8	0-20
97-63-2	PSD	Ethyl methacrylate	250	0.00	U	224	90	60-136	4	0-20
78-83-1	PSD	Isobutyl alcohol	2500	0.00	U	2830	113	60-143	7	0-20
126-99-8	PSD	2-Chloro-1,3-butadiene	50.0	0.00	U	46.7	93	63-146	5	0-20

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1714932
Matrix: WATER
Lab Sample ID 1203910785
Instrument: VOA4.I
Analysis Date: 11/07/2017 09:38
Dilution: 1
Analyst: VXY1
Purge Vol: 5 mL
Batch ID: 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	LCS	m,p-Xylenes	100	0.0	92.3	92	71-127
75-05-8	LCS	Acetonitrile	1250	0.0	1230	99	61-125
67-64-1	LCS	Acetone	250	0.0	244	98	48-157
74-88-4	LCS	Iodomethane	250	0.0	199	80	72-128
75-15-0	LCS	Carbon disulfide	250	0.0	211	84	69-138
108-05-4	LCS	Vinyl acetate	250	0.0	277	111	67-125
78-93-3	LCS	2-Butanone	250	0.0	274	110	55-138
108-10-1	LCS	4-Methyl-2-pentanone	250	0.0	253	101	66-124
591-78-6	LCS	2-Hexanone	250	0.0	299	120	56-140
75-71-8	LCS	Dichlorodifluoromethane	50.0	0.0	62.4	125	40-160
74-87-3	LCS	Chloromethane	50.0	0.0	65.1	130	58-135
75-01-4	LCS	Vinyl chloride	50.0	0.0	55.8	112	65-137
74-83-9	LCS	Bromomethane	50.0	0.0	49.9	100	63-137
75-00-3	LCS	Chloroethane	50.0	0.0	54.8	110	69-129
75-69-4	LCS	Trichlorofluoromethane	50.0	0.0	47.7	95	69-138
60-29-7	LCS	Ethyl ether	50.0	0.0	55.5	111	72-125
75-35-4	LCS	1,1-Dichloroethylene	50.0	0.0	47.0	94	66-126
75-09-2	LCS	Methylene chloride	50.0	0.0	40.1	80	68-119
1634-04-4	LCS	tert-Butyl methyl ether	50.0	0.0	42.1	84	76-128
156-60-5	LCS	trans-1,2-Dichloroethylene	50.0	0.0	51.1	102	71-124
75-34-3	LCS	1,1-Dichloroethane	50.0	0.0	50.2	100	73-123
156-59-2	LCS	cis-1,2-Dichloroethylene	50.0	0.0	44.1	88	75-123

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1714932
Matrix: WATER
Lab Sample ID 1203910785
Instrument: VOA4.I
Analysis Date: 11/07/2017 09:38
Dilution: 1
Analyst: VXY1
Purge Vol: 5 mL
Batch ID: 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	LCS	2,2-Dichloropropane	50.0	0.0	45.4	91	72-138
74-97-5	LCS	Bromochloromethane	50.0	0.0	43.4	87	76-125
67-66-3	LCS	Chloroform	50.0	0.0	43.7	87	76-123
71-55-6	LCS	1,1,1-Trichloroethane	50.0	0.0	43.6	87	74-136
563-58-6	LCS	1,1-Dichloropropene	50.0	0.0	43.1	86	72-129
56-23-5	LCS	Carbon tetrachloride	50.0	0.0	43.2	86	72-140
107-06-2	LCS	1,2-Dichloroethane	50.0	0.0	46.2	92	74-122
71-43-2	LCS	Benzene	50.0	0.0	43.5	87	72-121
79-01-6	LCS	Trichloroethylene	50.0	0.0	45.0	90	74-125
78-87-5	LCS	1,2-Dichloropropane	50.0	0.0	49.4	99	73-121
74-95-3	LCS	Dibromomethane	50.0	0.0	43.3	87	78-123
75-27-4	LCS	Bromodichloromethane	50.0	0.0	44.6	89	77-131
10061-01-5	LCS	cis-1,3-Dichloropropylene	50.0	0.0	45.4	91	78-131
108-88-3	LCS	Toluene	50.0	0.0	47.9	96	71-121
10061-02-6	LCS	trans-1,3-Dichloropropylene	50.0	0.0	47.8	96	78-131
79-00-5	LCS	1,1,2-Trichloroethane	50.0	0.0	46.7	93	74-118
142-28-9	LCS	1,3-Dichloropropane	50.0	0.0	45.8	92	74-118
127-18-4	LCS	Tetrachloroethylene	50.0	0.0	45.1	90	69-129
124-48-1	LCS	Dibromochloromethane	50.0	0.0	47.5	95	76-137
106-93-4	LCS	1,2-Dibromoethane	50.0	0.0	46.9	94	78-122
108-90-7	LCS	Chlorobenzene	50.0	0.0	47.0	94	74-120
100-41-4	LCS	Ethylbenzene	50.0	0.0	47.7	95	73-125

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1714932
Matrix: WATER
Lab Sample ID 1203910785
Instrument: VOA4.I
Analysis Date: 11/07/2017 09:38
Dilution: 1
Analyst: VXY1
Purge Vol: 5 mL
Batch ID: 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS	o-Xylene	50.0	0.0	45.2	90	74-126
100-42-5	LCS	Styrene	50.0	0.0	46.8	94	72-130
75-25-2	LCS	Bromoform	50.0	0.0	47.8	96	72-136
98-82-8	LCS	Isopropylbenzene	50.0	0.0	47.2	94	70-130
79-34-5	LCS	1,1,2,2-Tetrachloroethane	50.0	0.0	48.2	96	70-126
96-18-4	LCS	1,2,3-Trichloropropane	50.0	0.0	44.3	89	74-122
108-86-1	LCS	Bromobenzene	50.0	0.0	45.7	91	74-120
103-65-1	LCS	n-Propylbenzene	50.0	0.0	48.1	96	67-128
108-67-8	LCS	1,3,5-Trimethylbenzene	50.0	0.0	47.7	95	70-129
95-49-8	LCS	2-Chlorotoluene	50.0	0.0	45.7	91	71-124
106-43-4	LCS	4-Chlorotoluene	50.0	0.0	48.5	97	69-125
98-06-6	LCS	tert-Butylbenzene	50.0	0.0	46.9	94	72-130
95-63-6	LCS	1,2,4-Trimethylbenzene	50.0	0.0	47.7	95	70-126
135-98-8	LCS	sec-Butylbenzene	50.0	0.0	48.5	97	70-131
99-87-6	LCS	4-Isopropyltoluene	50.0	0.0	46.8	94	71-131
541-73-1	LCS	1,3-Dichlorobenzene	50.0	0.0	42.3	85	72-121
106-46-7	LCS	1,4-Dichlorobenzene	50.0	0.0	46.5	93	71-120
104-51-8	LCS	n-Butylbenzene	50.0	0.0	48.2	96	68-134
96-12-8	LCS	1,2-Dibromo-3-chloropropane	50.0	0.0	43.4	87	68-141
87-68-3	LCS	Hexachlorobutadiene	50.0	0.0	47.4	95	72-136
91-20-3	LCS	Naphthalene	50.0	0.0	46.1	92	72-132
87-61-6	LCS	1,2,3-Trichlorobenzene	50.0	0.0	46.1	92	70-130

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1714932
Matrix: WATER
Lab Sample ID 1203910785
Instrument: VOA4.I
Analysis Date: 11/07/2017 09:38
Dilution: 1
Analyst: VXY1
Purge Vol: 5 mL
Batch ID: 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	LCS	1,2,4-Trichlorobenzene	50.0	0.0	47.7	95	71-129
630-20-6	LCS	1,1,1,2-Tetrachloroethane	50.0	0.0	49.2	98	79-127
95-50-1	LCS	1,2-Dichlorobenzene	50.0	0.0	46.1	92	74-120
71-36-3	LCS	n-Butyl alcohol	5000	0.0	4770	95	63-138

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1714932
Matrix: WATER
Lab Sample ID 1203910786
Instrument: VOA4.I
Analysis Date: 11/07/2017 10:36
Dilution: 1
Analyst: VXY1
Purge Vol: 5 mL
Batch ID: 1714932

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	LCS	Acrolein	250	0.0	296	118	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	228	91	61-148
107-05-1	LCS	Allyl chloride	250	0.0	280	112	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	295	118	65-122
107-12-0	LCS	Propionitrile	250	0.0	273	109	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	272	109	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	215	86	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	220	88	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2720	109	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	47.6	95	66-147

Method Blank Summary

SDG Number:	**2018-565**	**Client:**	**ARSL004**	**Matrix:**	**WATER**
Client ID:	**MB for batch 1714932**	**Instrument ID:**	**VOA9.I**	**Data File:**	**110117V9\9Q307B1.D**
Lab Sample ID:	**1203909912**	**Prep Date:**	**11/01/2017 13:39**	**Analyzed:**	**11/01/17 13:39**
Column:	**DB-624**				

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

	Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01	LCS for batch 1714932	1203909913	110117V9\9Q305L1.D	11/01/17	1244
02	LCS for batch 1714932	1203909914	110117V9\9Q306L1.D	11/01/17	1311
03	CAPA-18-147600	436322004	110117V9\9Q315.D	11/01/17	1722
04	CAPA-18-147601	436322008	110117V9\9Q316.D	11/01/17	1750
05	CAPA-18-147577	436322003	110117V9\9Q322.D	11/01/17	2037

Method Blank Summary

SDG Number:	**2018-565**	**Client:**	**ARSL004**	**Matrix:**	**WATER**
Client ID:	**MB for batch 1714932**	**Instrument ID:**	**VOA4.I**	**Data File:**	**110717V4\4H206B.D**
Lab Sample ID:	**1203910784**	**Prep Date:**	**11/07/2017 11:05**	**Analyzed:**	**11/07/17 11:05**
Column:	**DB-624**				

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

	Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
07	LCS for batch 1714932	1203910785	110717V4\4H203L.D	11/07/17	0938
08	LCS for batch 1714932	1203910786	110717V4\4H205L.D	11/07/17	1036
09	CAPA-18-147578	436322007	110717V4\4H208.D	11/07/17	1203
10	CAPA-18-147578PS	1203909915	110717V4\4H210.D	11/07/17	1302
11	CAPA-18-147578PSD	1203909917	110717V4\4H211.D	11/07/17	1331
12	CAPA-18-147578PS	1203909916	110717V4\4H212.D	11/07/17	1401
13	CAPA-18-147578PSD	1203909918	110717V4\4H213.D	11/07/17	1430

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203909912**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 13:39**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 13:39**				
Data File:	**110117V9\9Q307B1.D**	**Column:**	**DB-624**		

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203909912**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 13:39**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 13:39**				
Data File:	**110117V9\9Q307B1.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:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203909912**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 13:39**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 13:39**				
Data File:	**110117V9\9Q307B1.D**	**Column:**	**DB-624**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	49.6	50.0	ug/L	99	(71%-134%)
Bromofluorobenzene	50.5	50.0	ug/L	101	(70%-131%)
Toluene-d8	49.5	50.0	ug/L	99	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203909913**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 12:44**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 12:44**				
Data File:	**110117V9\9Q305L1.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		55.9	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		51.9	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		48.3	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		49.8	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		51.1	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		52.2	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		52.1	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		53.9	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		48.3	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		56.2	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		50.9	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		47.8	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		51.8	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		47.5	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		47.1	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		48.0	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		52.2	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		48.5	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		46.1	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		49.2	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		56.9	ug/L	0.300	1.00
78-93-3	2-Butanone		300	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		51.1	ug/L	0.300	1.00
591-78-6	2-Hexanone		313	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		49.1	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		53.5	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		268	ug/L	1.50	5.00
67-64-1	Acetone		308	ug/L	1.50	10.0
75-05-8	Acetonitrile		1030	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		50.6	ug/L	0.300	1.00
108-86-1	Bromobenzene		48.4	ug/L	0.300	1.00
74-97-5	Bromochloromethane		50.0	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		53.5	ug/L	0.300	1.00
75-25-2	Bromoform		58.6	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203909913**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 12:44**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 12:44**				
Data File:	**110117V9\9Q305L1.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		50.1	ug/L	0.300	1.00
75-15-0	Carbon disulfide		245	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		54.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		50.3	ug/L	0.300	1.00
75-00-3	Chloroethane		50.6	ug/L	0.300	1.00
67-66-3	Chloroform		49.4	ug/L	0.300	1.00
74-87-3	Chloromethane		52.5	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		57.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		49.2	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		56.9	ug/L	0.300	1.00
60-29-7	Ethyl ether		49.8	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		50.0	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		55.8	ug/L	0.300	1.00
74-88-4	Iodomethane		245	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		52.3	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		46.9	ug/L	1.00	10.0
91-20-3	Naphthalene		51.9	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		53.1	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		54.3	ug/L	0.300	1.00
108-88-3	Toluene		50.9	ug/L	0.300	1.00
79-01-6	Trichloroethylene		53.6	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		53.2	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		249	ug/L	1.50	5.00
75-01-4	Vinyl chloride		54.6	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		50.5	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		52.9	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		108	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4540	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		51.7	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		50.0	ug/L	0.300	1.00
95-47-6	o-Xylene		52.0	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		52.4	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203909913**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 12:44**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 12:44**				
Data File:	**110117V9\9Q305L1.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		49.1	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		55.3	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		52.5	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		55.1	ug/L	0.300	1.00

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203909914**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 13:11**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 13:11**				
Data File:	**110117V9\9Q306L1.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		43.1	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		250	ug/L	1.50	5.00
107-13-1	Acrylonitrile		230	ug/L	1.50	5.00
107-05-1	Allyl chloride		213	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203909914**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 13:11**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 13:11**				
Data File:	**110117V9\9Q306L1.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		223	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2160	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		221	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		232	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		227	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		216	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203909914**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA9.I**	**Dilution:**	**1**
Run Date:	**11/01/2017 13:11**	**Analyst:**	**RXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/01/2017 13:11**				
Data File:	**110117V9\9Q306L1.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	48.1	50.0	ug/L	96	(71%-134%)
Bromofluorobenzene	48.0	50.0	ug/L	96	(70%-131%)
Toluene-d8	50.2	50.0	ug/L	100	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**1203909915**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147578PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 13:02**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 13:02**				
Data File:	**110717V4\4H210.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		49.1	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		46.4	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		51.3	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		52.1	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		52.7	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		52.2	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		44.5	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		47.2	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		50.5	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		47.1	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		49.1	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		49.5	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		51.2	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		46.5	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		52.4	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		52.4	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		49.1	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		43.9	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		49.5	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		46.9	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		47.7	ug/L	0.300	1.00
78-93-3	2-Butanone		187	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		47.0	ug/L	0.300	1.00
591-78-6	2-Hexanone		219	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		49.2	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		48.3	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		262	ug/L	1.50	5.00
67-64-1	Acetone		129	ug/L	1.50	10.0
75-05-8	Acetonitrile		1550	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		44.2	ug/L	0.300	1.00
108-86-1	Bromobenzene		46.6	ug/L	0.300	1.00
74-97-5	Bromochloromethane		46.4	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		48.5	ug/L	0.300	1.00
75-25-2	Bromoform		50.7	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**1203909915**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147578PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 13:02**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 13:02**				
Data File:	**110717V4\4H210.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		50.3	ug/L	0.300	1.00
75-15-0	Carbon disulfide		223	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		46.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		47.1	ug/L	0.300	1.00
75-00-3	Chloroethane		54.2	ug/L	0.300	1.00
67-66-3	Chloroform		46.7	ug/L	0.300	1.00
74-87-3	Chloromethane		61.3	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		49.1	ug/L	0.300	1.00
74-95-3	Dibromomethane		46.9	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		61.8	ug/L	0.300	1.00
60-29-7	Ethyl ether		55.1	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		47.6	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		49.0	ug/L	0.300	1.00
74-88-4	Iodomethane		208	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		48.0	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		43.2	ug/L	1.00	10.0
91-20-3	Naphthalene		48.1	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		46.1	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		46.9	ug/L	0.300	1.00
108-88-3	Toluene		48.0	ug/L	0.300	1.00
79-01-6	Trichloroethylene		46.2	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		49.0	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		295	ug/L	1.50	5.00
75-01-4	Vinyl chloride		51.7	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		45.5	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		46.9	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		92.4	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5700	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		49.7	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		49.2	ug/L	0.300	1.00
95-47-6	o-Xylene		46.7	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		50.0	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**1203909915**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147578PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 13:02**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 13:02**				
Data File:	**110717V4\4H210.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		46.2	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		54.3	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		52.4	ug/L	0.300	1.00

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**1203909916**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147578PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 14:01**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 14:01**				
Data File:	**110717V4\4H212.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		44.5	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		263	ug/L	1.50	5.00
107-13-1	Acrylonitrile		270	ug/L	1.50	5.00
107-05-1	Allyl chloride		261	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**1203909916**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147578PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 14:01**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 14:01**				
Data File:	**110717V4\4H212.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		214	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2650	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		262	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		200	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		252	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		208	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**1203909916**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147578PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 14:01**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 14:01**				
Data File:	**110717V4\4H212.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	55.0	50.0	ug/L	110	(71%-134%)
Bromofluorobenzene	48.9	50.0	ug/L	98	(70%-131%)
Toluene-d8	54.2	50.0	ug/L	108	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**1203909917**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147578PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 13:31**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 13:31**				
Data File:	**110717V4\4H211.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		52.5	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		50.6	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		56.0	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		52.2	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		55.6	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		56.4	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		47.5	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		51.8	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		52.5	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		51.9	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		51.5	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		55.8	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		53.2	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		50.4	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		56.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		55.2	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		51.5	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		45.7	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		52.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		49.2	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		50.0	ug/L	0.300	1.00
78-93-3	2-Butanone		204	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		48.5	ug/L	0.300	1.00
591-78-6	2-Hexanone		232	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		51.9	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		50.4	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		279	ug/L	1.50	5.00
67-64-1	Acetone		138	ug/L	1.50	10.0
75-05-8	Acetonitrile		1680	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		47.5	ug/L	0.300	1.00
108-86-1	Bromobenzene		49.7	ug/L	0.300	1.00
74-97-5	Bromochloromethane		51.0	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		51.6	ug/L	0.300	1.00
75-25-2	Bromoform		54.2	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**1203909917**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147578PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 13:31**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 13:31**				
Data File:	**110717V4\4H211.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		55.5	ug/L	0.300	1.00
75-15-0	Carbon disulfide		239	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		49.8	ug/L	0.300	1.00
108-90-7	Chlorobenzene		49.1	ug/L	0.300	1.00
75-00-3	Chloroethane		57.6	ug/L	0.300	1.00
67-66-3	Chloroform		49.9	ug/L	0.300	1.00
74-87-3	Chloromethane		68.1	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		51.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		50.9	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		65.9	ug/L	0.300	1.00
60-29-7	Ethyl ether		60.4	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		50.6	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		52.8	ug/L	0.300	1.00
74-88-4	Iodomethane		221	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		50.7	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		45.9	ug/L	1.00	10.0
91-20-3	Naphthalene		54.6	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		49.3	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		47.4	ug/L	0.300	1.00
108-88-3	Toluene		49.3	ug/L	0.300	1.00
79-01-6	Trichloroethylene		49.1	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		53.0	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		317	ug/L	1.50	5.00
75-01-4	Vinyl chloride		56.3	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		48.5	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		50.2	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		97.1	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		6220	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		52.3	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		50.8	ug/L	0.300	1.00
95-47-6	o-Xylene		49.2	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		52.7	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**1203909917**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147578PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 13:31**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 13:31**				
Data File:	**110717V4\4H211.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		49.6	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		49.3	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		57.8	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		53.4	ug/L	0.300	1.00

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**1203909918**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147578PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 14:30**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 14:30**				
Data File:	**110717V4\4H213.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		46.7	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		299	ug/L	1.50	5.00
107-13-1	Acrylonitrile		304	ug/L	1.50	5.00
107-05-1	Allyl chloride		282	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**1203909918**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147578PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 14:30**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 14:30**				
Data File:	**110717V4\4H213.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		224	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2830	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		291	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		218	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		278	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		228	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**1203909918**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147578PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 14:30**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 14:30**				
Data File:	**110717V4\4H213.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	55.8	50.0	ug/L	112	(71%-134%)
Bromofluorobenzene	48.2	50.0	ug/L	96	(70%-131%)
Toluene-d8	53.4	50.0	ug/L	107	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910784**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 11:05**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 11:05**				
Data File:	**110717V4\4H206B.D**	**Column:**	**DB-624**		

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910784**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 11:05**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 11:05**				
Data File:	**110717V4\4H206B.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:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910784**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 11:05**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 11:05**				
Data File:	**110717V4\4H206B.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	54.6	50.0	ug/L	109	(71%-134%)
Bromofluorobenzene	50.7	50.0	ug/L	101	(70%-131%)
Toluene-d8	53.8	50.0	ug/L	108	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910785**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 09:38**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 09:38**				
Data File:	**110717V4\4H203L.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		49.2	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		43.6	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		48.2	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		46.7	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		50.2	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		47.0	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		43.1	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		46.1	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		44.3	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		47.7	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		47.7	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		43.4	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		46.9	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		46.1	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		46.2	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		49.4	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		47.7	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		42.3	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		45.8	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		46.5	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		45.4	ug/L	0.300	1.00
78-93-3	2-Butanone		274	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		45.7	ug/L	0.300	1.00
591-78-6	2-Hexanone		299	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		48.5	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		46.8	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		253	ug/L	1.50	5.00
67-64-1	Acetone		244	ug/L	1.50	10.0
75-05-8	Acetonitrile		1230	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		43.5	ug/L	0.300	1.00
108-86-1	Bromobenzene		45.7	ug/L	0.300	1.00
74-97-5	Bromochloromethane		43.4	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		44.6	ug/L	0.300	1.00
75-25-2	Bromoform		47.8	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910785**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 09:38**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 09:38**				
Data File:	**110717V4\4H203L.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		49.9	ug/L	0.300	1.00
75-15-0	Carbon disulfide		211	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		43.2	ug/L	0.300	1.00
108-90-7	Chlorobenzene		47.0	ug/L	0.300	1.00
75-00-3	Chloroethane		54.8	ug/L	0.300	1.00
67-66-3	Chloroform		43.7	ug/L	0.300	1.00
74-87-3	Chloromethane		65.1	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		47.5	ug/L	0.300	1.00
74-95-3	Dibromomethane		43.3	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		62.4	ug/L	0.300	1.00
60-29-7	Ethyl ether		55.5	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		47.7	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		47.4	ug/L	0.300	1.00
74-88-4	Iodomethane		199	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		47.2	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		40.1	ug/L	1.00	10.0
91-20-3	Naphthalene		46.1	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		46.8	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		45.1	ug/L	0.300	1.00
108-88-3	Toluene		47.9	ug/L	0.300	1.00
79-01-6	Trichloroethylene		45.0	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		47.7	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		277	ug/L	1.50	5.00
75-01-4	Vinyl chloride		55.8	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		44.1	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		45.4	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		92.3	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4770	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		48.2	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		48.1	ug/L	0.300	1.00
95-47-6	o-Xylene		45.2	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		48.5	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910785**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 09:38**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 09:38**				
Data File:	**110717V4\4H203L.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		42.1	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		46.9	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		51.1	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		47.8	ug/L	0.300	1.00

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910786**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 10:36**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 10:36**				
Data File:	**110717V4\4H205L.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		47.6	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		296	ug/L	1.50	5.00
107-13-1	Acrylonitrile		295	ug/L	1.50	5.00
107-05-1	Allyl chloride		280	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910786**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 10:36**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 10:36**				
Data File:	**110717V4\4H205L.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		220	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2720	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		272	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		215	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		273	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		228	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910786**				
Client Sample:	**QC for batch 1714932**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1714932**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1714932**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**11/07/2017 10:36**	**Analyst:**	**VXY1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/07/2017 10:36**				
Data File:	**110717V4\4H205L.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	53.5	50.0	ug/L	107	(71%-134%)
Bromofluorobenzene	48.9	50.0	ug/L	98	(70%-131%)
Toluene-d8	52.4	50.0	ug/L	105	(74%-124%)

Semi-Volatile Analysis

Case Narrative

GC/MS Semivolatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-565
Work Order #: 436322

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:	1713403
Prep Batch Number:	1713402

Sample Analysis

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

Sample ID	Client ID
436322003	CAPA-18-147577
436322007	CAPA-18-147578
1203905982	Method Blank (MB)
1203905983	Laboratory Control Sample (LCS)
1203905984	436315003(CAPA-18-147580) Matrix Spike (MS)
1203905986	436315003(CAPA-18-147580) 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 436322003 (CAPA-18-147577) and 436322007 (CAPA-18-147578) and the associated QC. However, the method allows for a designated number of outliers dependent on the requested analyte list. This SDG satisfied the 8270D outlier acceptance criteria. If required, a CRDL was analyzed after the CCVs to demonstrate that there is adequate sensitivity to detect the failed compounds at the applicable lower quantitation limit.

Quality Control (QC) Information

Method Blank (MB) Statement
The MB analyzed with this SDG in this batch met the acceptance criteria.

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

Laboratory Control Sample Duplicate (LCSD)
An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery
The LCS spike recoveries met the acceptance limits.

QC Sample Designation
Sample 436315003 (CAPA-18-147580) was selected for analysis as the matrix spike and matrix spike duplicate.

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

MS/MSD Relative Percent Difference (RPD) Statement
The RPD values between the MS and MSD met the acceptance limits.

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

Technical Information:

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

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP. All reported compound mass spectra met the detection specifications in the method.

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

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

Miscellaneous Information:

Manual Integrations
Sample (See Below) required manual integration in order to properly identify one or more peaks and/or to correctly position the baseline as set in the calibration standard injections.

Sample	Analyte	Value
1203905983 (LCS)	4-Nitrophenol	Result 16.4ug/L

TIC Comment
Tentatively identified compounds (TIC) were requested for samples 436322003 (CAPA-18-147577) and 436322007 (CAPA-18-147578) 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
MSD5.I	Agilent 6890/5973 GC/MS w/ 7683 Autosampler	HP6890/HP5973	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: 2018-565 GEL Work Order: 436322

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: Barbara Bailey **Name: Barbara Bailey**

Date: 10 NOV 2017 **Title: Data Validator**

Sample Data Summary

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 10:20**	**Matrix:**	**W**
Lab Sample ID:	**436322003**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**VOA,SVOA**	**Client:**	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147577**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/31/2017 06:51**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**930 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3038.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.23	ug/L	3.23	10.8
120-82-1	1,2,4-Trichlorobenzene	U	3.23	ug/L	3.23	10.8
95-50-1	1,2-Dichlorobenzene	U	3.23	ug/L	3.23	10.8
122-66-7	Azobenzene	U	3.23	ug/L	3.23	10.8
	1,2-Diphenylhydrazine					
541-73-1	1,3-Dichlorobenzene	U	3.23	ug/L	3.23	10.8
106-46-7	1,4-Dichlorobenzene	U	3.23	ug/L	3.23	10.8
123-91-1	1,4-Dioxane	U	3.23	ug/L	3.23	10.8
90-12-0	1-Methylnaphthalene	U	0.323	ug/L	0.323	1.08
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.23	ug/L	3.23	10.8
95-95-4	2,4,5-Trichlorophenol	U	3.23	ug/L	3.23	10.8
88-06-2	2,4,6-Trichlorophenol	U	3.23	ug/L	3.23	10.8
120-83-2	2,4-Dichlorophenol	U	3.23	ug/L	3.23	10.8
105-67-9	2,4-Dimethylphenol	U	3.23	ug/L	3.23	10.8
51-28-5	2,4-Dinitrophenol	U	5.38	ug/L	5.38	21.5
121-14-2	2,4-Dinitrotoluene	U	3.23	ug/L	3.23	10.8
606-20-2	2,6-Dinitrotoluene	U	3.23	ug/L	3.23	10.8
91-58-7	2-Chloronaphthalene	U	0.441	ug/L	0.441	1.08
95-57-8	2-Chlorophenol	U	3.23	ug/L	3.23	10.8
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.23	ug/L	3.23	10.8
91-57-6	2-Methylnaphthalene	U	0.323	ug/L	0.323	1.08
88-75-5	2-Nitrophenol	U	3.23	ug/L	3.23	10.8
91-94-1	3,3'-Dichlorobenzidine	U	3.23	ug/L	3.23	10.8
101-55-3	4-Bromophenylphenylether	U	3.23	ug/L	3.23	10.8
59-50-7	Parachlorometa cresol	U	3.23	ug/L	3.23	10.8
	4-Chloro-3-methylphenol					
106-47-8	4-Chloroaniline	U	3.55	ug/L	3.55	10.8
7005-72-3	4-Chlorophenylphenylether	U	3.23	ug/L	3.23	10.8
100-02-7	4-Nitrophenol	U	3.23	ug/L	3.23	10.8
83-32-9	Acenaphthene	U	0.323	ug/L	0.323	1.08
208-96-8	Acenaphthylene	U	0.323	ug/L	0.323	1.08
62-53-3	Aniline	U	4.52	ug/L	4.52	10.8
120-12-7	Anthracene	U	0.323	ug/L	0.323	1.08
1912-24-9	Atrazine	U	3.23	ug/L	3.23	10.8
92-87-5	Benzidine	U	4.19	ug/L	4.19	10.8
56-55-3	Benzo(a)anthracene	U	0.323	ug/L	0.323	1.08
50-32-8	Benzo(a)pyrene	U	0.323	ug/L	0.323	1.08
205-99-2	Benzo(b)fluoranthene	U	0.323	ug/L	0.323	1.08
191-24-2	Benzo(ghi)perylene	U	0.323	ug/L	0.323	1.08

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 10:20**	**Matrix:**	**W**
Lab Sample ID:	**436322003**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**VOA,SVOA**	**Client:**	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147577**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/31/2017 06:51**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**930 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3038.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.323	ug/L	0.323	1.08
65-85-0	Benzoic acid	U	6.45	ug/L	6.45	21.5
100-51-6	Benzyl alcohol	U	3.23	ug/L	3.23	10.8
85-68-7	Butylbenzylphthalate	U	3.23	ug/L	3.23	10.8
218-01-9	Chrysene	U	0.323	ug/L	0.323	1.08
84-74-2	Di-n-butylphthalate	U	3.23	ug/L	3.23	10.8
117-84-0	Di-n-octylphthalate	U	3.23	ug/L	3.23	10.8
53-70-3	Dibenzo(a,h)anthracene	U	0.323	ug/L	0.323	1.08
132-64-9	Dibenzofuran	U	3.23	ug/L	3.23	10.8
84-66-2	Diethylphthalate	U	3.23	ug/L	3.23	10.8
131-11-3	Dimethylphthalate	U	3.23	ug/L	3.23	10.8
88-85-7	Dinoseb	U	3.23	ug/L	3.23	10.8
122-39-4	Diphenylamine	U	3.23	ug/L	3.23	10.8
206-44-0	Fluoranthene	U	0.323	ug/L	0.323	1.08
86-73-7	Fluorene	U	0.323	ug/L	0.323	1.08
118-74-1	Hexachlorobenzene	U	3.23	ug/L	3.23	10.8
87-68-3	Hexachlorobutadiene	U	3.23	ug/L	3.23	10.8
77-47-4	Hexachlorocyclopentadiene	U	3.23	ug/L	3.23	10.8
67-72-1	Hexachloroethane	U	3.23	ug/L	3.23	10.8
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.323	ug/L	0.323	1.08
78-59-1	Isophorone	U	3.76	ug/L	3.76	10.8
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.23	ug/L	3.23	10.8
924-16-3	N-Nitrosodi-n-butylamine	U	3.23	ug/L	3.23	10.8
55-18-5	N-Nitrosodiethylamine	U	3.23	ug/L	3.23	10.8
621-64-7	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*	U	3.23	ug/L	3.23	10.8
930-55-2	N-Nitrosopyrrolidine	U	3.23	ug/L	3.23	10.8
91-20-3	Naphthalene	U	0.323	ug/L	0.323	1.08
98-95-3	Nitrobenzene	U	3.23	ug/L	3.23	10.8
608-93-5	Pentachlorobenzene	U	3.23	ug/L	3.23	10.8
87-86-5	Pentachlorophenol	U	3.23	ug/L	3.23	10.8
85-01-8	Phenanthrene	U	0.323	ug/L	0.323	1.08
108-95-2	Phenol	U	3.23	ug/L	3.23	10.8
129-00-0	Pyrene	U	0.323	ug/L	0.323	1.08
110-86-1	Pyridine	U	3.23	ug/L	3.23	10.8
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.23	ug/L	3.23	10.8
111-91-1	bis(2-Chloroethoxy)methane	U	3.23	ug/L	3.23	10.8
111-44-4	bis(2-Chloroethyl) ether	U	3.23	ug/L	3.23	10.8
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.23	ug/L	3.23	10.8

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 10:20**	**Matrix:**	**W**
Lab Sample ID:	**436322003**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**VOA,SVOA**	**Client:**	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147577**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/31/2017 06:51**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**930 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3038.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	3.98	ug/L	3.98	10.8
99-09-2	3-Nitroaniline *m-Nitroaniline*	U	3.23	ug/L	3.23	10.8
95-48-7	o-Cresol	U	3.23	ug/L	3.23	10.8
88-74-4	2-Nitroaniline *o-Nitroaniline*	U	3.23	ug/L	3.23	10.8
100-01-6	4-Nitroaniline *p-Nitroaniline*	U	3.23	ug/L	3.23	10.8

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	84.8	108	ug/L	79	(32%-124%)
2-Fluorobiphenyl	35.5	53.8	ug/L	66	(32%-112%)
2-Fluorophenol	34.4	108	ug/L	32	(15%-88%)
Nitrobenzene-d5	33.5	53.8	ug/L	62	(36%-115%)
Phenol-d5	23.7	108	ug/L	22	(15%-91%)
p-Terphenyl-d14	47.2	53.8	ug/L	88	(36%-121%)

Tentatively Identified Compound Summary

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

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**436322007**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**VOA,SVOA**	**Client:**	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147578**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/31/2017 07:21**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**960 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3039.D**	**Column:**	**DB-5ms**		

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

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**436322007**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**VOA,SVOA**	**Client:**	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147578**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/31/2017 07:21**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**960 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3039.D**	**Column:**	**DB-5ms**		

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

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 12:56**	**Matrix:**	**W**
Lab Sample ID:	**436322007**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**VOA,SVOA**	**Client:**	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147578**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/31/2017 07:21**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**960 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3039.D**	**Column:**	**DB-5ms**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	73.3	104	ug/L	70	(32%-124%)
2-Fluorobiphenyl	32.7	52.1	ug/L	63	(32%-112%)
2-Fluorophenol	33.0	104	ug/L	32	(15%-88%)
Nitrobenzene-d5	32.8	52.1	ug/L	63	(36%-115%)
Phenol-d5	22.5	104	ug/L	22	(15%-91%)
p-Terphenyl-d14	44.1	52.1	ug/L	85	(36%-121%)

Tentatively Identified Compound Summary

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

Quality Control Summary

Surrogate Recovery Report

SDG Number: 2018-565

Matrix Type: LIQUID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203905982	MB for batch 1713402	40	29	78	72	76	89
1203905983	LCS for batch 1713402	46	31	82	76	96	87
1203905984	CAPA-18-147580MS	57	44	79	79	94	84
1203905986	CAPA-18-147580MSD	56	45	81	82	95	90
436322003	CAPA-18-147577	32	22	62	66	79	88
436322007	CAPA-18-147578	32	22	63	63	70	85

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

SDG Number: 2018-565
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1713402
Matrix: WATER
Lab Sample ID 1203905983
Instrument: MSD5.I
Analysis Date: 10/30/2017 16:42
Dilution: 1
Analyst: JMB3
Prep Batch ID: 1713402
Inj. Vol: 1 uL
Batch ID: 1713403

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	23.8	48	30-88
110-86-1	LCS	Pyridine	50.0	0.0	27.4	55	27-89
62-53-3	LCS	Aniline	50.0	0.0	42.2	84	49-112
108-95-2	LCS	Phenol	50.0	0.0	17.0	34	16-82
111-44-4	LCS	bis(2-Chloroethyl) ether	50.0	0.0	42.9	86	51-111
95-57-8	LCS	2-Chlorophenol	50.0	0.0	39.4	79	49-105
541-73-1	LCS	1,3-Dichlorobenzene	50.0	0.0	32.3	65	37-95
106-46-7	LCS	1,4-Dichlorobenzene	50.0	0.0	32.5	65	38-96
95-50-1	LCS	1,2-Dichlorobenzene	50.0	0.0	34.0	68	39-97
108-60-1	LCS	bis(2-Chloro-1-methylethyl)et	50.0	0.0	32.9	66	44-123
100-51-6	LCS	Benzyl alcohol	50.0	0.0	38.6	77	44-102
95-48-7	LCS	o-Cresol	50.0	0.0	35.4	71	41-101
65794-96-9	LCS	m,p-Cresols	50.0	0.0	35.8	72	43-102
621-64-7	LCS	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*	50.0	0.0	38.8	78	54-115
67-72-1	LCS	Hexachloroethane	50.0	0.0	30.1	60	36-96
98-95-3	LCS	Nitrobenzene	50.0	0.0	43.2	86	53-115
78-59-1	LCS	Isophorone	50.0	0.0	44.4	89	56-117
88-75-5	LCS	2-Nitrophenol	50.0	0.0	44.2	88	51-113
105-67-9	LCS	2,4-Dimethylphenol	50.0	0.0	37.3	75	51-104
111-91-1	LCS	bis(2-Chloroethoxy)methane	50.0	0.0	46.4	93	55-114
120-83-2	LCS	2,4-Dichlorophenol	50.0	0.0	44.8	90	53-109
65-85-0	LCS	Benzoic acid	100	0.0	31.6	32	21-74

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1713402
Matrix: WATER
Lab Sample ID 1203905983
Instrument: MSD5.I
Analysis Date: 10/30/2017 16:42
Dilution: 1
Analyst: JMB3
Prep Batch ID: 1713402
Inj. Vol: 1 uL
Batch ID: 1713403

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	55.1	110	65-136
87-68-3	LCS	Hexachlorobutadiene	50.0	0.0	32.5	65	35-98
59-50-7	LCS	Parachlorometa cresol *4-Chloro-3-methylphenol*	50.0	0.0	43.4	87	55-115
91-57-6	LCS	2-Methylnaphthalene	50.0	0.0	39.4	79	42-103
91-20-3	LCS	Naphthalene	50.0	0.0	41.9	84	44-102
90-12-0	LCS	1-Methylnaphthalene	50.0	0.0	39.6	79	45-108
77-47-4	LCS	Hexachlorocyclopentadiene	50.0	0.0	20.5	41	34-89
88-06-2	LCS	2,4,6-Trichlorophenol	50.0	0.0	45.1	90	55-120
95-95-4	LCS	2,4,5-Trichlorophenol	50.0	0.0	45.6	91	55-116
91-58-7	LCS	2-Chloronaphthalene	50.0	0.0	35.9	72	44-107
88-74-4	LCS	2-Nitroaniline *o-Nitroaniline*	50.0	0.0	38.8	78	53-121
99-09-2	LCS	3-Nitroaniline *m-Nitroaniline*	50.0	0.0	55.9	112	61-139
131-11-3	LCS	Dimethylphthalate	50.0	0.0	49.0	98	60-122
606-20-2	LCS	2,6-Dinitrotoluene	50.0	0.0	51.2	102	59-122
121-14-2	LCS	2,4-Dinitrotoluene	50.0	0.0	51.0	102	57-124
208-96-8	LCS	Acenaphthylene	50.0	0.0	42.7	85	50-113
83-32-9	LCS	Acenaphthene	50.0	0.0	43.0	86	49-112
51-28-5	LCS	2,4-Dinitrophenol	50.0	0.0	33.5	67	34-122
132-64-9	LCS	Dibenzofuran	50.0	0.0	42.5	85	50-111
58-90-2	LCS	2,3,4,6-Tetrachlorophenol	50.0	0.0	47.7	95	54-122
84-66-2	LCS	Diethylphthalate	50.0	0.0	47.2	94	57-122
100-02-7	LCS	4-Nitrophenol	50.0	0.0	16.4	33	15-137

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Client ID: LCS for batch 1713402
Lab Sample ID 1203905983
Instrument: MSD5.I
Analyst: JMB3
Inj. Vol: 1 uL

Sample Type: Laboratory Control Sample
Matrix: WATER
Analysis Date: 10/30/2017 16:42
Prep Batch ID: 1713402
Batch ID: 1713403
Dilution: 1

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	LCS	Fluorene	50.0	0.0	42.1	84	52-114
7005-72-3	LCS	4-Chlorophenylphenylether	50.0	0.0	43.4	87	52-121
100-01-6	LCS	4-Nitroaniline *p-Nitroaniline*	50.0	0.0	48.8	98	44-137
534-52-1	LCS	2-Methyl-4,6-dinitrophenol	50.0	0.0	45.1	90	45-124
122-39-4	LCS	Diphenylamine	50.0	0.0	40.4	81	55-113
122-66-7	LCS	Azobenzene *1,2-Diphenylhydrazine*	50.0	0.0	37.3	75	53-115
101-55-3	LCS	4-Bromophenylphenylether	50.0	0.0	41.4	83	54-116
118-74-1	LCS	Hexachlorobenzene	50.0	0.0	45.7	91	54-115
87-86-5	LCS	Pentachlorophenol	50.0	0.0	49.2	98	41-116
85-01-8	LCS	Phenanthrene	50.0	0.0	45.1	90	55-110
120-12-7	LCS	Anthracene	50.0	0.0	43.2	86	56-112
84-74-2	LCS	Di-n-butylphthalate	50.0	0.0	43.5	87	57-123
206-44-0	LCS	Fluoranthene	50.0	0.0	47.2	94	54-118
129-00-0	LCS	Pyrene	50.0	0.0	40.0	80	49-121
85-68-7	LCS	Butylbenzylphthalate	50.0	0.0	37.5	75	52-125
117-81-7	LCS	bis(2-Ethylhexyl)phthalate	50.0	0.0	34.4	69	52-125
56-55-3	LCS	Benzo(a)anthracene	50.0	0.0	47.0	94	57-112
218-01-9	LCS	Chrysene	50.0	0.0	47.0	94	58-117
117-84-0	LCS	Di-n-octylphthalate	50.0	0.0	38.5	77	50-129
205-99-2	LCS	Benzo(b)fluoranthene	50.0	0.0	45.6	91	41-118
207-08-9	LCS	Benzo(k)fluoranthene	50.0	0.0	44.3	89	42-121
50-32-8	LCS	Benzo(a)pyrene	50.0	0.0	44.8	90	40-118

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1713402
Matrix: WATER
Lab Sample ID 1203905983
Instrument: MSD5.I
Analysis Date: 10/30/2017 16:42
Dilution: 1
Analyst: JMB3
Prep Batch ID: 1713402
Inj. Vol: 1 uL
Batch ID: 1713403

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	55.1	110	34-125
53-70-3	LCS	Dibenzo(a,h)anthracene	50.0	0.0	53.9	108	38-129
191-24-2	LCS	Benzo(ghi)perylene	50.0	0.0	53.3	107	33-131
123-91-1	LCS	1,4-Dioxane	50.0	0.0	30.1	60	38-78
930-55-2	LCS	N-Nitrosopyrrolidine	50.0	0.0	45.4	91	54-113
95-94-3	LCS	1,2,4,5-Tetrachlorobenzene	50.0	0.0	38.2	76	44-102
1912-24-9	LCS	Atrazine	50.0	0.0	51.4	103	60-131
92-87-5	LCS	Benzidine	100	0.0	91.0	91	20-144
91-94-1	LCS	3,3'-Dichlorobenzidine	50.0	0.0	54.5	109	43-127
120-82-1	LCS	1,2,4-Trichlorobenzene	50.0	0.0	35.8	72	39-99

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Client ID: CAPA-18-147580MS
Lab Sample ID 1203905984
Instrument: MSD5.I
Analvst: JMB3
Inj. Vol: 1 uL

Sample Type: Matrix Spike
Matrix: W
Analvsis Date: 10/31/2017 05:50
Prep Batch ID: 1713402
Batch ID: 1713403
Dilution: 1

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	106	0.00	U	63.4	60	25-106
110-86-1	MS	Pyridine	106	0.00	U	60.4	57	24-93
62-53-3	MS	Aniline	106	0.00	U	83.2	78	37-113
108-95-2	MS	Phenol	106	0.00	U	51.6	48	23-82
111-44-4	MS	bis(2-Chloroethyl) ether	106	0.00	U	89.0	84	39-114
95-57-8	MS	2-Chlorophenol	106	0.00	U	89.2	84	37-108
541-73-1	MS	1,3-Dichlorobenzene	106	0.00	U	68.7	65	27-97
106-46-7	MS	1,4-Dichlorobenzene	106	0.00	U	70.6	66	28-97
95-50-1	MS	1,2-Dichlorobenzene	106	0.00	U	72.8	68	28-99
108-60-1	MS	bis(2-Chloro-1-methylethyl)et	106	0.00	U	70.9	67	32-127
100-51-6	MS	Benzyl alcohol	106	0.00	U	88.2	83	37-116
95-48-7	MS	o-Cresol	106	0.00	U	83.3	78	34-109
65794-96-9	MS	m,p-Cresols	106	0.00	U	90.8	85	36-120
621-64-7	MS	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*	106	0.00	U	84.9	80	42-118
67-72-1	MS	Hexachloroethane	106	0.00	U	63.5	60	29-94
98-95-3	MS	Nitrobenzene	106	0.00	U	93.2	88	38-123
78-59-1	MS	Isophorone	106	0.00	U	93.0	87	43-120
88-75-5	MS	2-Nitrophenol	106	0.00	U	95.6	90	39-115
105-67-9	MS	2,4-Dimethylphenol	106	0.00	U	82.4	77	39-107
111-91-1	MS	bis(2-Chloroethoxy)methane	106	0.00	U	96.9	91	42-118
120-83-2	MS	2,4-Dichlorophenol	106	0.00	U	96.6	91	40-111
65-85-0	MS	Benzoic acid	213	0.00	U	99.1	47	17-95

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Client ID: CAPA-18-147580MS
Lab Sample ID 1203905984
Instrument: MSD5.I
Analvst: JMB3
Inj. Vol: 1 uL

Sample Type: Matrix Spike
Matrix: W
Analvsis Date: 10/31/2017 05:50
Prep Batch ID: 1713402
Batch ID: 1713403
Dilution: 1

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS	4-Chloroaniline	106	0.00	U	109	103	44-138
87-68-3	MS	Hexachlorobutadiene	106	0.00	U	66.7	63	26-98
59-50-7	MS	Parachlorometa cresol *4-Chloro-3-methylphenol*	106	0.00	U	96.9	91	41-122
91-57-6	MS	2-Methylnaphthalene	106	0.00	U	81.2	76	29-109
91-20-3	MS	Naphthalene	106	0.00	U	88.1	83	31-108
90-12-0	MS	1-Methylnaphthalene	106	0.00	U	82.1	77	33-112
77-47-4	MS	Hexachlorocyclopentadiene	106	0.00	U	52.4	49	26-79
88-06-2	MS	2,4,6-Trichlorophenol	106	0.00	U	97.9	92	39-124
95-95-4	MS	2,4,5-Trichlorophenol	106	0.00	U	98.0	92	42-120
91-58-7	MS	2-Chloronaphthalene	106	0.00	U	76.3	72	29-113
88-74-4	MS	2-Nitroaniline *o-Nitroaniline*	106	0.00	U	85.5	80	41-121
99-09-2	MS	3-Nitroaniline *m-Nitroaniline*	106	0.00	U	111	104	42-144
131-11-3	MS	Dimethylphthalate	106	0.00	U	105	99	45-128
606-20-2	MS	2,6-Dinitrotoluene	106	0.00	U	111	104	46-124
121-14-2	MS	2,4-Dinitrotoluene	106	0.00	U	109	103	45-125
208-96-8	MS	Acenaphthylene	106	0.00	U	90.6	85	35-120
83-32-9	MS	Acenaphthene	106	0.00	U	94.0	88	35-117
51-28-5	MS	2,4-Dinitrophenol	106	0.00	U	75.5	71	27-122
132-64-9	MS	Dibenzofuran	106	0.00	U	92.1	87	38-113
58-90-2	MS	2,3,4,6-Tetrachlorophenol	106	0.00	U	105	99	40-128
84-66-2	MS	Diethylphthalate	106	0.00	U	99.3	93	43-127
100-02-7	MS	4-Nitrophenol	106	0.00	U	41.3	39	17-85

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Matrix Spike
Client ID: CAPA-18-147580MS
Matrix: W
Lab Sample ID 1203905984
Instrument: MSD5.I
Analysis Date: 10/31/2017 05:50
Dilution: 1
Analyst: JMB3
Prep Batch ID: 1713402
Inj. Vol: 1 uL
Batch ID: 1713403

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS	Fluorene	106	0.00	U	91.4	86	39-117
7005-72-3	MS	4-Chlorophenylphenylether	106	0.00	U	97.8	92	39-121
100-01-6	MS	4-Nitroaniline *p-Nitroaniline*	106	0.00	U	112	105	30-133
534-52-1	MS	2-Methyl-4,6-dinitrophenol	106	0.00	U	93.0	87	32-126
122-39-4	MS	Diphenylamine	106	0.00	U	89.9	84	37-118
122-66-7	MS	Azobenzene *1,2-Diphenylhydrazine*	106	0.00	U	80.7	76	38-120
101-55-3	MS	4-Bromophenylphenylether	106	0.00	U	95.0	89	39-121
118-74-1	MS	Hexachlorobenzene	106	0.00	U	98.4	92	40-118
87-86-5	MS	Pentachlorophenol	106	0.00	U	107	101	35-121
85-01-8	MS	Phenanthrene	106	0.00	U	97.2	91	40-115
120-12-7	MS	Anthracene	106	0.00	U	94.6	89	38-120
84-74-2	MS	Di-n-butylphthalate	106	0.00	U	91.5	86	41-128
206-44-0	MS	Fluoranthene	106	0.00	U	99.7	94	41-119
129-00-0	MS	Pyrene	106	0.00	U	83.3	78	35-128
85-68-7	MS	Butylbenzylphthalate	106	0.00	U	78.6	74	40-129
117-81-7	MS	bis(2-Ethylhexyl)phthalate	106	0.00	U	73.6	69	38-131
56-55-3	MS	Benzo(a)anthracene	106	0.00	U	98.9	93	39-120
218-01-9	MS	Chrysene	106	0.00	U	102	96	41-124
117-84-0	MS	Di-n-octylphthalate	106	0.00	U	82.8	78	37-134
205-99-2	MS	Benzo(b)fluoranthene	106	0.00	U	97.8	92	31-122
207-08-9	MS	Benzo(k)fluoranthene	106	0.00	U	94.7	89	33-123
50-32-8	MS	Benzo(a)pyrene	106	0.00	U	100	94	32-118

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Client ID: CAPA-18-147580MS
Lab Sample ID 1203905984
Instrument: MSD5.I
Analyst: JMB3
Inj. Vol: 1 uL

Sample Type: Matrix Spike
Matrix: W
Analysis Date: 10/31/2017 05:50
Prep Batch ID: 1713402
Batch ID: 1713403
Dilution: 1

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
193-39-5	MS	Indeno(1,2,3-cd)pyrene	106	0.00	U	120	113	27-121
53-70-3	MS	Dibenzo(a,h)anthracene	106	0.00	U	116	109	30-125
191-24-2	MS	Benzo(ghi)perylene	106	0.00	U	113	106	24-126
123-91-1	MS	1,4-Dioxane	106	0.00	U	72.5	68	24-110
930-55-2	MS	N-Nitrosopyrrolidine	106	0.00	U	99.1	93	47-119
95-94-3	MS	1,2,4,5-Tetrachlorobenzene	106	0.00	U	80.0	75	32-101
1912-24-9	MS	Atrazine	106	0.00	U	106	100	42-129
92-87-5	MS	Benzidine	213	0.00	U	172	81	15-130
91-94-1	MS	3,3'-Dichlorobenzidine	106	0.00	U	124	116	34-124
120-82-1	MS	1,2,4-Trichlorobenzene	106	0.00	U	74.9	70	26-102

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Client ID: CAPA-18-147580MSD
Lab Sample ID 1203905986
Instrument: MSD5.I
Analvst: JMB3
Inj. Vol: 1 uL

Sample Type: Matrix Spike Duplicate
Matrix: W
Analvsis Date: 10/31/2017 06:20
Prep Batch ID: 1713402
Batch ID: 1713403
Dilution: 1

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	106	0.00	U	60.4	57	25-106	5	0-30
110-86-1	MSD	Pyridine	106	0.00	U	57.7	54	24-93	5	0-30
62-53-3	MSD	Aniline	106	0.00	U	84.4	79	37-113	1	0-30
108-95-2	MSD	Phenol	106	0.00	U	48.0	45	23-82	7	0-30
111-44-4	MSD	bis(2-Chloroethyl) ether	106	0.00	U	90.3	85	39-114	1	0-30
95-57-8	MSD	2-Chlorophenol	106	0.00	U	86.9	82	37-108	3	0-30
541-73-1	MSD	1,3-Dichlorobenzene	106	0.00	U	74.2	70	27-97	8	0-30
106-46-7	MSD	1,4-Dichlorobenzene	106	0.00	U	72.6	68	28-97	3	0-30
95-50-1	MSD	1,2-Dichlorobenzene	106	0.00	U	77.4	73	28-99	6	0-30
108-60-1	MSD	bis(2-Chloro-1-methylethyl)et	106	0.00	U	70.2	66	32-127	1	0-30
100-51-6	MSD	Benzyl alcohol	106	0.00	U	86.9	82	37-116	1	0-30
95-48-7	MSD	o-Cresol	106	0.00	U	81.2	76	34-109	3	0-30
65794-96-9	MSD	m,p-Cresols	106	0.00	U	84.9	80	36-120	7	0-30
621-64-7	MSD	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*	106	0.00	U	82.9	78	42-118	2	0-30
67-72-1	MSD	Hexachloroethane	106	0.00	U	69.4	65	29-94	9	0-30
98-95-3	MSD	Nitrobenzene	106	0.00	U	85.5	80	38-123	9	0-30
78-59-1	MSD	Isophorone	106	0.00	U	85.6	80	43-120	8	0-30
88-75-5	MSD	2-Nitrophenol	106	0.00	U	91.1	86	39-115	5	0-30
105-67-9	MSD	2,4-Dimethylphenol	106	0.00	U	78.5	74	39-107	5	0-30
111-91-1	MSD	bis(2-Chloroethoxy)methane	106	0.00	U	92.1	87	42-118	5	0-30
120-83-2	MSD	2,4-Dichlorophenol	106	0.00	U	92.6	87	40-111	4	0-30
65-85-0	MSD	Benzoic acid	213	0.00	U	97.3	46	17-95	2	0-30

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Matrix Spike Duplicate
Client ID: CAPA-18-147580MSD
Matrix: W
Lab Sample ID 1203905986
Instrument: MSD5.I
Analysis Date: 10/31/2017 06:20
Dilution: 1
Analyst: JMB3
Prep Batch ID: 1713402
Inj. Vol: 1 uL
Batch ID: 1713403

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
106-47-8	MSD	4-Chloroaniline	106	0.00	U	107	101	44-138	2	0-30
87-68-3	MSD	Hexachlorobutadiene	106	0.00	U	71.9	68	26-98	7	0-30
59-50-7	MSD	Parachlorometa cresol *4-Chloro-3-methylphenol*	106	0.00	U	94.5	89	41-122	3	0-30
91-57-6	MSD	2-Methylnaphthalene	106	0.00	U	81.9	77	29-109	1	0-30
91-20-3	MSD	Naphthalene	106	0.00	U	86.6	81	31-108	2	0-30
90-12-0	MSD	1-Methylnaphthalene	106	0.00	U	85.7	81	33-112	4	0-30
77-47-4	MSD	Hexachlorocyclopentadiene	106	0.00	U	55.5	52	26-79	6	0-30
88-06-2	MSD	2,4,6-Trichlorophenol	106	0.00	U	92.4	87	39-124	6	0-30
95-95-4	MSD	2,4,5-Trichlorophenol	106	0.00	U	91.6	86	42-120	7	0-30
91-58-7	MSD	2-Chloronaphthalene	106	0.00	U	79.8	75	29-113	4	0-30
88-74-4	MSD	2-Nitroaniline *o-Nitroaniline*	106	0.00	U	81.4	77	41-121	5	0-30
99-09-2	MSD	3-Nitroaniline *m-Nitroaniline*	106	0.00	U	110	103	42-144	1	0-30
131-11-3	MSD	Dimethylphthalate	106	0.00	U	102	96	45-128	3	0-30
606-20-2	MSD	2,6-Dinitrotoluene	106	0.00	U	101	95	46-124	10	0-30
121-14-2	MSD	2,4-Dinitrotoluene	106	0.00	U	99.0	93	45-125	10	0-30
208-96-8	MSD	Acenaphthylene	106	0.00	U	91.6	86	35-120	1	0-30
83-32-9	MSD	Acenaphthene	106	0.00	U	97.1	91	35-117	3	0-30
51-28-5	MSD	2,4-Dinitrophenol	106	0.00	U	64.8	61	27-122	15	0-30
132-64-9	MSD	Dibenzofuran	106	0.00	U	92.6	87	38-113	1	0-30
58-90-2	MSD	2,3,4,6-Tetrachlorophenol	106	0.00	U	103	97	40-128	2	0-30
84-66-2	MSD	Diethylphthalate	106	0.00	U	96.7	91	43-127	3	0-30
100-02-7	MSD	4-Nitrophenol	106	0.00	U	36.7	35	17-85	12	0-30

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Sample Type: Matrix Spike Duplicate
Client ID: CAPA-18-147580MSD
Matrix: W
Lab Sample ID 1203905986
Instrument: MSD5.I
Analysis Date: 10/31/2017 06:20
Dilution: 1
Analyst: JMB3
Prep Batch ID: 1713402
Inj. Vol: 1 uL
Batch ID: 1713403

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
86-73-7	MSD	Fluorene	106	0.00	U	90.1	85	39-117	1	0-30
7005-72-3	MSD	4-Chlorophenylphenylether	106	0.00	U	98.1	92	39-121	0	0-30
100-01-6	MSD	4-Nitroaniline *p-Nitroaniline*	106	0.00	U	105	99	30-133	6	0-30
534-52-1	MSD	2-Methyl-4,6-dinitrophenol	106	0.00	U	92.2	87	32-126	1	0-30
122-39-4	MSD	Diphenylamine	106	0.00	U	87.5	82	37-118	3	0-30
122-66-7	MSD	Azobenzene *1,2-Diphenylhydrazine*	106	0.00	U	80.8	76	38-120	0	0-30
101-55-3	MSD	4-Bromophenylphenylether	106	0.00	U	102	96	39-121	7	0-30
118-74-1	MSD	Hexachlorobenzene	106	0.00	U	102	96	40-118	4	0-30
87-86-5	MSD	Pentachlorophenol	106	0.00	U	107	101	35-121	0	0-30
85-01-8	MSD	Phenanthrene	106	0.00	U	96.2	90	40-115	1	0-30
120-12-7	MSD	Anthracene	106	0.00	U	94.5	89	38-120	0	0-30
84-74-2	MSD	Di-n-butylphthalate	106	0.00	U	90.5	85	41-128	1	0-30
206-44-0	MSD	Fluoranthene	106	0.00	U	96.4	91	41-119	3	0-30
129-00-0	MSD	Pyrene	106	0.00	U	85.0	80	35-128	2	0-30
85-68-7	MSD	Butylbenzylphthalate	106	0.00	U	77.9	73	40-129	1	0-30
117-81-7	MSD	bis(2-Ethylhexyl)phthalate	106	0.00	U	72.3	68	38-131	2	0-30
56-55-3	MSD	Benzo(a)anthracene	106	0.00	U	98.8	93	39-120	0	0-30
218-01-9	MSD	Chrysene	106	0.00	U	99.8	94	41-124	2	0-30
117-84-0	MSD	Di-n-octylphthalate	106	0.00	U	73.9	69	37-134	11	0-30
205-99-2	MSD	Benzo(b)fluoranthene	106	0.00	U	95.1	89	31-122	3	0-30
207-08-9	MSD	Benzo(k)fluoranthene	106	0.00	U	94.1	88	33-123	1	0-30
50-32-8	MSD	Benzo(a)pyrene	106	0.00	U	95.5	90	32-118	5	0-30

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-565
Client ID: CAPA-18-147580MSD
Lab Sample ID 1203905986
Instrument: MSD5.I
Analyst: JMB3
Inj. Vol: 1 uL

Sample Type: Matrix Spike Duplicate
Matrix: W
Analysis Date: 10/31/2017 06:20
Prep Batch ID: 1713402
Batch ID: 1713403
Dilution: 1

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	106	0.00	U	116	109	27-121	3	0-30
53-70-3	MSD Dibenzo(a,h)anthracene	106	0.00	U	113	106	30-125	3	0-30
191-24-2	MSD Benzo(ghi)perylene	106	0.00	U	113	106	24-126	0	0-30
123-91-1	MSD 1,4-Dioxane	106	0.00	U	74.2	70	24-110	2	0-30
930-55-2	MSD N-Nitrosopyrrolidine	106	0.00	U	95.6	90	47-119	4	0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	106	0.00	U	84.9	80	32-101	6	0-30
1912-24-9	MSD Atrazine	106	0.00	U	108	102	42-129	2	0-30
92-87-5	MSD Benzidine	213	0.00	U	152	72	15-130	12	0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	106	0.00	U	125	118	34-124	1	0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	106	0.00	U	79.7	75	26-102	6	0-30

Method Blank Summary

SDG Number:	**2018-565**	**Client:**	**ARSL004**	**Matrix:**	**WATER**
Client ID:	**MB for batch 1713402**	**Instrument ID:**	**MSD5.I**	**Data File:**	**s103017.B\s5j3014.D**
Lab Sample ID:	**1203905982**	**Prep Date:**	**10/30/2017 05:33**	**Analyzed:**	**10/30/17 16:12**
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 1713402	1203905983	s103017.B\s5j3015.D	10/30/17	1642
02	CAPA-18-147580MS	1203905984	s103017.B\s5j3036.D	10/31/17	0550
03	CAPA-18-147580MSD	1203905986	s103017.B\s5j3037.D	10/31/17	0620
04	CAPA-18-147577	436322003	s103017.B\s5j3038.D	10/31/17	0651
05	CAPA-18-147578	436322007	s103017.B\s5j3039.D	10/31/17	0721

Quality Control Data

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203905982**				
Client Sample:	**QC for batch 1713402**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1713402**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/30/2017 16:12**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3014.D**	**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
	1,2-Diphenylhydrazine					
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
	4-Chloro-3-methylphenol					
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

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203905982**				
Client Sample:	**QC for batch 1713402**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1713402**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/30/2017 16:12**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3014.D**	**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 *N-Nitrosodipropylamine*	U	3.00	ug/L	3.00	10.0
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

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203905982**				
Client Sample:	**QC for batch 1713402**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1713402**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/30/2017 16:12**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3014.D**	**Column:**	**DB-5ms**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	76.4	100	ug/L	76	(32%-124%)
2-Fluorobiphenyl	36.0	50.0	ug/L	72	(32%-112%)
2-Fluorophenol	40.1	100	ug/L	40	(15%-88%)
Nitrobenzene-d5	39.0	50.0	ug/L	78	(36%-115%)
Phenol-d5	28.5	100	ug/L	29	(15%-91%)
p-Terphenyl-d14	44.6	50.0	ug/L	89	(36%-121%)

Tentatively Identified Compound Summary

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

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203905983**				
Client Sample:	**QC for batch 1713402**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1713402**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/30/2017 16:42**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3015.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		38.2	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		35.8	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		34.0	ug/L	3.00	10.0
122-66-7	Azobenzene		37.3	ug/L	3.00	10.0
	1,2-Diphenylhydrazine					
541-73-1	1,3-Dichlorobenzene		32.3	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		32.5	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		30.1	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		39.6	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		47.7	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		45.6	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		45.1	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		44.8	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		37.3	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		33.5	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		51.0	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		51.2	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		35.9	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		39.4	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		45.1	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		39.4	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		44.2	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		54.5	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		41.4	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		43.4	ug/L	3.00	10.0
	4-Chloro-3-methylphenol					
106-47-8	4-Chloroaniline		55.1	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		43.4	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		16.4	ug/L	3.00	10.0
83-32-9	Acenaphthene		43.0	ug/L	0.300	1.00
208-96-8	Acenaphthylene		42.7	ug/L	0.300	1.00
62-53-3	Aniline		42.2	ug/L	4.20	10.0
120-12-7	Anthracene		43.2	ug/L	0.300	1.00
1912-24-9	Atrazine		51.4	ug/L	3.00	10.0
92-87-5	Benzidine		91.0	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		47.0	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		44.8	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		45.6	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		53.3	ug/L	0.300	1.00

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203905983**				
Client Sample:	**QC for batch 1713402**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1713402**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/30/2017 16:42**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3015.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		44.3	ug/L	0.300	1.00
65-85-0	Benzoic acid		31.6	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		38.6	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		37.5	ug/L	3.00	10.0
218-01-9	Chrysene		47.0	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		43.5	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		38.5	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		53.9	ug/L	0.300	1.00
132-64-9	Dibenzofuran		42.5	ug/L	3.00	10.0
84-66-2	Diethylphthalate		47.2	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		49.0	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		40.4	ug/L	3.00	10.0
206-44-0	Fluoranthene		47.2	ug/L	0.300	1.00
86-73-7	Fluorene		42.1	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		45.7	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		32.5	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		20.5	ug/L	3.00	10.0
67-72-1	Hexachloroethane		30.1	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		55.1	ug/L	0.300	1.00
78-59-1	Isophorone		44.4	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		23.8	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 *N-Nitrosodipropylamine*		38.8	ug/L	3.00	10.0
930-55-2	N-Nitrosopyrrolidine		45.4	ug/L	3.00	10.0
91-20-3	Naphthalene		41.9	ug/L	0.300	1.00
98-95-3	Nitrobenzene		43.2	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		49.2	ug/L	3.00	10.0
85-01-8	Phenanthrene		45.1	ug/L	0.300	1.00
108-95-2	Phenol		17.0	ug/L	3.00	10.0
129-00-0	Pyrene		40.0	ug/L	0.300	1.00
110-86-1	Pyridine		27.4	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		32.9	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		46.4	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		42.9	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		34.4	ug/L	3.00	10.0

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**			**Matrix:**	**WATER**
Lab Sample ID:	**1203905983**				
Client Sample:	**QC for batch 1713402**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1713402**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/30/2017 16:42**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3015.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		35.8	ug/L	3.70	10.0
99-09-2	3-Nitroaniline *m-Nitroaniline*		55.9	ug/L	3.00	10.0
95-48-7	o-Cresol		35.4	ug/L	3.00	10.0
88-74-4	2-Nitroaniline *o-Nitroaniline*		38.8	ug/L	3.00	10.0
100-01-6	4-Nitroaniline *p-Nitroaniline*		48.8	ug/L	3.00	10.0

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	95.8	100	ug/L	96	(32%-124%)
2-Fluorobiphenyl	37.8	50.0	ug/L	76	(32%-112%)
2-Fluorophenol	45.8	100	ug/L	46	(15%-88%)
Nitrobenzene-d5	41.2	50.0	ug/L	82	(36%-115%)
Phenol-d5	31.2	100	ug/L	31	(15%-91%)
p-Terphenyl-d14	43.7	50.0	ug/L	87	(36%-121%)

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 11:42**	**Matrix:**	**W**
Lab Sample ID:	**1203905984**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1713402**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147580MS**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/31/2017 05:50**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**470 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3036.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		80.0	ug/L	6.38	21.3
120-82-1	1,2,4-Trichlorobenzene		74.9	ug/L	6.38	21.3
95-50-1	1,2-Dichlorobenzene		72.8	ug/L	6.38	21.3
122-66-7	Azobenzene		80.7	ug/L	6.38	21.3
	1,2-Diphenylhydrazine					
541-73-1	1,3-Dichlorobenzene		68.7	ug/L	6.38	21.3
106-46-7	1,4-Dichlorobenzene		70.6	ug/L	6.38	21.3
123-91-1	1,4-Dioxane		72.5	ug/L	6.38	21.3
90-12-0	1-Methylnaphthalene		82.1	ug/L	0.638	2.13
58-90-2	2,3,4,6-Tetrachlorophenol		105	ug/L	6.38	21.3
95-95-4	2,4,5-Trichlorophenol		98.0	ug/L	6.38	21.3
88-06-2	2,4,6-Trichlorophenol		97.9	ug/L	6.38	21.3
120-83-2	2,4-Dichlorophenol		96.6	ug/L	6.38	21.3
105-67-9	2,4-Dimethylphenol		82.4	ug/L	6.38	21.3
51-28-5	2,4-Dinitrophenol		75.5	ug/L	10.6	42.6
121-14-2	2,4-Dinitrotoluene		109	ug/L	6.38	21.3
606-20-2	2,6-Dinitrotoluene		111	ug/L	6.38	21.3
91-58-7	2-Chloronaphthalene		76.3	ug/L	0.872	2.13
95-57-8	2-Chlorophenol		89.2	ug/L	6.38	21.3
534-52-1	2-Methyl-4,6-dinitrophenol		93.0	ug/L	6.38	21.3
91-57-6	2-Methylnaphthalene		81.2	ug/L	0.638	2.13
88-75-5	2-Nitrophenol		95.6	ug/L	6.38	21.3
91-94-1	3,3'-Dichlorobenzidine		124	ug/L	6.38	21.3
101-55-3	4-Bromophenylphenylether		95.0	ug/L	6.38	21.3
59-50-7	Parachlorometa cresol		96.9	ug/L	6.38	21.3
	4-Chloro-3-methylphenol					
106-47-8	4-Chloroaniline		109	ug/L	7.02	21.3
7005-72-3	4-Chlorophenylphenylether		97.8	ug/L	6.38	21.3
100-02-7	4-Nitrophenol		41.3	ug/L	6.38	21.3
83-32-9	Acenaphthene		94.0	ug/L	0.638	2.13
208-96-8	Acenaphthylene		90.6	ug/L	0.638	2.13
62-53-3	Aniline		83.2	ug/L	8.94	21.3
120-12-7	Anthracene		94.6	ug/L	0.638	2.13
1912-24-9	Atrazine		106	ug/L	6.38	21.3
92-87-5	Benzidine		172	ug/L	8.30	21.3
56-55-3	Benzo(a)anthracene		98.9	ug/L	0.638	2.13
50-32-8	Benzo(a)pyrene		100	ug/L	0.638	2.13
205-99-2	Benzo(b)fluoranthene		97.8	ug/L	0.638	2.13
191-24-2	Benzo(ghi)perylene		113	ug/L	0.638	2.13

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 11:42**	**Matrix:**	**W**
Lab Sample ID:	**1203905984**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1713402**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147580MS**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/31/2017 05:50**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**470 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3036.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		94.7	ug/L	0.638	2.13
65-85-0	Benzoic acid		99.1	ug/L	12.8	42.6
100-51-6	Benzyl alcohol		88.2	ug/L	6.38	21.3
85-68-7	Butylbenzylphthalate		78.6	ug/L	6.38	21.3
218-01-9	Chrysene		102	ug/L	0.638	2.13
84-74-2	Di-n-butylphthalate		91.5	ug/L	6.38	21.3
117-84-0	Di-n-octylphthalate		82.8	ug/L	6.38	21.3
53-70-3	Dibenzo(a,h)anthracene		116	ug/L	0.638	2.13
132-64-9	Dibenzofuran		92.1	ug/L	6.38	21.3
84-66-2	Diethylphthalate		99.3	ug/L	6.38	21.3
131-11-3	Dimethylphthalate		105	ug/L	6.38	21.3
88-85-7	Dinoseb	U	6.38	ug/L	6.38	21.3
122-39-4	Diphenylamine		89.9	ug/L	6.38	21.3
206-44-0	Fluoranthene		99.7	ug/L	0.638	2.13
86-73-7	Fluorene		91.4	ug/L	0.638	2.13
118-74-1	Hexachlorobenzene		98.4	ug/L	6.38	21.3
87-68-3	Hexachlorobutadiene		66.7	ug/L	6.38	21.3
77-47-4	Hexachlorocyclopentadiene		52.4	ug/L	6.38	21.3
67-72-1	Hexachloroethane		63.5	ug/L	6.38	21.3
193-39-5	Indeno(1,2,3-cd)pyrene		120	ug/L	0.638	2.13
78-59-1	Isophorone		93.0	ug/L	7.45	21.3
62-75-9	N-Methyl-N-nitrosomethylamine		63.4	ug/L	6.38	21.3
924-16-3	N-Nitrosodi-n-butylamine	U	6.38	ug/L	6.38	21.3
55-18-5	N-Nitrosodiethylamine	U	6.38	ug/L	6.38	21.3
621-64-7	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*		84.9	ug/L	6.38	21.3
930-55-2	N-Nitrosopyrrolidine		99.1	ug/L	6.38	21.3
91-20-3	Naphthalene		88.1	ug/L	0.638	2.13
98-95-3	Nitrobenzene		93.2	ug/L	6.38	21.3
608-93-5	Pentachlorobenzene	U	6.38	ug/L	6.38	21.3
87-86-5	Pentachlorophenol		107	ug/L	6.38	21.3
85-01-8	Phenanthrene		97.2	ug/L	0.638	2.13
108-95-2	Phenol		51.6	ug/L	6.38	21.3
129-00-0	Pyrene		83.3	ug/L	0.638	2.13
110-86-1	Pyridine		60.4	ug/L	6.38	21.3
108-60-1	bis(2-Chloro-1-methylethyl)ether		70.9	ug/L	6.38	21.3
111-91-1	bis(2-Chloroethoxy)methane		96.9	ug/L	6.38	21.3
111-44-4	bis(2-Chloroethyl) ether		89.0	ug/L	6.38	21.3
117-81-7	bis(2-Ethylhexyl)phthalate		73.6	ug/L	6.38	21.3

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 11:42**	**Matrix:**	**W**
Lab Sample ID:	**1203905984**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1713402**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147580MS**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/31/2017 05:50**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**470 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3036.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		90.8	ug/L	7.87	21.3
99-09-2	3-Nitroaniline *m-Nitroaniline*		111	ug/L	6.38	21.3
95-48-7	o-Cresol		83.3	ug/L	6.38	21.3
88-74-4	2-Nitroaniline *o-Nitroaniline*		85.5	ug/L	6.38	21.3
100-01-6	4-Nitroaniline *p-Nitroaniline*		112	ug/L	6.38	21.3

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	199	213	ug/L	94	(32%-124%)
2-Fluorobiphenyl	84.1	106	ug/L	79	(32%-112%)
2-Fluorophenol	120	213	ug/L	57	(15%-88%)
Nitrobenzene-d5	84.6	106	ug/L	79	(36%-115%)
Phenol-d5	93.3	213	ug/L	44	(15%-91%)
p-Terphenyl-d14	89.7	106	ug/L	84	(36%-121%)

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 11:42**	**Matrix:**	**W**
Lab Sample ID:	**1203905986**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1713402**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147580MSD**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/31/2017 06:20**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**470 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3037.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		84.9	ug/L	6.38	21.3
120-82-1	1,2,4-Trichlorobenzene		79.7	ug/L	6.38	21.3
95-50-1	1,2-Dichlorobenzene		77.4	ug/L	6.38	21.3
122-66-7	Azobenzene		80.8	ug/L	6.38	21.3
	1,2-Diphenylhydrazine					
541-73-1	1,3-Dichlorobenzene		74.2	ug/L	6.38	21.3
106-46-7	1,4-Dichlorobenzene		72.6	ug/L	6.38	21.3
123-91-1	1,4-Dioxane		74.2	ug/L	6.38	21.3
90-12-0	1-Methylnaphthalene		85.7	ug/L	0.638	2.13
58-90-2	2,3,4,6-Tetrachlorophenol		103	ug/L	6.38	21.3
95-95-4	2,4,5-Trichlorophenol		91.6	ug/L	6.38	21.3
88-06-2	2,4,6-Trichlorophenol		92.4	ug/L	6.38	21.3
120-83-2	2,4-Dichlorophenol		92.6	ug/L	6.38	21.3
105-67-9	2,4-Dimethylphenol		78.5	ug/L	6.38	21.3
51-28-5	2,4-Dinitrophenol		64.8	ug/L	10.6	42.6
121-14-2	2,4-Dinitrotoluene		99.0	ug/L	6.38	21.3
606-20-2	2,6-Dinitrotoluene		101	ug/L	6.38	21.3
91-58-7	2-Chloronaphthalene		79.8	ug/L	0.872	2.13
95-57-8	2-Chlorophenol		86.9	ug/L	6.38	21.3
534-52-1	2-Methyl-4,6-dinitrophenol		92.2	ug/L	6.38	21.3
91-57-6	2-Methylnaphthalene		81.9	ug/L	0.638	2.13
88-75-5	2-Nitrophenol		91.1	ug/L	6.38	21.3
91-94-1	3,3'-Dichlorobenzidine		125	ug/L	6.38	21.3
101-55-3	4-Bromophenylphenylether		102	ug/L	6.38	21.3
59-50-7	Parachlorometa cresol		94.5	ug/L	6.38	21.3
	4-Chloro-3-methylphenol					
106-47-8	4-Chloroaniline		107	ug/L	7.02	21.3
7005-72-3	4-Chlorophenylphenylether		98.1	ug/L	6.38	21.3
100-02-7	4-Nitrophenol		36.7	ug/L	6.38	21.3
83-32-9	Acenaphthene		97.1	ug/L	0.638	2.13
208-96-8	Acenaphthylene		91.6	ug/L	0.638	2.13
62-53-3	Aniline		84.4	ug/L	8.94	21.3
120-12-7	Anthracene		94.5	ug/L	0.638	2.13
1912-24-9	Atrazine		108	ug/L	6.38	21.3
92-87-5	Benzidine		152	ug/L	8.30	21.3
56-55-3	Benzo(a)anthracene		98.8	ug/L	0.638	2.13
50-32-8	Benzo(a)pyrene		95.5	ug/L	0.638	2.13
205-99-2	Benzo(b)fluoranthene		95.1	ug/L	0.638	2.13
191-24-2	Benzo(ghi)perylene		113	ug/L	0.638	2.13

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 11:42**	**Matrix:**	**W**
Lab Sample ID:	**1203905986**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1713402**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147580MSD**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/31/2017 06:20**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**470 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3037.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		94.1	ug/L	0.638	2.13
65-85-0	Benzoic acid		97.3	ug/L	12.8	42.6
100-51-6	Benzyl alcohol		86.9	ug/L	6.38	21.3
85-68-7	Butylbenzylphthalate		77.9	ug/L	6.38	21.3
218-01-9	Chrysene		99.8	ug/L	0.638	2.13
84-74-2	Di-n-butylphthalate		90.5	ug/L	6.38	21.3
117-84-0	Di-n-octylphthalate		73.9	ug/L	6.38	21.3
53-70-3	Dibenzo(a,h)anthracene		113	ug/L	0.638	2.13
132-64-9	Dibenzofuran		92.6	ug/L	6.38	21.3
84-66-2	Diethylphthalate		96.7	ug/L	6.38	21.3
131-11-3	Dimethylphthalate		102	ug/L	6.38	21.3
88-85-7	Dinoseb	U	6.38	ug/L	6.38	21.3
122-39-4	Diphenylamine		87.5	ug/L	6.38	21.3
206-44-0	Fluoranthene		96.4	ug/L	0.638	2.13
86-73-7	Fluorene		90.1	ug/L	0.638	2.13
118-74-1	Hexachlorobenzene		102	ug/L	6.38	21.3
87-68-3	Hexachlorobutadiene		71.9	ug/L	6.38	21.3
77-47-4	Hexachlorocyclopentadiene		55.5	ug/L	6.38	21.3
67-72-1	Hexachloroethane		69.4	ug/L	6.38	21.3
193-39-5	Indeno(1,2,3-cd)pyrene		116	ug/L	0.638	2.13
78-59-1	Isophorone		85.6	ug/L	7.45	21.3
62-75-9	N-Methyl-N-nitrosomethylamine		60.4	ug/L	6.38	21.3
924-16-3	N-Nitrosodi-n-butylamine	U	6.38	ug/L	6.38	21.3
55-18-5	N-Nitrosodiethylamine	U	6.38	ug/L	6.38	21.3
621-64-7	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*		82.9	ug/L	6.38	21.3
930-55-2	N-Nitrosopyrrolidine		95.6	ug/L	6.38	21.3
91-20-3	Naphthalene		86.6	ug/L	0.638	2.13
98-95-3	Nitrobenzene		85.5	ug/L	6.38	21.3
608-93-5	Pentachlorobenzene	U	6.38	ug/L	6.38	21.3
87-86-5	Pentachlorophenol		107	ug/L	6.38	21.3
85-01-8	Phenanthrene		96.2	ug/L	0.638	2.13
108-95-2	Phenol		48.0	ug/L	6.38	21.3
129-00-0	Pyrene		85.0	ug/L	0.638	2.13
110-86-1	Pyridine		57.7	ug/L	6.38	21.3
108-60-1	bis(2-Chloro-1-methylethyl)ether		70.2	ug/L	6.38	21.3
111-91-1	bis(2-Chloroethoxy)methane		92.1	ug/L	6.38	21.3
111-44-4	bis(2-Chloroethyl) ether		90.3	ug/L	6.38	21.3
117-81-7	bis(2-Ethylhexyl)phthalate		72.3	ug/L	6.38	21.3

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-565**	**Date Collected:**	**10/24/2017 11:42**	**Matrix:**	**W**
Lab Sample ID:	**1203905986**	**Date Received:**	**10/26/2017 08:55**		
Client Sample:	**QC for batch 1713402**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147580MSD**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1713403**	**Inst:**	**MSD5.I**	**Dilution:**	**1**
Run Date:	**10/31/2017 06:20**	**Analyst:**	**JMB3**	**Inj. Vol:**	**1 uL**
Prep Date:	**10/30/2017 05:33**	**Aliquot:**	**470 mL**	**Final Volume:**	**1 mL**
Data File:	**s103017.B\s5j3037.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		84.9	ug/L	7.87	21.3
99-09-2	3-Nitroaniline *m-Nitroaniline*		110	ug/L	6.38	21.3
95-48-7	o-Cresol		81.2	ug/L	6.38	21.3
88-74-4	2-Nitroaniline *o-Nitroaniline*		81.4	ug/L	6.38	21.3
100-01-6	4-Nitroaniline *p-Nitroaniline*		105	ug/L	6.38	21.3

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	202	213	ug/L	95	(32%-124%)
2-Fluorobiphenyl	87.7	106	ug/L	82	(32%-112%)
2-Fluorophenol	120	213	ug/L	56	(15%-88%)
Nitrobenzene-d5	86.7	106	ug/L	81	(36%-115%)
Phenol-d5	95.0	213	ug/L	45	(15%-91%)
p-Terphenyl-d14	95.4	106	ug/L	90	(36%-121%)

Perchlorates by LCMSMS Analysis

Case Narrative

Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-565
Work Order #: 436322

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:	1714762
Prep Batch Number:	1714758

Sample Analysis

Sample ID	Client ID
436322001	436322001 (CAPA-18-147551)
436322005	436322005 (CAPA-18-147552)
1203909517	Interference Check Sample (ICS)
1203909513	Method Blank (MB)
1203909514	Laboratory Control Sample (LCS)
1203909515	436322001(CAPA-18-147551) Matrix Spike (MS)
1203909516	436322001(CAPA-18-147551) 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 436322001 (CAPA-18-147551) 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: 2018-565 GEL Work Order: 436322

The Qualifiers in this report are defined as follows:

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

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: Michael A. Penny Jr. **Name: Michael Penny**

Date: 08 NOV 2017 **Title: Group Leader**

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Lab Code: GEL

Instrument: LCMSMS

Method: SW846 6850 Modified

Matrix: WATER

Extraction Batch ID: 1714758

Extraction Type: Filter/DAI

Sample Volume/Weight: 10.0 mL

Concentrated Extract Volume: 10.0

Client Sample No.
CAPA-18-147551

Date Received: 26-OCT-17

GEL Job No (SDG): 2018-565

GEL Sample ID: 436322001

Date Filtered: 01-NOV-17

Injection 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	0.237	ug/L		1	03-NOV-17 18:52	per1103017a
	Perchlorate Isotope Ratio			3.02			1	03-NOV-17 18:52	per1103017a
14797-73-0	Perchlorate-101	.05	.2	0.238	ug/L		1	03-NOV-17 18:52	per1103017a
	Perchlorate-O(18)			0.401	ug/L		1	03-NOV-17 18:52	per1103017a

^ 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 LLC

Lab Code: GEL

Instrument: LCMSMS

Method: SW846 6850 Modified

Matrix: WATER

Extraction Batch ID: 1714758

Extraction Type: Filter/DAI

Sample Volume/Weight: 10.0 mL

Concentrated Extract Volume: 10.0

Client Sample No.
CAPA-18-147552

Date Received: 26-OCT-17

GEL Job No (SDG): 2018-565

GEL Sample ID: 436322005

Date Filtered: 01-NOV-17

Injection 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	0.267	ug/L		1	03-NOV-17 19:24	per1103020a
	Perchlorate Isotope Ratio			3.23			1	03-NOV-17 19:24	per1103020a
14797-73-0	Perchlorate-101	.05	.2	0.251	ug/L		1	03-NOV-17 19:24	per1103020a
	Perchlorate-O(18)			0.392	ug/L		1	03-NOV-17 19:24	per1103020a

^ 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): 2018-565

Extract Batch Code: 1714758

Date Filtered: 01-NOV-17

Matrix: WATER

Sample ID: 1203909514

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.187	ug/L	93		85 - 115
Perchlorate Isotope Ratio		2.7				-
Perchlorate-101	0.200	.21	ug/L	105		85 - 115
Perchlorate-O(18)		.411	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): 2018-565

Extract Batch Code: 1714758

Date Extracted: 01-NOV-17

GEL MS/PS ID: 1203909515

Client ID: CAPA-18-147551

GEL MSD/PSD ID: 1203909516

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	0.237	ug/L	0.427	95	.48	121	12	30	75 - 125
Perchlorate Isotope Ratio	0	3.02		2.98		3.04		2		-
Perchlorate-101	0.200	0.238	ug/L	0.435	98	.478	120	9	30	75 - 125
Perchlorate-O(18)	0	0.401	ug/L	0.399		.399		0		-

^ 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 LLC

Lab Code: GEL

Instrument: LCMSMS

Method: EPA 6850 Modified

Matrix: WATER

Extraction Batch ID: 1714758

Extraction Type: Filter/DAI

Sample Volume/Weight: 10.0 mL

Concentrated Extract Volume: 10.0

Client Sample No.
MB

Date Received: 01-NOV-17

GEL Job No (SDG): 2018-565

GEL Sample ID: 1203909513

Date Filtered: 01-NOV-17

Injection 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	03-NOV-17 18:10	per1103013a
	Perchlorate Isotope Ratio						1	03-NOV-17 18:10	per1103013a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	03-NOV-17 18:10	per1103013a
	Perchlorate-O(18)			0.409	ug/L		1	03-NOV-17 18:10	per1103013a

^ 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 LLC

Lab Code: GEL

Instrument: LCMSMS

Method: EPA 6850 Modified

Matrix: WATER

Extraction Batch ID: 1714758

Extraction Type: Filter/DAI

Sample Volume/Weight: 10.0 mL

Concentrated Extract Volume: 10.0

Client Sample No.
LCS

Date Received: 01-NOV-17

GEL Job No (SDG): 2018-565

GEL Sample ID: 1203909514

Date Filtered: 01-NOV-17

Injection 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	0.187	ug/L	J	1	03-NOV-17 18:21	per1103014a
	Perchlorate Isotope Ratio			2.7			1	03-NOV-17 18:21	per1103014a
14797-73-0	Perchlorate-101	.05	.2	0.210	ug/L		1	03-NOV-17 18:21	per1103014a
	Perchlorate-O(18)			0.411	ug/L		1	03-NOV-17 18:21	per1103014a

^ 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 LLC

Lab Code: GEL

Instrument: LCMSMS

Method: SW846 6850 Modified

Matrix: WATER

Extraction Batch ID: 1714758

Extraction Type: Filter/DAI

Sample Volume/Weight: 10.0 mL

Concentrated Extract Volume: 10.0

Client Sample No.
ICS

Date Received:

GEL Job No (SDG): 2018-565

GEL Sample ID: 1203909517

Date Filtered: 01-NOV-17

Injection 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	0.233	ug/L		1	03-NOV-17 18:31	per1103015a
	Perchlorate Isotope Ratio			3.32			1	03-NOV-17 18:31	per1103015a
14797-73-0	Perchlorate-101	.05	.2	0.213	ug/L		1	03-NOV-17 18:31	per1103015a
	Perchlorate-O(18)			0.409	ug/L		1	03-NOV-17 18:31	per1103015a

^ 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 = Instrument Value X $\frac{\text{Concentrated Extract Volume}}{\text{Aliquot}}$ X $\frac{1}{\%\text{Solids}}$

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Lab Code: GEL

Instrument: LCMSMS

Method: SW846 6850 Modified

Matrix: WATER

Extraction Batch ID: 1714758

Extraction Type: Filter/DAI

Sample Volume/Weight: 10.0 mL

Concentrated Extract Volume: 10.0

Client Sample No.
CAPA-18-147551MS

Date Received: 26-OCT-17

GEL Job No (SDG): 2018-565

GEL Sample ID: 1203909515

Date Filtered: 01-NOV-17

Injection 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	0.427	ug/L		1	03-NOV-17 19:03	per1103018a
	Perchlorate Isotope Ratio			2.98			1	03-NOV-17 19:03	per1103018a
14797-73-0	Perchlorate-101	.05	.2	0.435	ug/L		1	03-NOV-17 19:03	per1103018a
	Perchlorate-O(18)			0.399	ug/L		1	03-NOV-17 19:03	per1103018a

^ 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 LLC

Lab Code: GEL

Instrument: LCMSMS

Method: SW846 6850 Modified

Matrix: WATER

Extraction Batch ID: 1714758

Extraction Type: Filter/DAI

Sample Volume/Weight: 10.0 mL

Concentrated Extract Volume: 10.0

Client Sample No.
CAPA-18-147551MSD

Date Received: 26-OCT-17

GEL Job No (SDG): 2018-565

GEL Sample ID: 1203909516

Date Filtered: 01-NOV-17

Injection 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	0.480	ug/L		1	03-NOV-17 19:13	per1103019a
	Perchlorate Isotope Ratio			3.04			1	03-NOV-17 19:13	per1103019a
14797-73-0	Perchlorate-101	.05	.2	0.478	ug/L		1	03-NOV-17 19:13	per1103019a
	Perchlorate-O(18)			0.399	ug/L		1	03-NOV-17 19:13	per1103019a

^ 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 #: 2018-565
Work Order #: 436322

Sample ID	Client ID
436322001	CAPA-18-147551
436322002	CAPA-18-147577
436322005	CAPA-18-147552
436322006	CAPA-18-147578
1203905702	Method Blank (MB)**ICP**
1203905703	Laboratory Control Sample (LCS)
1203905706	436322001(CAPA-18-147551L) Serial Dilution (SD)
1203905704	436322001(CAPA-18-147551D) Sample Duplicate (DUP)
1203905705	436322001(CAPA-18-147551S) Matrix Spike (MS)
1203905768	Method Blank (MB)**ICP-MS**
1203905769	Laboratory Control Sample (LCS)
1203905772	436322001(CAPA-18-147551L) Serial Dilution (SD)
1203905770	436322001(CAPA-18-147551D) Sample Duplicate (DUP)
1203905771	436322001(CAPA-18-147551S) Matrix Spike (MS)
1203917282	Method Blank (MB)**CVAA**
1203917283	Laboratory Control Sample (LCS)
1203917288	436156001(CAPA-18-147569L) Serial Dilution (SD)
1203917284	436156001(CAPA-18-147569D) Sample Duplicate (DUP)
1203917286	436156001(CAPA-18-147569S) Matrix Spike (MS)

Sample Analysis

Samples 436322001,002,005 and 006 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1713303, 1713329, 1717920 and 1720822
Prep Batch :	1713302, 1713328 and 1717917
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-ICP was performed on a PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

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

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

Calibration Information

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

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

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

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

Continuing Calibration Verification (CCV) Requirements
All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement
The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)
An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery
The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement
The following samples were selected as the quality control (QC) samples for this SDG: 436322001 (CAPA-18-147551)-ICP and ICP-MS and 436156001 (CAPA-18-147569)-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.

Hardness = 2.497 (Ca) + 4.118 (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: 2018-565 GEL Work Order: 436322

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: 21 NOV 2017 **Title: Data Validator**

Sample Data Summary

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−565 **CONTRACT:** ESHL00114 **METHOD TYPE:** EPA

SAMPLE ID: 436322001 **BASIS:** As Received **DATE COLLECTED** 24−OCT−17

CLIENT ID: CAPA−18−147551 **LEVEL:** Low **DATE RECEIVED** 26−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	11/13/17 11:20	111317W1−4	1717920

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−565 **CONTRACT:** ESHL00114 **METHOD TYPE:** SW846

SAMPLE ID: 436322001 **BASIS:** As Received **DATE COLLECTED** 24−OCT−17

CLIENT ID: CAPA−18−147551 **LEVEL:** Low **DATE RECEIVED** 26−OCT−17

MATRIX: W **%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429−90−5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	11/14/17 17:56	111417−1	1713303
7440−36−0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/30/17 18:07	171030−3	1713329
7440−38−2	Arsenic	2.18	ug/L	J	2	5	5	1	MS	BAJ	10/30/17 18:07	171030−3	1713329
7440−39−3	Barium	53.6	ug/L		1	5	5	1	P	HSC	11/14/17 17:56	111417−1	1713303
7440−41−7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/14/17 17:56	111417−1	1713303
7440−42−8	Boron	15	ug/L	U	15	50	50	1	P	HSC	11/14/17 17:56	111417−1	1713303
7440−43−9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/30/17 18:07	171030−3	1713329
7440−70−2	Calcium	28200	ug/L		50	200	200	1	P	HSC	11/18/17 06:49	111817−2	1713303
7440−47−3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/30/17 18:07	171030−3	1713329
7440−48−4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/14/17 17:56	111417−1	1713303
7440−50−8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/14/17 17:56	111417−1	1713303
7439−89−6	Iron	30.7	ug/L	J	30	100	100	1	P	HSC	11/14/17 17:56	111417−1	1713303
7439−92−1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/30/17 18:07	171030−3	1713329
7439−95−4	Magnesium	10000	ug/L		110	300	300	1	P	HSC	11/14/17 17:56	111417−1	1713303
7439−96−5	Manganese	15.8	ug/L		2	10	10	1	P	HSC	11/14/17 17:56	111417−1	1713303
7439−98−7	Molybdenum	1.27	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/30/17 18:07	171030−3	1713329
7440−02−0	Nickel	46	ug/L		0.6	2	2	1	MS	BAJ	10/30/17 18:07	171030−3	1713329
7440−09−7	Potassium	3470	ug/L		50	150	150	1	P	HSC	11/14/17 17:56	111417−1	1713303
7782−49−2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/30/17 18:07	171030−3	1713329
7631−86−9	Silica	50400	ug/L		53	213	213	1	P	HSC	11/14/17 17:56	111417−1	1713303
7440−22−4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/30/17 18:07	171030−3	1713329
7440−23−5	Sodium	12500	ug/L		100	300	300	1	P	HSC	11/18/17 06:49	111817−2	1713303
7440−24−6	Strontium	165	ug/L		1	5	5	1	P	HSC	11/14/17 17:56	111417−1	1713303
7440−28−0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/30/17 18:07	171030−3	1713329
7440−31−5	Tin	2.77	ug/L	J	2.5	10	10	1	P	HSC	11/14/17 17:56	111417−1	1713303
7440−61−1	Uranium	0.611	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/30/17 18:07	171030−3	1713329
7440−62−2	Vanadium	2.49	ug/L	J	1	5	5	1	P	HSC	11/14/17 17:56	111417−1	1713303
7440−66−6	Zinc	29.4	ug/L		3.3	10	10	1	P	HSC	11/18/17 06:49	111817−2	1713303

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−565 **CONTRACT:** ESHL00114 **METHOD TYPE:**

SAMPLE ID: 436322001 **BASIS:** As Received **DATE COLLECTED** 24−OCT−17

CLIENT ID: CAPA−18−147551 **LEVEL:** Low **DATE RECEIVED** 26−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	112	mg/L		0.453	1.24	1.24	1		JJ2	11/20/17 14:52		1720822

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1713303	1713302	SW846 3005A	50	mL	50	mL	10/27/17	SXW1
1713329	1713328	SW846 3005A	50	mL	50	mL	10/26/17	JXM8
1717920	1717917	EPA 245.1/245.2 Prep	20	mL	20	mL	11/10/17	AXS5

***Analytical Methods:**

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

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−565 **CONTRACT:** ESHL00114 **METHOD TYPE:** EPA

SAMPLE ID: 436322002 **BASIS:** As Received **DATE COLLECTED** 24−OCT−17

CLIENT ID: CAPA−18−147577 **LEVEL:** Low **DATE RECEIVED** 26−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	11/13/17 11:22	111317W1−4	1717920

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1717920	1717917	EPA 245.1/245.2 Prep	20	mL	20	mL	11/10/17	AXS5

***Analytical Methods:**

AV **EPA 245.2 1974**

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−565 **CONTRACT:** ESHL00114 **METHOD TYPE:** EPA

SAMPLE ID: 436322005 **BASIS:** As Received **DATE COLLECTED** 24−OCT−17

CLIENT ID: CAPA−18−147552 **LEVEL:** Low **DATE RECEIVED** 26−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	11/13/17 11:24	111317W1−4	1717920

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−565 **CONTRACT:** ESHL00114 **METHOD TYPE:** SW846

SAMPLE ID: 436322005 **BASIS:** As Received **DATE COLLECTED** 24−OCT−17

CLIENT ID: CAPA−18−147552 **LEVEL:** Low **DATE RECEIVED** 26−OCT−17

MATRIX: W **%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429−90−5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	11/14/17 18:12	111417−1	1713303
7440−36−0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	10/30/17 18:24	171030−3	1713329
7440−38−2	Arsenic	2.72	ug/L	J	2	5	5	1	MS	BAJ	10/30/17 18:24	171030−3	1713329
7440−39−3	Barium	7.73	ug/L		1	5	5	1	P	HSC	11/14/17 18:12	111417−1	1713303
7440−41−7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	11/14/17 18:12	111417−1	1713303
7440−42−8	Boron	15	ug/L	U	15	50	50	1	P	HSC	11/14/17 18:12	111417−1	1713303
7440−43−9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/30/17 18:24	171030−3	1713329
7440−70−2	Calcium	20800	ug/L		50	200	200	1	P	HSC	11/18/17 06:46	111817−2	1713303
7440−47−3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/30/17 18:24	171030−3	1713329
7440−48−4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	11/14/17 18:12	111417−1	1713303
7440−50−8	Copper	3	ug/L	U	3	10	10	1	P	HSC	11/14/17 18:12	111417−1	1713303
7439−89−6	Iron	30	ug/L	U	30	100	100	1	P	HSC	11/14/17 18:12	111417−1	1713303
7439−92−1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/30/17 18:24	171030−3	1713329
7439−95−4	Magnesium	5860	ug/L		110	300	300	1	P	HSC	11/14/17 18:12	111417−1	1713303
7439−96−5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	11/14/17 18:12	111417−1	1713303
7439−98−7	Molybdenum	1.59	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/30/17 18:24	171030−3	1713329
7440−02−0	Nickel	0.735	ug/L	J	0.6	2	2	1	MS	BAJ	10/30/17 18:24	171030−3	1713329
7440−09−7	Potassium	2450	ug/L		50	150	150	1	P	HSC	11/14/17 18:12	111417−1	1713303
7782−49−2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/30/17 18:24	171030−3	1713329
7631−86−9	Silica	42000	ug/L		53	213	213	1	P	HSC	11/14/17 18:12	111417−1	1713303
7440−22−4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/30/17 18:24	171030−3	1713329
7440−23−5	Sodium	10200	ug/L		100	300	300	1	P	HSC	11/18/17 06:46	111817−2	1713303
7440−24−6	Strontium	90.8	ug/L		1	5	5	1	P	HSC	11/14/17 18:12	111417−1	1713303
7440−28−0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/30/17 18:24	171030−3	1713329
7440−31−5	Tin	2.76	ug/L	J	2.5	10	10	1	P	HSC	11/14/17 18:12	111417−1	1713303
7440−61−1	Uranium	0.565	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/30/17 18:24	171030−3	1713329
7440−62−2	Vanadium	4.52	ug/L	J	1	5	5	1	P	HSC	11/14/17 18:12	111417−1	1713303
7440−66−6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	11/18/17 06:46	111817−2	1713303

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−565 **CONTRACT:** ESHL00114 **METHOD TYPE:**

SAMPLE ID: 436322005 **BASIS:** As Received **DATE COLLECTED** 24−OCT−17

CLIENT ID: CAPA−18−147552 **LEVEL:** Low **DATE RECEIVED** 26−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	76	mg/L		0.453	1.24	1.24	1		JJ2	11/20/17 14:52		1720822

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1713303	1713302	SW846 3005A	50	mL	50	mL	10/27/17	SXW1
1713329	1713328	SW846 3005A	50	mL	50	mL	10/26/17	JXM8
1717920	1717917	EPA 245.1/245.2 Prep	20	mL	20	mL	11/10/17	AXS5

***Analytical Methods:**

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

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−565 **CONTRACT:** ESHL00114 **METHOD TYPE:** EPA

SAMPLE ID: 436322006 **BASIS:** As Received **DATE COLLECTED** 24−OCT−17

CLIENT ID: CAPA−18−147578 **LEVEL:** Low **DATE RECEIVED** 26−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	11/13/17 11:25	111317W1−4	1717920

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1717920	1717917	EPA 245.1/245.2 Prep	20	mL	20	mL	11/10/17	AXS5

***Analytical Methods:**

AV **EPA 245.2 1974**

Quality Control Summary

METALS
−3b−
PREPARATION BLANK SUMMARY

SDG NO. 2018−565
Contract: ESHL00114
Matrix: W

Sample ID	Analyte	Result	Units	Acceptance Window	Conc Qual	M*	MDL	RDL
1203905702								
	Aluminum	68	ug/L	+/−200	U	P	68	200
	Barium	1	ug/L	+/−5	U	P	1	5
	Beryllium	1	ug/L	+/−5	U	P	1	5
	Boron	15	ug/L	+/−50	U	P	15	50
	Calcium	50	ug/L	+/−200	U	P	50	200
	Cobalt	1	ug/L	+/−5	U	P	1	5
	Copper	3	ug/L	+/−10	U	P	3	10
	Iron	30	ug/L	+/−100	U	P	30	100
	Magnesium	110	ug/L	+/−300	U	P	110	300
	Tin	2.5	ug/L	+/−10	U	P	2.5	10
	Manganese	2	ug/L	+/−10	U	P	2	10
	Potassium	−50.5	ug/L	+/−150	J	P	50	150
	Silica	53	ug/L	+/−213	U	P	53	213
	Sodium	100	ug/L	+/−300	U	P	100	300
	Strontium	1	ug/L	+/−5	U	P	1	5
	Vanadium	1	ug/L	+/−5	U	P	1	5
	Zinc	3.3	ug/L	+/−10	U	P	3.3	10
1203905768								
	Antimony	1.12	ug/L	+/−3	J	MS	1	3
	Arsenic	2	ug/L	+/−5	U	MS	2	5
	Cadmium	0.3	ug/L	+/−1	U	MS	0.3	1
	Chromium	3	ug/L	+/−10	U	MS	3	10
	Lead	0.5	ug/L	+/−2	U	MS	0.5	2
	Molybdenum	0.2	ug/L	+/−0.5	U	MS	0.2	0.5
	Nickel	0.6	ug/L	+/−2	U	MS	0.6	2
	Selenium	2	ug/L	+/−5	U	MS	2	5
	Silver	0.3	ug/L	+/−1	U	MS	0.3	1
	Thallium	0.6	ug/L	+/−2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/−0.2	U	MS	0.067	0.2
1203917282								
	Mercury	0.067	ug/L	+/−0.2	U	AV	0.067	0.2

***Analytical Methods:**

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

METALS
−5a−

Matrix Spike Summary

SDG NO. 2018−565 **Client ID** CAPA−18−147551S

Contract: ESHL00114 **Level:** Low

Matrix: WATER **% Solids:**

Sample ID: 436322001 **Spike ID:** 1203905705

Analyte	Units	Acceptance Limit	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M*
Aluminum	ug/L	75−125	4920		68	U	5000	98.3		P
Barium	ug/L	75−125	543		53.6		500	97.8		P
Beryllium	ug/L	75−125	493		1	U	500	98.7		P
Boron	ug/L	75−125	529		15	U	500	103		P
Calcium	ug/L		34100		28200		5000	119	N/A	P
Cobalt	ug/L	75−125	486		1	U	500	97.2		P
Copper	ug/L	75−125	501		3	U	500	100		P
Iron	ug/L	75−125	4940		30.7	J	5000	98.2		P
Magnesium	ug/L	75−125	15300		10000		5000	106		P
Manganese	ug/L	75−125	501		15.8		500	97		P
Potassium	ug/L	75−125	8350		3470		5000	97.6		P
Silica	ug/L		61400		50400		10700	103	N/A	P
Sodium	ug/L	75−125	17100		12500		5000	92.6		P
Strontium	ug/L	75−125	659		165		500	98.8		P
Tin	ug/L	75−125	498		2.77	J	500	99		P
Vanadium	ug/L	75−125	503		2.49	J	500	100		P
Zinc	ug/L	75−125	515		29.4		500	97		P

***Analytical Methods:**

P **SW846 3005A/6010C**

METALS
−5a−

Matrix Spike Summary

SDG NO. 2018−565 **Client ID** CAPA−18−147551S

Contract: ESHL00114 **Level:** Low

Matrix: WATER **% Solids:**

Sample ID: 436322001 **Spike ID:** 1203905771

Analyte	Units	Acceptance Limit	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M*
Nickel	ug/L	75−125	96.3		46		50	100		MS
Selenium	ug/L	75−125	48.8		2	U	50	96.6		MS
Silver	ug/L	75−125	56.3		0.3	U	50	113		MS
Thallium	ug/L	75−125	51.1		0.6	U	50	102		MS
Uranium	ug/L	75−125	52.4		0.611		50	104		MS
Antimony	ug/L	75−125	53.5		1	U	50	106		MS
Arsenic	ug/L	75−125	52		2.18	J	50	99.7		MS
Cadmium	ug/L	75−125	50.9		0.3	U	50	102		MS
Chromium	ug/L	75−125	54		3	U	50	104		MS
Lead	ug/L	75−125	51.5		0.5	U	50	103		MS
Molybdenum	ug/L	75−125	59.2		1.27		50	116		MS

***Analytical Methods:**

MS SW846 3005A/6020A

METALS
−5a−

Matrix Spike Summary

SDG NO. 2018−565 **Client ID** CAPA−18−147569S

Contract: ESHL00114 **Level:** Low

Matrix: WATER **% Solids:**

Sample ID: 436156001 **Spike ID:** 1203917286

Analyte	Units	Acceptance Limit	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M*
Mercury	ug/L	75−125	2.04		0.067	U	2	102		AV

***Analytical Methods:**

AV **EPA 245.1/245.2**

Metals
−6−
Duplicate Sample Summary

SDG No.: 2018−565 **Lab Code:** GEL

Contract: ESHL00114 **Client ID:** CAPA−18−147551D

Matrix: WATER **Level:** Low

Sample ID: 436322001 **Duplicate ID:** 1203905704 **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	+/−20%	53.6		53.8		.399		P
Beryllium	ug/L		1	U	1	U			P
Boron	ug/L		15	U	15	U			P
Calcium	ug/L	+/−20%	28200		28500		1.02		P
Cobalt	ug/L		1	U	1	U			P
Copper	ug/L		3	U	3	U			P
Iron	ug/L		30.7	J	30	U	200		P
Magnesium	ug/L	+/−20%	10000		10200		1.58		P
Manganese	ug/L	+/−10	15.8		15.9		.485		P
Potassium	ug/L	+/−20%	3470		3410		1.65		P
Silica	ug/L	+/−20%	50400		50700		.653		P
Sodium	ug/L	+/−20%	12500		12600		1.14		P
Strontium	ug/L	+/−20%	165		167		1.18		P
Tin	ug/L	+/−10	2.77	J	3.55	J	24.8		P
Vanadium	ug/L	+/−5	2.49	J	2.64	J	5.51		P
Zinc	ug/L	+/−10	29.4		22.7		25.9		P

***Analytical Methods:**
P SW846 3005A/6010C

Metals
−6−
Duplicate Sample Summary

SDG No.: 2018−565 **Lab Code:** GEL

Contract: ESHL00114 **Client ID:** CAPA−18−147551D

Matrix: WATER **Level:** Low

Sample ID: 436322001 **Duplicate ID:** 1203905770 **Percent Solids for Dup:** N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1	U	1	U			MS
Arsenic	ug/L	+/−5	2.18	J	2.53	J	14.7		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	1.27		1.24		1.91		MS
Nickel	ug/L	+/−20%	46		45.4		1.45		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	0.611		0.595		2.65		MS

***Analytical Methods:**
MS SW846 3005A/6020A

Metals
−6−
Duplicate Sample Summary

SDG No.: 2018−565 **Lab Code:** GEL

Contract: ESHL00114 **Client ID:** CAPA−18−147569D

Matrix: WATER **Level:** Low

Sample ID: 436156001 **Duplicate ID:** 1203917284 **Percent Solids for Dup:** N/A

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

***Analytical Methods:**
AV EPA 245.1/245.2

METALS
−7−
Laboratory Control Sample Summary

SDG NO. 2018−565

Contract: ESHL00114

Aqueous LCS Source: OS2I **Solid LCS Source:**

Sample ID	Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limit	M*
1203905703								
	Aluminum	ug/L	5000	5050		101	80−120	P
	Barium	ug/L	500	498		99.7	80−120	P
	Beryllium	ug/L	500	495		99	80−120	P
	Boron	ug/L	500	509		102	80−120	P
	Calcium	ug/L	5000	5100		102	80−120	P
	Cobalt	ug/L	500	508		102	80−120	P
	Copper	ug/L	500	502		100	80−120	P
	Iron	ug/L	5000	5080		102	80−120	P
	Magnesium	ug/L	5000	5170		103	80−120	P
	Manganese	ug/L	500	502		100	80−120	P
	Potassium	ug/L	5000	4810		96.1	80−120	P
	Silica	ug/L	10700	10200		95.4	80−120	P
	Sodium	ug/L	5000	4760		95.2	80−120	P
	Strontium	ug/L	500	512		102	80−120	P
	Tin	ug/L	500	499		99.7	80−120	P
	Vanadium	ug/L	500	499		99.8	80−120	P
	Zinc	ug/L	500	485		97.1	80−120	P

***Analytical Methods:**

P **SW846 3005A/6010C**

METALS
−7−
Laboratory Control Sample Summary

SDG NO. 2018−565

Contract: ESHL00114

Aqueous LCS Source: Inorganic Ventures **Solid LCS Source:**

Sample ID	Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limit	M*
1203905769								
	Antimony	ug/L	50	52.3		105	80−120	MS
	Arsenic	ug/L	50	50.8		102	80−120	MS
	Cadmium	ug/L	50	51.1		102	80−120	MS
	Chromium	ug/L	50	51.6		103	80−120	MS
	Lead	ug/L	50	51.1		102	80−120	MS
	Molybdenum	ug/L	50	50.8		102	80−120	MS
	Nickel	ug/L	50	49.7		99.4	80−120	MS
	Selenium	ug/L	50	51.1		102	80−120	MS
	Silver	ug/L	50	53.5		107	80−120	MS
	Thallium	ug/L	50	49.5		98.9	80−120	MS
	Uranium	ug/L	50	50.3		101	80−120	MS

***Analytical Methods:**

MS **SW846 3005A/6020A**

METALS
−7−
Laboratory Control Sample Summary

SDG NO. 2018−565

Contract: ESHL00114

Aqueous LCS Source: GEL **Solid LCS Source:**

Sample ID	Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limit	M*
1203917283								
	Mercury	ug/L	2	2.03		102	85−115	AV

***Analytical Methods:**

AV **EPA 245.1/245.2**

METALS
−9−
Serial Dilution Sample Summary

SDG NO. 2018−565 **Client ID** CAPA−18−147551L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 436322001 **Serial Dilution ID:** 1203905706

Analyte	Initial Value ug/L	C	Serial Value ug/L	C	% Difference	Qual	Acceptance Limit	M*
Aluminum	68	U	340	U				P
Barium	53.6		55.3		3.331		10	P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	28200		29400		4.355		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30.7	J	150	U	4.086			P
Magnesium	10000		10300		2.556		10	P
Manganese	15.8		15.8	J	.142			P
Potassium	3470		3400		1.901		10	P
Silica	50400		50500		.31		10	P
Sodium	12500		12900		3.536		10	P
Strontium	165		172		4.5		10	P
Tin	2.77	J	12.5	U	173.569			P
Vanadium	2.49	J	5	U	10.181			P
Zinc	29.4		71.9		144.132			P

***Analytical Methods:**

P **SW846 3005A/6010C**

METALS
−9−
Serial Dilution Sample Summary

SDG NO. 2018−565 **Client ID** CAPA−18−147551L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 436322001 **Serial Dilution ID:** 1203905772

Analyte	Initial Value ug/L	C	Serial Value ug/L	C	% Difference	Qual	Acceptance Limit	M*
Antimony	1	U	5	U				MS
Arsenic	2.18	J	10	U	87.958			MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.27		1.44	J	13.349			MS
Nickel	46		47.7		3.66			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.611		.665	J	8.838			MS

***Analytical Methods:**

MS **SW846 3005A/6020A**

METALS
−9−
Serial Dilution Sample Summary

SDG NO. 2018−565 **Client ID** CAPA−18−147569L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 436156001 **Serial Dilution ID:** 1203917288

Analyte	Initial Value ug/L	C	Serial Value ug/L	C	% Difference	Qual	Acceptance Limit	M*
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 #: 2018-565
Work Order #: 436322

Method/Analysis Information

Product:	**Carbon and Total Organic**		
Analytical Batch:	1714357	**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
436322002	CAPA-18-147577
436322006	CAPA-18-147578
1203908472	Method Blank (MB)
1203908473	Laboratory Control Sample (LCS)
1203908474	436322006(CAPA-18-147578) Sample Duplicate (DUP)
1203908476	436322006(CAPA-18-147578) 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 436322006 (CAPA-18-147578) was selected for QC analysis.

Matrix Spike (MS)/Post Spike (PS) Recovery Statement
The MS/PS recoveries for this sample set were within the required acceptance limits where applicable.

Duplicate Relative Percent Difference (RPD) Statement
The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

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

Holding Times
All samples in this SDG met the specified holding time.

Sample Preservation/Integrity
All the samples from this sample group met the preservation and integrity requirements of the method.

Sample Dilutions
The samples in this SDG did not require dilutions.

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

Electronic Packaging Comment
This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:
Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are

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

Method/Analysis Information

Product:	**Cyanide and Total**		
Analytical Batch:	1712934	**Method:**	WSP-CN(T)
Prep Batch :	1712933	**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
436322002	CAPA-18-147577
436322006	CAPA-18-147578
1203904782	Method Blank (MB)
1203904783	Laboratory Control Sample (LCS)
1203904784	436149002(CAPA-18-147574) Sample Duplicate (DUP)
1203904786	436149002(CAPA-18-147574) Matrix Spike (MS)

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

SOP Reference
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-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 436149002 (CAPA-18-147574) 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:	**Ion Chromatography**		
Analytical Batch:	1715567	**Method:**	WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
436322001	CAPA-18-147551
436322005	CAPA-18-147552
1203911413	Method Blank (MB)
1203911414	Laboratory Control Sample (LCS)
1203911415	436504005(CAPA-18-147570) Sample Duplicate (DUP)
1203911416	436504005(CAPA-18-147570) 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 436504005 (CAPA-18-147570) 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 following sample 436322001 (CAPA-18-147551) was diluted because target analyte concentrations exceeded the calibration range. 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	436322 001
Chloride	5X

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

Miscellaneous Information

Manual Integrations
Samples 1203911415 (CAPA-18-147570DUP), 1203911416 (CAPA-18-147570PS), 436322001 (CAPA-18-147551) and 436322005 (CAPA-18-147552) were manually integrated to correctly position the baseline as set in the calibration standards.

Additional Comments
Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	**Ammonia Nitrogen**		
Analytical Batch:	1714362	**Method:**	NH3
Prep Batch :	1714361	**Method:**	EPA 350.1 Prep

Sample Analysis

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

Sample ID	Client ID
436322001	CAPA-18-147551
436322005	CAPA-18-147552
1203908495	Method Blank (MB)
1203908496	Laboratory Control Sample (LCS)
1203908497	436027001(CAPA-18-147558) Sample Duplicate (DUP)
1203908498	436027001(CAPA-18-147558) Matrix Spike (MS)

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

SOP Reference
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-106 REV# 9.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration
All initial calibration requirements have been met for this SDG.

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

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

Calibration Verification Information (CCV)

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

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

Quality Control (QC) Information

Method Blank (MB) Statement
The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)
An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery
The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation
Sample 436027001 (CAPA-18-147558) was selected for QC analysis.

Matrix Spike (MS)/Post Spike (PS) Recovery Statement
The MS/PS recovery for this sample set was within the required acceptance limits where applicable.

Duplicate Relative Percent Difference (RPD) Statement
The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

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

Holding Times
All samples in this SDG met the specified holding time.

Sample Preservation/Integrity
All the samples from this sample group met the preservation and integrity requirements of the method.

Sample Dilutions
The samples in this SDG did not require dilutions.

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

Electronic Packaging Comment
This data package was generated using an electronic data processing program referred to as virtual packaging. In an

effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:
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 Kjeldahl Nitrogen**		
Analytical Batch:	1714720	**Method:**	TKN
Prep Batch :	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
436322002	CAPA-18-147577
436322006	CAPA-18-147578
1203909428	Method Blank (MB)
1203909429	Laboratory Control Sample (LCS)
1203909430	435631005(CAPA-18-147589) Sample Duplicate (DUP)
1203909431	435631005(CAPA-18-147589) Matrix Spike (MS)

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

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration
All initial calibration requirements have been met for this SDG.

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

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

Calibration Verification Information (CCV)

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

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

Quality Control (QC) Information

Method Blank (MB) Statement
The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)
An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery
The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation
Sample 435631005 (CAPA-18-147589) was selected for QC analysis.

Matrix Spike (MS)/Post Spike (PS) Recovery Statement
The percent recoveries (%R) obtained from the spike analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity.

Analyte	Sample	Value
Nitrogen, Total Kjeldahl	1203909431 (CAPA-18-147589MS)	111* (90%-110%)

Duplicate Relative Percent Difference (RPD) Statement
The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

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

Holding Times
All samples in this SDG met the specified holding time.

Sample Preservation/Integrity
All the samples from this sample group met the preservation and integrity requirements of the method.

Sample Dilutions
The samples in this SDG did not require dilutions.

Sample Re-analysis
Sample1203909429 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

Electronic Packaging Comment
This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:
Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product:	**Nitrate Nitrite by Cadmium Reduction**		
Analytical Batch:	1714065	**Method:**	NO3NO2

Sample Analysis

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

Sample ID	Client ID
436322001	CAPA-18-147551
436322005	CAPA-18-147552
1203907654	Method Blank (MB)
1203907655	Laboratory Control Sample (LCS)
1203907656	436322001(CAPA-18-147551) Sample Duplicate (DUP)
1203907659	436322001(CAPA-18-147551) 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 436322001 (CAPA-18-147551) 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 following samples 1203907656 (CAPA-18-147551DUP), 1203907659 (CAPA-18-147551PS) and 436322001 (CAPA-18-147551) 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	436322 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:	1714064	**Method:**	PO4
Prep Batch :	1714063	**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
436322001	CAPA-18-147551
436322005	CAPA-18-147552
1203907646	Method Blank (MB)
1203907647	Laboratory Control Sample (LCS)
1203907648	436322001(CAPA-18-147551) Sample Duplicate (DUP)
1203907649	436322001(CAPA-18-147551) 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
Sample 436322001 (CAPA-18-147551) was selected for QC analysis.

Matrix Spike (MS)/Post Spike (PS) Recovery Statement
The MS/PS recovery for this sample set was within the required acceptance limits where applicable.

Duplicate Relative Percent Difference (RPD) Statement
The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

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

Holding Times
All samples in this SDG met the specified holding time.

Sample Preservation/Integrity
All the samples from this sample group met the preservation and integrity requirements of the method.

Sample Dilutions
The samples in this SDG did not require dilutions.

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

Electronic Packaging Comment
This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:
Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are

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

Method/Analysis Information

Product:	**Solids and Total Dissolved**		
Analytical Batch:	1714068	**Method:**	TDS

Sample Analysis

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

Sample ID	Client ID
436322001	CAPA-18-147551
436322005	CAPA-18-147552
1203907667	Method Blank (MB)
1203907668	Laboratory Control Sample (LCS)
1203907669	436315001(CAPA-18-147554) 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 436315001 (CAPA-18-147554) was selected for QC analysis.

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

Analyte	Sample	Value
Total Dissolved Solids	1203907669 (CAPA-18-147554DUP)	11.9* (0%-5%)

Technical Information

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

Holding Times
All samples in this SDG met the specified holding time.

Sample Dilutions
The samples in this SDG did not require dilutions.

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

Electronic Packaging Comment
This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:
Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product:	**Specific Conductivity**		
Analytical Batch:	1714428	**Method:**	EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
436322001	CAPA-18-147551
436322005	CAPA-18-147552
1203908702	Laboratory Control Sample (LCS)
1203908703	436027001(CAPA-18-147558) Sample Duplicate (DUP)

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

SOP Reference
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-009 REV# 15.

Preparation/Analytical Method Verification

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

Calibration Information

The Titration and Ion analysis was performed on a Orion 160 Conductivity Meter.

Initial Calibration
All initial calibration requirements have been met for this SDG.

Initial Standardization
The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)
An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery
The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 436027001 (CAPA-18-147558) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement
The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

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

Holding Times
All samples in this SDG met the specified holding time.

Sample Dilutions
The samples in this SDG did not require dilutions.

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

Electronic Packaging Comment
This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:
Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: **pH**

Analytical Batch: 1714511 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
436322001	CAPA-18-147551
436322005	CAPA-18-147552
1203908949	Laboratory Control Sample (LCS)
1203908950	436315001(CAPA-18-147554) 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 436315001 (CAPA-18-147554) 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
1203908950 (CAPA-18-147554DUP)	pH	Received 26-OCT-17, out of holding 24-OCT-17
436322001 (CAPA-18-147551)	pH	Received 26-OCT-17, out of holding 24-OCT-17
436322005 (CAPA-18-147552)	pH	Received 26-OCT-17, out of holding 24-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:	1714485	**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
436322001	CAPA-18-147551
436322005	CAPA-18-147552
1203908862	Laboratory Control Sample (LCS)
1203908889	436315001(CAPA-18-147554) Sample Duplicate (DUP)
1203908891	436315001(CAPA-18-147554) 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 436315001 (CAPA-18-147554) 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

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Qualifier Definition Report
for

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

Client SDG: 2018-565 GEL Work Order: 436322

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: 16 NOV 2017 **Title: Analyst I**

Sample Data Summary

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Certificate of Analysis

Report Date: November 16, 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: 2018-565

Client Sample ID: CAPA-18-147551
Sample ID: 436322001
Matrix: W
Collect Date: 24-OCT-17 10:20
Receive Date: 26-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	J	0.104	0.067	0.200	mg/L		1	MXL2	11/02/17	1933	1715567	1
Fluoride		0.118	0.033	0.100	mg/L		1					
Sulfate		16.5	0.133	0.400	mg/L		1					
Chloride		26.6	0.335	1.00	mg/L		5	MXL2	11/04/17	0049	1715567	2
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0797	0.017	0.050	mg/L	1.00	1	KLP1	11/01/17	1344	1714362	3
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.945	0.085	0.250	mg/L		5	KLP1	10/30/17	1129	1714065	4
PO4 "As Received"												
Phosphorus, Total as P		0.0721	0.020	0.050	mg/L	1.00	1	KLP1	10/31/17	1035	1714064	5
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		229	3.40	14.3	mg/L			KLP1	10/31/17	1246	1714068	6
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		87.6	1.45	4.00	mg/L			RXB5	11/03/17	1810	1714485	7
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		349	1.00	1.00	umhos/cm		1	VH1	11/08/17	1030	1714428	8
PH "As Received"												
pH at Temp 16.7C	H	7.91	0.010	0.100	SU		1	RXB5	11/03/17	1811	1714511	9

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	11/01/17	0940	1714361
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	10/30/17	1300	1714063

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Certificate of Analysis

Report Date: November 16, 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: 2018-565

Client Sample ID: CAPA-18-147551
Sample ID: 436322001

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:300.0	
3	EPA:350.1	
4	EPA:353.2	
5	EPA 365.4 1974	
6	EPA:160.1	
7	EPA:310.1	
8	EPA:120.1	
9	EPA 150.1 1982	

Notes:

Column headers are defined as follows:

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

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Certificate of Analysis

Report Date: November 16, 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: 2018-565

Client Sample ID: CAPA-18-147577
Sample ID: 436322002
Matrix: W
Collect Date: 24-OCT-17 10:20
Receive Date: 26-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.635	0.330	1.00	mg/L		1	TSM	11/05/17	0244	1714357	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	11/02/17	0830	1712934	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	11/02/17	0920	1714720	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	11/02/17	0706	1712933
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
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: November 16, 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: 2018-565

Client Sample ID: CAPA-18-147552
Sample ID: 436322005
Matrix: W
Collect Date: 24-OCT-17 12:56
Receive Date: 26-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	J	0.0706	0.067	0.200	mg/L		1	MXL2	11/02/17	2002	1715567	1
Chloride		8.47	0.067	0.200	mg/L		1					
Fluoride		0.125	0.033	0.100	mg/L		1					
Sulfate		7.85	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0557	0.017	0.050	mg/L	1.00	1	KLP1	11/01/17	1345	1714362	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.913	0.017	0.050	mg/L		1	KLP1	10/30/17	1132	1714065	3
PO4 "As Received"												
Phosphorus, Total as P		0.0851	0.020	0.050	mg/L	1.00	1	KLP1	10/31/17	1038	1714064	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		183	3.40	14.3	mg/L			KLP1	10/31/17	1246	1714068	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		80.0	1.45	4.00	mg/L			RXB5	11/03/17	1814	1714485	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		239	1.00	1.00	umhos/cm		1	VH1	11/08/17	1030	1714428	7
PH "As Received"												
pH at Temp 16.7C	H	8.22	0.010	0.100	SU		1	RXB5	11/03/17	1812	1714511	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	11/01/17	0940	1714361
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	10/30/17	1300	1714063

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Certificate of Analysis

Report Date: November 16, 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: 2018-565

Client Sample ID:	CAPA-18-147552	Project:	ESHL00114
Sample ID:	436322005	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 16, 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: 2018-565

Client Sample ID: CAPA-18-147578
Sample ID: 436322006
Matrix: W
Collect Date: 24-OCT-17 12:56
Receive Date: 26-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.524	0.330	1.00	mg/L		1	TSM	11/05/17	0355	1714357	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	11/02/17	0831	1712934	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	11/02/17	0926	1714720	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	11/02/17	0706	1712933
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
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

Quality Control Summary

QC Summary

Report Date: November 16, 2017

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

Contact: **Ms. Nita Patel**

Workorder: **436322**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Carbon Analysis										
Batch 1714357										
QC1203908474 436322006 DUP										
Total Organic Carbon Average	J	0.524	J	0.395	mg/L	28.1 ^		(+/-1.00)	TSM	11/05/17 04:41
QC1203908473 LCS										
Total Organic Carbon Average	10.0			10.2	mg/L		102	(80%-120%)		11/05/17 01:46
QC1203908472 MB										
Total Organic Carbon Average			U	ND	mg/L					11/05/17 01:34
QC1203908476 436322006 PS										
Total Organic Carbon Average	10.0 J	0.524		11.3	mg/L		107	(75%-125%)		11/05/17 05:28
Flow Injection Analysis										
Batch 1712934										
QC1203904784 436149002 DUP										
Cyanide, Total	U	ND	U	ND	ug/L	N/A			AXH3	11/02/17 08:00
QC1203904783 LCS										
Cyanide, Total	50.0			47.1	ug/L		94.2	(90%-110%)		11/02/17 07:58
QC1203904782 MB										
Cyanide, Total			U	ND	ug/L					11/02/17 07:57
QC1203904786 436149002 MS										
Cyanide, Total	100 U	ND		102	ug/L		102	(90%-110%)		11/02/17 08:01
Ion Chromatography										
Batch 1715567										
QC1203911415 436504005 DUP										
Bromide	U	ND	U	ND	mg/L	N/A			MXL2	11/03/17 00:57

QC Summary

Workorder: **436322**

Parmname	NOM		Sample	Qual	QC	Units	RPD%		REC%	Range	Anlst	Date Time
Ion Chromatography												
Batch 1715567												
Chloride			2.41		2.36	mg/L	2			(0%-20%)	MXL2	11/03/17 00:57
Fluoride			0.239		0.243	mg/L	1.53	^		(+/-0.100)		
Sulfate			3.22		3.18	mg/L	1.26			(0%-20%)		
QC1203911414 LCS												
Bromide	1.25				1.16	mg/L			92.5	(80%-120%)		11/02/17 18:34
Chloride	5.00				4.62	mg/L			92.5	(80%-120%)		
Fluoride	2.50				2.48	mg/L			99.1	(80%-120%)		
Sulfate	10.0				9.46	mg/L			94.6	(80%-120%)		
QC1203911413 MB												
Bromide				U	ND	mg/L						11/02/17 18:04
Chloride				U	ND	mg/L						
Fluoride				U	ND	mg/L						
Sulfate				U	ND	mg/L						
QC1203911416 436504005 PS												
Bromide	1.25	U	ND		1.24	mg/L			95.7	(75%-125%)		11/03/17 01:26
Chloride	5.00		2.41		7.29	mg/L			97.6	(75%-125%)		
Fluoride	2.50		0.239		2.74	mg/L			100	(75%-125%)		
Sulfate	10.0		3.22		12.8	mg/L			95.5	(75%-125%)		

QC Summary

Workorder: **436322**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Nutrient Analysis										
Batch 1714064										
QC1203907648 436322001 DUP										
Phosphorus, Total as P		0.0721		0.0726	mg/L	8.77 ^		(+/-0.050)	KLP1	10/31/17 10:36
QC1203907647 LCS										
Phosphorus, Total as P	1.00			0.961	mg/L		96.1	(80%-124%)		10/31/17 10:34
QC1203907646 MB										
Phosphorus, Total as P			U	ND	mg/L					10/31/17 10:34
QC1203907649 436322001 MS										
Phosphorus, Total as P	1.00	0.0721		1.05	mg/L		95.4	(63%-139%)		10/31/17 10:37
Batch 1714065										
QC1203907656 436322001 DUP										
Nitrogen, Nitrate/Nitrite		0.945		0.885	mg/L	6.56 ^		(+/-0.250)	KLP1	10/30/17 11:30
QC1203907655 LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.07	mg/L		107	(90%-110%)		10/30/17 11:26
QC1203907654 MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					10/30/17 11:25
QC1203907659 436322001 PS										
Nitrogen, Nitrate/Nitrite	1.00	0.189		1.28	mg/L		109	(90%-110%)		10/30/17 11:31
Batch 1714362										
QC1203908497 436027001 DUP										
Nitrogen, Ammonia		0.138		0.142	mg/L	2.86 ^		(+/-0.050)	KLP1	11/01/17 13:35
QC1203908496 LCS										
Nitrogen, Ammonia	1.00			0.935	mg/L		93.5	(90%-110%)		11/01/17 13:30
QC1203908495 MB										
Nitrogen, Ammonia			U	ND	mg/L					11/01/17 13:29

QC Summary

Workorder: 436322

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Nutrient Analysis											
Batch 1714362											
QC1203908498 436027001 MS											
Nitrogen, Ammonia	1.00		0.138		1.15	mg/L		101	(90%-110%)	KLP1	11/01/17 13:35
Batch 1714720											
QC1203909430 435631005 DUP											
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A			KLP1	11/02/17 09:04
QC1203909429 LCS											
Nitrogen, Total Kjeldahl	1.00				0.967	mg/L		96.7	(90%-110%)		11/02/17 09:51
QC1203909428 MB											
Nitrogen, Total Kjeldahl				U	ND	mg/L					11/02/17 09:00
QC1203909431 435631005 MS											
Nitrogen, Total Kjeldahl	1.00	U	ND		1.11	mg/L		111*	(90%-110%)		11/02/17 09:05
Solids Analysis											
Batch 1714068											
QC1203907669 436315001 DUP											
Total Dissolved Solids			170		191	mg/L	11.9*		(0%-5%)	KLP1	10/31/17 12:46
QC1203907668 LCS											
Total Dissolved Solids	300				309	mg/L		103	(95%-105%)		10/31/17 12:46
QC1203907667 MB											
Total Dissolved Solids				U	ND	mg/L					10/31/17 12:46
Titration and Ion Analysis											
Batch 1714428											
QC1203908703 436027001 DUP											
Conductivity			307		306	umhos/cm	0.326		(0%-10%)	VH1	11/08/17 10:29
QC1203908702 LCS											
Conductivity	1410				1400	umhos/cm		98.7	(95%-105%)		11/08/17 10:27

QC Summary

Workorder: 436322

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Titration and Ion Analysis										
Batch 1714485										
QC1203908889 436315001 DUP										
Alkalinity, Total as CaCO3		71.7		71.5	mg/L	0.279		(0%-20%)	RXB5	11/03/17 18:08
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A				
QC1203908862 LCS										
Alkalinity, Total as CaCO3	100			107	mg/L		107	(90%-110%)		11/03/17 15:17
QC1203908891 436315001 MS										
Alkalinity, Total as CaCO3	100	71.7		175	mg/L		103	(80%-120%)		11/03/17 18:09
Batch 1714511										
QC1203908950 436315001 DUP										
pH	H	7.51	H	7.52	SU	0.133		(0%-5%)	RXB5	11/03/17 18:06
QC1203908949 LCS										
pH	7.00			7.00	SU		100	(99%-101%)		11/03/17 15:15

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.

QC Summary

Workorder: **436322**

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

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 #: 2018-565
Work Order #: 436322

Method/Analysis Information

Product:	**Alphaspec Am241 Liquid**
Analytical Method:	HASL-300:AM-241
Analytical Batch Number:	1713388

Sample ID	Client ID
436322002	CAPA-18-147577
436322006	CAPA-18-147578
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
Sample, (See Below), did not meet the client tracer yield requirements, however it is 110 percent and does meet the GEL standard tracer yield requirements.

Sample	Analyte	Value
436322006 (CAPA-18-147578)	Americium-243 Tracer	110* (50%-105%)

Laboratory Control Sample (LCS) Recovery
The LCS spike recoveries met the acceptance limits.

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

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

RDL Met
The method RDL has been met.

Technical Information:

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

Negative > 3 sigma TPU
Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis
None of the samples in this sample set required reprep or reanalysis.

Recounts
Sample 1203905946 (MB) was recounted due to a peak shift. The recount is reported.

Miscellaneous Information:

Manual Integration
No manual integrations were performed on data in this batch.

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

Additional Comments
Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

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

Sample ID	Client ID
436322002	CAPA-18-147577
436322006	CAPA-18-147578
1203905949	Method Blank (MB)
1203905951	Laboratory Control Sample (LCS)
1203905950	436322006(CAPA-18-147578) Sample Duplicate (DUP)

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

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

Calibration Information:

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

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

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

Quality Control (QC) Information:

Blank Information
Aliquots for samples 1203905949 (MB) and 1203905951 (LCS) were changed to 1.0, and the MDCs (and Lc if requested) for all samples are calculated using a blank population per client request.

Method Blank Criteria
The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level
The blank result is less than the decision level.

Tracer/Carrier Yield
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
436322006 (CAPA-18-147578)	Plutonium-239/240	Result -0.0184 < MDA 0.0688 > 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
Samples 1203905950 (CAPA-18-147578DUP) and 436322002 (CAPA-18-147577) were recounted due to detector error. 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:	**IsoU**
Analytical Method:	HASL-300:ISOU
Analytical Batch Number:	1713390

Sample ID	Client ID
436322002	CAPA-18-147577
436322006	CAPA-18-147578
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 436322002 (CAPA-18-147577) 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:	**Gammaspec**
Analytical Method:	EPA:901.1
Analytical Batch Number:	1713592

Sample ID	Client ID
436322002	CAPA-18-147577
436322006	CAPA-18-147578
1203906422	Method Blank (MB)
1203906424	Laboratory Control Sample (LCS)
1203906423	436149002(CAPA-18-147574) 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, March 2017, October 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: 436149002 (CAPA-18-147574). The QC was from ARSL work order 436149.

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

RDL Met
The method RDL has been met.

Technical Information:

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

Sample Re-prep/Re-analysis
None of the samples in this sample set required reprep or reanalysis.

Recounts
None of the samples in this sample set were recounted.

Miscellaneous Information:

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

Additional Comments
Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	**GFPC, Sr90, liquid**
Analytical Method:	EPA:905.0
Analytical Batch Number:	1714184

Sample ID	Client ID
436322002	CAPA-18-147577
436322006	CAPA-18-147578
1203907994	Method Blank (MB)

1203907997	Laboratory Control Sample (LCS)
1203907995	436149002(CAPA-18-147574) Sample Duplicate (DUP)
1203907996	436149002(CAPA-18-147574) Matrix Spike (MS)

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

SOP Reference
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 19.

Calibration Information:

Calibration Information
All initial and continuing calibration requirements have been met. The initial Calibration was performed in April 2016.

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

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

Quality Control (QC) Information:

Blank Information
Aliquots for samples 1203907994 (MB) and 1203907997 (LCS) were changed to 1.0 per client request.

Method Blank Criteria
The Method Blank (MB) met acceptance criteria.

CSU
The blank result is less than 1.65 times the CSU.

Blank Decision Level
The blank result is less than the decision level.

Tracer/Carrier Yield
All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery
The LCS spike recoveries met the acceptance limits.

Designated QC
The following sample was used for QC: 436149002 (CAPA-18-147574). The QC was from ARSL work order 436149.

Matrix Spike (MS) Recovery
The MS spike recoveries met acceptance limits.

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

RDL Met

The method RDL has been met.

Technical Information:

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

Negative > 3 sigma TPU
Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis
None of the samples in this sample set required reprep or reanalysis.

Recounts
Sample 1203907997 (LCS) was recounted due to high recovery. The recount is reported.

Miscellaneous Information:

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

Additional Comments
The matrix spike, 1203907996 (CAPA-18-147574MS), aliquot was reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	**WSP-GrossA/B**
Analytical Method:	EPA 900.0/SW846 9310
Analytical Batch Number:	1716449

Sample ID	Client ID
436322002	CAPA-18-147577
436322006	CAPA-18-147578
1203913664	Method Blank (MB)
1203913668	Laboratory Control Sample (LCS)
1203913665	437078009(CAPA-18-147631) Sample Duplicate (DUP)
1203913666	437078009(CAPA-18-147631) Matrix Spike (MS)
1203913667	437078009(CAPA-18-147631) Matrix Spike Duplicate (MSD)

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

SOP Reference
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with

GL-RAD-A-001 REV# 19.

Calibration Information:

Calibration Information
All initial and continuing calibration requirements have been met. The initial Calibration was performed in December 2016.

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

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

Quality Control (QC) Information:

Blank Information
Aliquots for samples 1203913664 (MB) and 1203913668 (LCS) were changed to 1.0 per client request.

Method Blank Criteria
The Method Blank (MB) met acceptance criteria.

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

Sample	Analyte	Value
1203913664 (MB)	ALPHA and BETA	Blank result > 1.65 CSU

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

Sample	Analyte	Value
1203913664 (MB)	ALPHA and BETA	Blank result > DL

Laboratory Control Sample (LCS) Recovery
The LCS spike recoveries met the acceptance limits.

Designated QC
The following sample was used for QC: 437078009 (CAPA-18-147631). The QC was from ARSL work order 437078.

Matrix Spike (MS) Recovery
The MS spike recoveries met acceptance limits.

Duplication Criteria between MS and MSD
The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) met the duplication acceptance criteria.

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

RDL Met

The method RDL has been met.

Technical Information:

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

Negative > 3 sigma TPU
Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis
None of the samples in this sample set required reprep or reanalysis.

Gross Alpha/Beta Preparation Information
High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating, especially to a dull red heat. For this sample set, the prepared planchet was counted for beta activity before being flamed. After flaming, the planchet was counted for alpha activity.

Recounts
Sample 1203913666 (CAPA-18-147631MS) was recounted due to low recovery. The recount is reported.

Miscellaneous Information:

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

Additional Comments
The matrix spike and matrix spike duplicate, 1203913666 (CAPA-18-147631MS) and 1203913667 (CAPA-18-147631MSD), aliquots were reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

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

Client SDG: 2018-565 GEL Work Order: 436322

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: Heather McCarty **Name: Heather McCarty**

Date: 18 NOV 2017 **Title: Analyst II**

Sample Data Summary

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

Certificate of Analysis

Company : Los Alamos National Laboratory
Address : TA-00, SM1237, Rm104C
Los Alamos, New Mexico 87545
Report Date: November 18, 2017
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147577
Sample ID: 436322002
Matrix: W
Collect Date: 24-OCT-17
Receive Date: 26-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															
Alphaspec Am241 Liquid "As Received"															
Americium-241	U	0.00	+/-0.00683	0.0424	0.0179	+/-0.00683	0.050	pCi/L			JXR5	11/05/17	1218	1713388	1
ISOPU "As Received"															
Plutonium-238	U	0.00	+/-0.00476	0.0337	0.0142	+/-0.00476	0.050	pCi/L			JXR5	11/09/17	1300	1713389	2
Plutonium-239/240	U	-0.00582	+/-0.0101	0.0436	0.0192	+/-0.0101	0.050	pCi/L							
IsoU "As Received"															
Uranium-234		0.367	+/-0.0289	0.0465	0.0203	+/-0.0337	1.00	pCi/L			JXR5	11/08/17	1322	1713390	3
Uranium-235/236	U	0.0272	+/-0.0102	0.0495	0.0211	+/-0.0103	1.00	pCi/L							
Uranium-238		0.273	+/-0.0253	0.045	0.0195	+/-0.0284	0.500	pCi/L							
Rad Gamma Spec Analysis															
Gammaspec "As Received"															
Cesium-137	U	0.627	+/-1.31	4.96	2.20	+/-1.32	8.00	pCi/L			BSW1	11/14/17	0552	1713592	4
Cobalt-60	U	0.738	+/-1.37	5.63	2.39	+/-1.38	8.00	pCi/L							
Neptunium-237	U	-0.302	+/-2.29	8.50	3.88	+/-2.29		pCi/L							
Potassium-40	U	-13.9	+/-17.3	62.6	27.0	+/-17.6		pCi/L							
Sodium-22	U	-0.653	+/-1.44	5.34	2.25	+/-1.45		pCi/L							
Rad Gas Flow Proportional Counting															
GFPC, Sr90, liquid "As Received"															
Strontium-90	U	0.0847	+/-0.125	0.449	0.193	+/-0.125	0.500	pCi/L			LXB3	11/11/17	1542	1714184	5
WSP-GrossA/B "As Received"															
Beta		5.89	+/-1.13	2.92	1.30	+/-1.23	3.00	pCi/L			AXH4	11/15/17	1142	1716449	6
Alpha	U	1.70	+/-0.845	2.39	0.753	+/-0.857	3.00	pCi/L			AXH4	11/15/17	1648	1716449	7

The following Analytical Methods were performed

Method	Description
1	HASL-300:AM-241
2	HASL-300:ISOPU
3	HASL-300:ISOU
4	EPA:901.1
5	EPA:905.0
6	EPA 900.0/SW846 9310
7	EPA 900.0/SW846 9310

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer	Alphaspec Am241 Liquid "As Received"	1713388	93.3	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1713389	90.4	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1713390	80.2	(50%-105%)

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

Certificate of Analysis

Company : Los Alamos National Laboratory
Address : TA-00, SM1237, Rm104C
Los Alamos, New Mexico 87545
Report Date: November 18, 2017
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147577
Sample ID: 436322002
Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery		**Test**												**Batch ID**	**Recovery%**	**Acceptable Limits**
Strontium Carrier		GFPC, Sr90, liquid "As Received"												1714184	80.3	(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
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

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

Los Alamos, New Mexico 87545

Report Date: November 18, 2017

Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147578
Sample ID: 436322006
Matrix: W
Collect Date: 24-OCT-17
Receive Date: 26-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															
Alphaspec Am241 Liquid "As Received"															
Americium-241	U	0.00828	+/-0.00717	0.0363	0.0153	+/-0.00718	0.050	pCi/L			JXR5	11/05/17	1218	1713388	1
ISOPU "As Received"															
Plutonium-238	U	-0.0122	+/-0.00968	0.053	0.0224	+/-0.00968	0.050	pCi/L			JXR5	11/08/17	1456	1713389	2
Plutonium-239/240	U	-0.0184	+/-0.0122	0.0688	0.0302	+/-0.0122	0.050	pCi/L							
IsoU "As Received"															
Uranium-234		0.449	+/-0.0365	0.0605	0.0264	+/-0.0429	1.00	pCi/L			JXR5	11/05/17	1533	1713390	3
Uranium-235/236	U	0.0636	+/-0.0158	0.0644	0.0274	+/-0.0161	1.00	pCi/L							
Uranium-238		0.189	+/-0.0246	0.0585	0.0254	+/-0.0263	0.500	pCi/L							
Rad Gamma Spec Analysis															
Gammaspec "As Received"															
Cesium-137	U	-0.658	+/-1.13	4.02	1.73	+/-1.14	8.00	pCi/L			BSW1	11/14/17	0617	1713592	4
Cobalt-60	U	-0.901	+/-0.820	2.94	1.04	+/-0.847	8.00	pCi/L							
Neptunium-237	U	-1.1	+/-2.32	7.60	3.43	+/-2.33		pCi/L							
Potassium-40	U	-24	+/-16.2	59.4	25.5	+/-17.1		pCi/L							
Sodium-22	U	-0.236	+/-1.16	4.60	1.88	+/-1.16		pCi/L							
Rad Gas Flow Proportional Counting															
GFPC, Sr90, liquid "As Received"															
Strontium-90	U	0.286	+/-0.137	0.435	0.189	+/-0.138	0.500	pCi/L			LXB3	11/11/17	1544	1714184	5
WSP-GrossA/B "As Received"															
Beta		3.90	+/-0.936	2.73	1.25	+/-0.993	3.00	pCi/L			AXH4	11/15/17	1140	1716449	6
Alpha	U	0.331	+/-0.646	2.59	0.964	+/-0.646	3.00	pCi/L			AXH4	11/15/17	1648	1716449	7

The following Analytical Methods were performed

Method	Description
1	HASL-300:AM-241
2	HASL-300:ISOPU
3	HASL-300:ISOU
4	EPA:901.1
5	EPA:905.0
6	EPA 900.0/SW846 9310
7	EPA 900.0/SW846 9310

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer	Alphaspec Am241 Liquid "As Received"	1713388	110 *	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1713389	74.2	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1713390	76.7	(50%-105%)
Strontium Carrier	GFPC, Sr90, liquid "As Received"	1714184	84.1	(50%-105%)

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Certificate of Analysis

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Los Alamos, New Mexico 87545
Report Date: November 18, 2017
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147578
Sample ID: 436322006
Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery		**Test**									**Batch ID**	**Recovery%**		**Acceptable Limits**	

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

QC Summary

Client : **Los Alamos National Laboratory**
TA-00, SM1237, Rm104C
Los Alamos, New Mexico
Contact: **Ms. Nita Patel**
Workorder: **436322**

Report Date: November 18, 2017

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						

QC Summary

Workorder: **436322**

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						

QC Summary

Workorder: **436322**

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 1713592										
QC1203906423 436149002 DUP										
Cesium-137	U	2.44	U	-1.28	pCi/L	0.651		(0-1)	BSW1	11/14/1706:19
	Uncert:	+/-1.27		+/-1.55						
	TPU:	+/-1.28		+/-1.57						
Cobalt-60	U	1.51	U	-2.02	pCi/L	0.627		(0-1)		
	Uncert:	+/-1.17		+/-1.52						
	TPU:	+/-1.22		+/-1.60						
Neptunium-237	U	2.10	U	-3.74	pCi/L	0.605		(0-1)		
	Uncert:	+/-2.08		+/-2.54						
	TPU:	+/-2.14		+/-2.69						
Potassium-40	U	3.77	U	-53.9	pCi/L	0.648		(0-1)		
	Uncert:	+/-20.6		+/-20.3						
	TPU:	+/-20.6		+/-23.9						
Sodium-22	U	-0.439	U	-2.32	pCi/L	0.298		(0-1)		
	Uncert:	+/-1.19		+/-1.88						
	TPU:	+/-1.19		+/-1.96						
QC1203906424 LCS										
Americium-241	34300			37300	pCi/L		109	(80%-120%)	BSW1	11/12/1711:39
	Uncert:			+/-795						
	TPU:			+/-2210						
Cesium-137	13000			13700	pCi/L		105	(80%-120%)		
	Uncert:			+/-177						
	TPU:			+/-587						
Cobalt-60	11300			11300	pCi/L		100	(80%-120%)		
	Uncert:			+/-183						
	TPU:			+/-547						
Neptunium-237			U	-70.9	pCi/L					
	Uncert:			+/-56.2						
	TPU:			+/-58.6						
Potassium-40			U	-50.6	pCi/L					
	Uncert:			+/-124						
	TPU:			+/-124						
Sodium-22			U	30.2	pCi/L					
	Uncert:			+/-18.6						
	TPU:			+/-19.9						
QC1203906422 MB										
Cesium-137			U	-2.2	pCi/L				BSW1	11/14/1706:18
	Uncert:			+/-1.21						
	TPU:			+/-1.31						
Cobalt-60			U	0.387	pCi/L					
	Uncert:			+/-1.16						

QC Summary

Workorder: 436322

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 1713592										
	TPU:			+/-1.16						
Neptunium-237			U	0.751	pCi/L					
	Uncert:			+/-2.18						
	TPU:			+/-2.19						
Potassium-40			U	-18	pCi/L					
	Uncert:			+/-15.0						
	TPU:			+/-15.6						
Sodium-22			U	-0.202	pCi/L					
	Uncert:			+/-0.761						
	TPU:			+/-0.762						
Rad Gas Flow										
Batch 1714184										
QC1203907995 436149002 DUP										
Strontium-90	U	-0.105	U	0.0561	pCi/L	0.355		(0-1)	LXB3	11/11/1715:43
	Uncert:	+/-0.104		+/-0.123						
	TPU:	+/-0.104		+/-0.123						
**Strontium Carrier	7.85	6.80		7.80	mg		99.4	(50%-105%)		
QC1203907997 LCS										
Strontium-90	23.7			26.9	pCi/L		113	(80%-120%)	LXB3	11/13/1708:20
	Uncert:			+/-0.700						
	TPU:			+/-2.41						
**Strontium Carrier	7.85			4.80	mg		61.1	(50%-105%)		
QC1203907994 MB										
Strontium-90			U	-0.0173	pCi/L				LXB3	11/11/1715:43
	Uncert:			+/-0.0672						
	TPU:			+/-0.0672						
**Strontium Carrier	7.85			6.70	mg		85.4	(50%-105%)		
QC1203907996 436149002 MS										
Strontium-90	237 U	-0.105		181	pCi/L		76.3	(75%-125%)	LXB3	11/11/1715:43
	Uncert:	+/-0.104		+/-4.90						
	TPU:	+/-0.104		+/-15.4						
**Strontium Carrier	7.85	6.80		8.10	mg		103	(50%-105%)		
Batch 1716449										
QC1203913665 437078009 DUP										
Alpha		2.35	U	1.11	pCi/L	0.36		(0-1)	AXH4	11/15/1716:48
	Uncert:	+/-0.879		+/-0.802						
	TPU:	+/-0.901		+/-0.808						
Beta	U	2.54		4.00	pCi/L	0.363		(0-1)		11/15/1711:42
	Uncert:	+/-0.959		+/-0.980						
	TPU:	+/-0.982		+/-1.04						
QC1203913668 LCS										
Alpha	12.1			11.6	pCi/L		95.6	(80%-120%)	AXH4	11/15/1716:50
	Uncert:			+/-0.557						
	TPU:			+/-1.12						
Beta	47.4			49.7	pCi/L		105	(80%-120%)		11/15/1712:09

QC Summary

Workorder: **436322**

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Gas Flow										
Batch 1716449										
	Uncert:			+/-0.878						
	TPU:			+/-4.21						
QC1203913664 MB										
Alpha			U	0.235	pCi/L				AXH4	11/15/1716:48
	Uncert:			+/-0.124						
	TPU:			+/-0.125						
Beta			U	0.276	pCi/L					11/15/1712:08
	Uncert:			+/-0.130						
	TPU:			+/-0.132						
QC1203913666 437078009 MS										
Alpha	483	2.35		371	pCi/L		76.3	(75%-125%)	AXH4	11/16/1710:18
	Uncert:	+/-0.879		+/-20.9						
	TPU:	+/-0.901		+/-39.2						
Beta	1900 U	2.54		2020	pCi/L		107	(75%-125%)		11/15/1712:08
	Uncert:	+/-0.959		+/-35.6						
	TPU:	+/-0.982		+/-172						
QC1203913667 437078009 MSD										
Alpha	483	2.35		453	pCi/L	0.494	93.3	(0-1)	AXH4	11/15/1716:50
	Uncert:	+/-0.879		+/-21.9						
	TPU:	+/-0.901		+/-43.6						
Beta	1900 U	2.54		1790	pCi/L	0.364	94.2	(0-1)		11/15/1712:08
	Uncert:	+/-0.959		+/-33.2						
	TPU:	+/-0.982		+/-152						

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.
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.

QC Summary

Workorder: **436322**

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

R Sample results are rejected

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

UI Gamma Spectroscopy--Uncertain identification

UJ Gamma Spectroscopy--Uncertain identification

UL Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Y Other specific qualifiers were required to properly define the results. Consult case narrative.

^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

h Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
** Indicates analyte is a surrogate/tracer compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence 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.