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 #: 2018-604

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 NU

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-18-147566	Oct 27 2017	11:30	W				1		1		1		
CAPA-18-147592	Oct 27 2017	11:30	W	1	2	2		1		1		1	1
CAPA-18-147617	Oct 27 2017	11:30	W		2								
CAPA-18-147567	Oct 27 2017	13:15	W				1		1		1		
CAPA-18-147593	Oct 27 2017	13:15	W	1	2	2		1		1		1	1
CAPA-18-147618	Oct 27 2017	13:15	W		2								

Special Instructions:

Relinquished by:	Print Name: Robert Martinez	Date/Time: 10/30/17 730	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-18-147566

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):	10-27-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1130		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-53 S1		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

TV 10-27-17

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): D. Hughes, D. Jaramillo

RELINQUISHED BY (Printed Name) / (Signature)	Date/Time	RECEIVED BY (Printed Name) / (Signature)	Date/Time
TanyaVanderVis	10-27-17 1405	MATT ENGLERT	10-27-17 1405 ME
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-18-147567

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):	10-27-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1315		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-53 S2		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS: TV 10-27-17

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

COLLECTED BY (PRINT): D. Hughes, D. Jaramillo

RELINQUISHED BY (Printed Name) Tanya VanDorVis (Signature) Tanya VanDorVis	**Date/Time** 10-27-17 1405	**RECEIVED BY** MATT ENGLERT (Printed Name) (Signature)	**Date/Time** 10-27-17 1405
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-18-147592

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):	10-27-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1130		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-53 S1		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

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

SAMPLE COMMENTS: Sampled with running diesel generator ~40ft. away.

LOCATION COMMENTS: None

FIELD PARAMETERS:

Sample Time	1130 HH:MM	Dissolved Oxygen	6.26 mg/L	Flow (in gpm)	4.00
Oxidation-Reduction Potential	225.9 mV	pH	8.02	Specific Conductance	124.8 µS/cm
Temperature	20.2°C	Turbidity	0.41 NTU		

COLLECTED BY (PRINT): D. Hughes, D. Jaramillo

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147592

WORK ORDER:

RELINQUISHED BY (Printed Name) Tanya VanderVis (Signature) Tanya VanderVis	**Date/Time** 10-27-2017 1405	**RECEIVED BY** (Printed Name) MATT ENGLERT (Signature) ESLM	**Date/Time** 10-27-17 1405
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-18-147593

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):	10-27-2017	OK	**FIELD MATRIX:**	WG	OK
TIME COLLECTED (HH:MM):	1315		**MEDIA:**		
PRS ID:	NA		**SAMPLE TECH CODE:**	GSP	
LOCATION ID:	R-53 S2		**FIELD PREP:**	UF	
LOCATION TYPE:	NA		**FIELD QC TYPE:**	REG	
TOP DEPTH:			**SAMPLE USAGE:**	INV	
BOTTOM DEPTH:			**EXCAVATED:**		YES / NO / (NA)

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

SAMPLE COMMENTS: Sampled with running diesel generator ~40ft away

LOCATION COMMENTS: none

FIELD PARAMETERS:

Sample Time	1315 HH:MM	Dissolved Oxygen	6.55 mg/L	Flow (in gpm)	3.90
Oxidation-Reduction Potential	265.7mV	pH	8.15	Specific Conductance	122.0 µS/cm
Temperature	21.4°C	Turbidity	0.10 NTU		

COLLECTED BY (PRINT): D. Hughes, D. Jaramillo

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147593

WORK ORDER:

RELINQUISHED BY **(Printed Name)** Tanya VanderVis **(Signature)** Tanya VanderVis	**Date/Time** 10-27-17 1405	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time** 10-27-17 1405
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-18-147617

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):	10-27-2017	OK	**FIELD MATRIX:**	WG	OK
TIME COLLECTED (HH:MM):	1130		**MEDIA:**		
PRS ID:	NA		**SAMPLE TECH CODE:**	DC	
LOCATION ID:	R-53 S1		**FIELD PREP:**	UF	
LOCATION TYPE:	NA		**FIELD QC TYPE:**	FTB	
TOP DEPTH:			**SAMPLE USAGE:**	QC	
BOTTOM DEPTH:			**EXCAVATED:**		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	1 2 (Dup) TB	HCL	Y	NA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS: TV 10-27-17

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

COLLECTED BY (PRINT): D. Hughes, D. Jaramillo

RELINQUISHED BY (Printed Name) Tanya VanderVis (Signature) Tanya VanderVis	**Date/Time** 10-27-17 1405	**RECEIVED BY** (Printed Name) MATT ENGLERT (Signature) M Englert	**Date/Time** 10-27-17 ~~1500~~ NE 1405
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-18-147618

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):	10-27-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1315		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-53 S2		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	1 2 (1 FB)	HCL	Y	NA

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS: TV 10-27-17

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

COLLECTED BY (PRINT): D. Hughes, D. Jaramillo

RELINQUISHED BY (Printed Name) Tanya VanderVis (Signature) Tanya VanderVis	**Date/Time** 10-27-17 1405	**RECEIVED BY** (Printed Name) MATT ENGLERT (Signature) M Englert	**Date/Time** 10-27-17 1405
RELINQUISHED BY (Printed Name) (Signature)	**Date/Time**	**RECEIVED BY** (Printed Name) (Signature)	**Date/Time**

Report Date: 10/05/2017

FSID(S): 2018 - 6004

TEST – Explosives	YES	NO
Samples collected from a WFO area		X

Field Test for Explosives Results	YES	NO	NA
Spot test shows presence of explosive residues. **If YES - Do not ship.**		X	

TEST – Field Screen	YES	NO
The sample has field screening measurements of alpha and beta activity.		X

Sample Activity (dpm/100cm²)	Shipment Activity (dpm*g/100cm²)	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/100cm² or Beta > 160,000,000 dpm*g/100cm². **If YES - Do not ship.**					NO
On the external surface of the sample container, alpha activity 24 dpm/cm², beta activity 240 dpm/cm², or surface activity 0.5 mR/hr. **If YES - Do not ship.**					NA
The sample is tentatively identified as DOT hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package – Limited Quantity Material - UN2910, based on field screening measurements of alpha and beta activity.					NO

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 sampling location within TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, Sediment/Soil from Effluent Canyon, Mortandad Canyon from Effluent Canyon to the Soil Contamination Area near the sediment traps, Bayo Canyon at TA-10, TA-35, TA-15, TA-36, TA-39, TA-48 or TA-49 **AND** does not have usable field screening measurements of alpha and beta activity available **AND** the sampling location or related sampling location(s) do not have prior reliable analytical measurements of radioactive isotopes available **AND** knowledge of sample is not acceptable to identify appropriate labeling.

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 Martz	10/30/17 300
(Signature)	

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) Paul Mark	10/30/2017 15:00
(Signature)	

DATA VALIDATION REPORT

Chain Of Custody No. 2018-604

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
436615	EPA:120.1	2				
436615	EPA:150.1	2				
436615	EPA:160.1	2				
436615	EPA:170.0	4		2		
436615	EPA:245.2	4				
436615	EPA:300.0	2				
436615	EPA:310.1	2				
436615	EPA:335.4	2				
436615	EPA:350.1	2				
436615	EPA:351.2	2				
436615	EPA:353.2	2				
436615	EPA:365.4	2				
436615	EPA:900	2				
436615	EPA:901.1	2				
436615	EPA:905.0	2				
436615	HASL-300:AM-241	2				
436615	HASL-300:ISOPU	2				
436615	HASL-300:ISOU	2				
436615	SM:A2340B	2				
436615	SW-846:6010C	2				
436615	SW-846:6020	2				
436615	SW-846:6850	2				
436615	SW-846:8260B	2		2		
436615	SW-846:8270D	2				
436615	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
436615	EPA:120.1	1717163	1717163	2										1				1			
436615	EPA:150.1	1715386	1715386	2										1				2			
436615	EPA:160.1	1714739	1714739	2					1					1				1			
436615	EPA:170.0	NA	NA	4		2															
436615	EPA:245.2	1719070	1719065	4					1	1				1				1			
436615	EPA:300.0	1715632	1715632	2					1					1				1			
436615	EPA:310.1	1715371	1715371	2						1				1				1			
436615	EPA:335.4	1714507	1714503	2					1	1				1				1			
436615	EPA:350.1	1715525	1715524	2					1	1				1				1			
436615	EPA:351.2	1715519	1715516	2					1	2				1				2			
436615	EPA:353.2	1715194	1715194	2					1					1				1			
436615	EPA:365.4	1714723	1714722	2					1	1				1				1			
436615	EPA:900	1716449	1716449	2					1	1	1			1				1			
436615	EPA:901.1	1716271	1716271	2					1					1				1			
436615	EPA:905.0	1717217	1717217	2					1	1				1				1			
436615	HASL-300:AM-241	1715443	1715443	2					1					1				1			
436615	HASL-300:ISOPU	1715444	1715444	2					1					1				1			
436615	HASL-300:ISOU	1715445	1715445	2					1					1				1			
436615	SM:A2340B	1721823	1721823	2																	
436615	SW-846:6010C	1714505	1714502	2					1	1				1				1			
436615	SW-846:6020	1714517	1714516	2					1	1				1				1			
436615	SW-846:6850	1714762	1714758	2					1	1	1			1							
436615	SW-846:8260B	1717151	1717151	2		2			2					4							
436615	SW-846:8270D	1715004	1715003	2					1	1	1			1							
436615	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-18-147566	436615001	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-18-147567	436615004	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAPA-18-147571	1203915375	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203915374	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147566	436615001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147567	1203910984	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147567	436615004	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203910983	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	WT_SIP-17-148289	1203911838	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147566	436615001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147567	1203909472	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147567	436615004	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203909471	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203909470	MB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147566	436615001	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147567	436615004	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147592	436615002	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147593	436615005	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147617	436615003	FTB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147618	436615006	FTB	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147566	1203920278	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147566	1203920280	MS	0	0	1	0
EPA:245.2	INORGANIC	CAPA-18-147566	436615001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147567	436615004	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147592	436615002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147593	436615005	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203920276	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203920275	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-147648	1203911578	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147566	436615001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147567	436615004	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203911577	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203911576	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147566	436615001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147567	1203910953	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147567	1203910955	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147567	436615004	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203910950	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAPA-18-147592	1203908918	DUP	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147592	1203908920	MS	0	0	1	0
EPA:335.4	INORGANIC	CAPA-18-147592	436615002	REG	1	0	0	0

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Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:335.4	INORGANIC	CAPA-18-147593	436615005	REG	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203908917	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203908916	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-147642	1203911275	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-18-147642	1203911276	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147566	436615001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147567	436615004	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203911274	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203911273	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-147657	1203911263	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-147657	1203911265	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-147658	1203911264	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-18-147658	1203911266	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147592	436615002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147593	436615005	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203911262	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203911261	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147566	1203910564	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147566	436615001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147567	436615004	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203910562	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203910561	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147550	1203909440	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147550	1203909442	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147566	436615001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147567	436615004	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203909437	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203909436	MB	1	0	0	0
EPA:900	RAD	CAPA-18-147592	436615002	REG	2	0	0	0
EPA:900	RAD	CAPA-18-147593	436615005	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-18-147576	1203913159	DUP	5	0	0	0
EPA:901.1	RAD	CAPA-18-147592	436615002	REG	5	0	0	0
EPA:901.1	RAD	CAPA-18-147593	436615005	REG	5	0	0	0
EPA:901.1	RAD	LCS	1203913160	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203913158	MB	5	0	0	0

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Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:905.0	RAD	CAPA-18-147592	436615002	REG	1	0	0	0
EPA:905.0	RAD	CAPA-18-147593	1203915511	DUP	1	0	0	0
EPA:905.0	RAD	CAPA-18-147593	1203915512	MS	0	0	1	0
EPA:905.0	RAD	CAPA-18-147593	436615005	REG	1	0	0	0
EPA:905.0	RAD	LCS	1203915513	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203915510	MB	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147576	1203911097	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147592	436615002	REG	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147593	436615005	REG	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203911098	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203911096	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147576	1203911100	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147592	436615002	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147593	436615005	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203911101	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203911099	MB	2	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147576	1203911104	DUP	3	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147592	436615002	REG	3	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147593	436615005	REG	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203911105	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203911103	MB	3	0	0	0
SM:A2340B	INORGANIC	CAPA-18-147566	436615001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAPA-18-147567	436615004	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147566	1203908913	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147566	1203908914	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAPA-18-147566	436615001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147567	436615004	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203908912	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203908911	MB	17	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147566	1203908953	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147566	1203908954	MS	0	0	11	0
SW-846:6020	INORGANIC	CAPA-18-147566	436615001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147567	436615004	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203908952	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203908951	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-18-147566	436615001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147567	436615004	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203909514	LCS	0	0	1	0

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203909513	MB	1	0	0	0
SW-846:8260B	VOC	CAPA-18-147592	436615002	REG	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147593	436615005	REG	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147617	436615003	FTB	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147618	436615006	FTB	80	3	0	0
SW-846:8260B	VOC	LCS	1203915328	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203915329	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203915330	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203915331	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203915326	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203915327	MB	80	3	0	0
SW-846:8270D	SVOC	CAPA-18-147592	436615002	REG	80	6	0	0
SW-846:8270D	SVOC	CAPA-18-147593	436615005	REG	80	6	0	0
SW-846:8270D	SVOC	CAPA-18-147596	1203910075	MS	0	6	76	0
SW-846:8270D	SVOC	CAPA-18-147596	1203910076	MSD	0	6	76	0
SW-846:8270D	SVOC	LCS	1203910074	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203910073	MB	80	6	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147578	1203908474	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147592	436615002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147593	436615005	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	1203915326	METHOD BLANK	SW-846:8260B	W	Hexachlorobutadiene	0.41	J	ug/L	1.00
MB	1203915326	METHOD BLANK	SW-846:8260B	W	Trichlorobenzene[1,2,3-]	0.33	J	ug/L	1.00
MB	1203920275	METHOD BLANK	EPA:245.2	W	Mercury	-0.131	J	ug/L	0.200
CAPA-18-147617	436615003	TRIP BLANK	EPA:170.0	W	Temperature	1		Deg C	
CAPA-18-147617	436615003	TRIP BLANK	SW-846:8260B	W	Hexachlorobutadiene	0.43	BJ	ug/L	1.00
CAPA-18-147617	436615003	TRIP BLANK	SW-846:8260B	W	Trichlorobenzene[1,2,3-]	0.32	BJ	ug/L	1.00
CAPA-18-147618	436615006	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-18-147566	1203920275	METHOD BLANK	EPA:245.2	Mercury	-0.131	ug/L	0.067	U	0.200	N	5	100	Y
CAPA-18-147592	1203920275	METHOD BLANK	EPA:245.2	Mercury	-0.131	ug/L	0.067	U	0.200	N	5	100	Y
CAPA-18-147567	1203920275	METHOD BLANK	EPA:245.2	Mercury	-0.131	ug/L	0.067	U	0.200	N	5	100	Y
CAPA-18-147593	1203920275	METHOD BLANK	EPA:245.2	Mercury	-0.131	ug/L	0.067	U	0.200	N	5	100	Y
CAPA-18-147592	436615003	TRIP BLANK	SW-846:8260B	Hexachlorobutadiene	0.43	ug/L	0.58	BJ	1.00	Y	5	100	Y
CAPA-18-147592	1203915326	METHOD BLANK	SW-846:8260B	Hexachlorobutadiene	0.41	ug/L	0.58	BJ	1.00	Y	5	100	Y
CAPA-18-147617	1203915326	METHOD BLANK	SW-846:8260B	Hexachlorobutadiene	0.41	ug/L	0.43	BJ	1.00	Y	5	100	Y
CAPA-18-147593	1203915326	METHOD BLANK	SW-846:8260B	Hexachlorobutadiene	0.41	ug/L	0.33	BJ	1.00	Y	5	100	Y
CAPA-18-147592	436615003	TRIP BLANK	SW-846:8260B	Trichlorobenzene[1,2,3-]	0.32	ug/L	0.51	BJ	1.00	Y	5	100	Y
CAPA-18-147592	1203915326	METHOD BLANK	SW-846:8260B	Trichlorobenzene[1,2,3-]	0.33	ug/L	0.51	BJ	1.00	Y	5	100	Y
CAPA-18-147617	1203915326	METHOD BLANK	SW-846:8260B	Trichlorobenzene[1,2,3-]	0.33	ug/L	0.32	BJ	1.00	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

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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
CAMO-18-147657	1203911265		EPA:351.2	Total Kjeldahl Nitrogen	1715516	11-07-2017	W	116		110	90	10		
CAMO-18-147658	1203911266		EPA:351.2	Total Kjeldahl Nitrogen	1715516	11-07-2017	W	115		110	90	10		
CAPA-18-147566	1203908914		SW-846:6010C	Silicon Dioxide	1714502	11-24-2017	W	71.7		125	75			
CAPA-18-147566	1203908914		SW-846:6010C	Silicon Dioxide	1714502	11-24-2017	W	71.7		125	75			

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?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

DATA VALIDATION REPORT

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-53 S1	2018-604	CAPA-18-147566	REG	INIT	INORGANIC	SW-846:6010C	Silicon Dioxide		J-	I6a	Y	65200	ug/L	65.2	mg/L			W	10/27/2017		1714505	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00269	pCi/L	0.00269	pCi/L	0.0472	0.00712	W	10/27/2017		1715443	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	-0.709	pCi/L	-0.709	pCi/L	4.31	1.34	W	10/27/2017		1716271	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-0.18	pCi/L	-0.18	pCi/L	4.11	0.999	W	10/27/2017		1716271	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.159	pCi/L	0.159	pCi/L	2.16	0.547	W	10/27/2017		1716449	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	VOC	SW-846:8260B	Hexachlorobutadiene	BJ	U	V4d	N	0.58	ug/L	0.58	ug/L			W	10/27/2017		1717151	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-1.69	pCi/L	-1.69	pCi/L	7.56	2.11	W	10/27/2017		1716271	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.0159	pCi/L	0.0159	pCi/L	0.0335	0.0082	W	10/27/2017		1715444	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0114	pCi/L	-0.0114	pCi/L	0.0479	0.00991	W	10/27/2017		1715444	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	16.6	pCi/L	16.6	pCi/L	40.1	13.0	W	10/27/2017		1716271	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	0.615	pCi/L	0.615	pCi/L	4.47	1.00	W	10/27/2017		1716271	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.0249	pCi/L	-0.0249	pCi/L	0.476	0.122	W	10/27/2017		1717217	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	VOC	SW-846:8260B	Trichlorobenzene[1,2,3-]	BJ	U	V4d	N	0.51	ug/L	0.51	ug/L			W	10/27/2017		1717151	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	VOC	SW-846:8260B	Trichlorobenzene[1,2,4-]	BJ	U	V4	N	0.38	ug/L	0.38	ug/L			W	10/27/2017		1717151	VAL	Y
R-53 S1	2018-604	CAPA-18-147592	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0561	pCi/L	0.0561	pCi/L	0.0726	0.0171	W	10/27/2017		1715445	VAL	Y
R-53 S2	2018-604	CAPA-18-147593	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00712	pCi/L	0.00712	pCi/L	0.0624	0.00872	W	10/27/2017		1715443	VAL	Y
R-53 S2	2018-604	CAPA-18-147593	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	1.52	pCi/L	1.52	pCi/L	6.81	2.02	W	10/27/2017		1716271	VAL	Y
R-53 S2	2018-604	CAPA-18-147593	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	0.682	pCi/L	0.682	pCi/L	7.88	1.78	W	10/27/2017		1716271	VAL	Y
R-53 S2	2018-604	CAPA-18-147593	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	1.54	pCi/L	1.54	pCi/L	2.08	0.701	W	10/27/2017		1716449	VAL	Y
R-53 S2	2018-604	CAPA-18-147593	REG	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	2.03	pCi/L	2.03	pCi/L	2.47	0.787	W	10/27/2017		1716449	VAL	Y
R-53 S2	2018-604	CAPA-18-147593	REG	INIT	VOC	SW-846:8260B	Hexachlorobutadiene	BJ	U	V4	N	0.33	ug/L	0.33	ug/L			W	10/27/2017		1717151	VAL	Y
R-53 S2	2018-604	CAPA-18-147593	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	4.35	pCi/L	4.35	pCi/L	11.0	6.26	W	10/27/2017		1716271	VAL	Y
R-53 S2	2018-604	CAPA-18-147593	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.00213	pCi/L	-0.00213	pCi/L	0.0313	0.00705	W	10/27/2017		1715444	VAL	Y
R-53 S2	2018-604	CAPA-18-147593	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0106	pCi/L	-0.0106	pCi/L	0.0448	0.00766	W	10/27/2017		1715444	VAL	Y
R-53 S2	2018-604	CAPA-18-147593	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-38	pCi/L	-38	pCi/L	93.0	26.9	W	10/27/2017		1716271	VAL	Y
R-53 S2	2018-604	CAPA-18-147593	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	1.83	pCi/L	1.83	pCi/L	9.20	2.05	W	10/27/2017		1716271	VAL	Y
R-53 S2	2018-604	CAPA-18-147593	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.11	pCi/L	0.11	pCi/L	0.241	0.0726	W	10/27/2017		1717217	VAL	Y
R-53 S2	2018-604	CAPA-18-147593	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0332	pCi/L	0.0332	pCi/L	0.0767	0.0136	W	10/27/2017		1715445	VAL	Y
R-53 S1	2018-604	CAPA-18-147617	FTB	INIT	VOC	SW-846:8260B	Hexachlorobutadiene	BJ	U	V4	N	0.43	ug/L	0.43	ug/L			W	10/27/2017		1717151	VAL	Y
R-53 S1	2018-604	CAPA-18-147617	FTB	INIT	VOC	SW-846:8260B	Trichlorobenzene[1,2,3-]	BJ	U	V4	N	0.32	ug/L	0.32	ug/L			W	10/27/2017		1717151	VAL	Y

Reason Code	Description
I6a	The associated matrix spike recovery was below the lower acceptance limit (LAL) but >10%. Follow the external laboratory limits located within the associated data package.
J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualifiy the analyte as not detected and/or any other standard qualifire. The analyte is detected in the sample.
R5	Analyte is not detected because the amount reported is less than the MDC.
U_LAB	The analytical laboratory qualified the analyte as not detected.
V4	The sample result is less than or equal to 5 times (10 times for acetone, methylene chloride, and 2-butanone) the concentration of the related analyte in the method blank, which indicates the reported detection is considered indistinguishable from contamination in the blank.
V4d	The samples result is </=5x the concentration of the related analyte in the trip, rinsate and/or equipment blank.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147566	R-53 S1	REG	EPA:120.1	0	1
CAPA-18-147566	R-53 S1	REG	EPA:150.1	0	1
CAPA-18-147566	R-53 S1	REG	EPA:160.1	0	1
CAPA-18-147566	R-53 S1	REG	EPA:170.0	0	1
CAPA-18-147566	R-53 S1	REG	EPA:245.2	0	1
CAPA-18-147566	R-53 S1	REG	EPA:300.0	0	4
CAPA-18-147566	R-53 S1	REG	EPA:310.1	0	2
CAPA-18-147566	R-53 S1	REG	EPA:350.1	0	1
CAPA-18-147566	R-53 S1	REG	EPA:353.2	0	1
CAPA-18-147566	R-53 S1	REG	EPA:365.4	0	1
CAPA-18-147566	R-53 S1	REG	SM:A2340B	0	1
CAPA-18-147566	R-53 S1	REG	SW-846:6010C	0	17
CAPA-18-147566	R-53 S1	REG	SW-846:6020	0	11
CAPA-18-147566	R-53 S1	REG	SW-846:6850	0	1
CAPA-18-147567	R-53 S2	REG	EPA:120.1	0	1
CAPA-18-147567	R-53 S2	REG	EPA:150.1	0	1
CAPA-18-147567	R-53 S2	REG	EPA:160.1	0	1
CAPA-18-147567	R-53 S2	REG	EPA:170.0	0	1
CAPA-18-147567	R-53 S2	REG	EPA:245.2	0	1
CAPA-18-147567	R-53 S2	REG	EPA:300.0	0	4
CAPA-18-147567	R-53 S2	REG	EPA:310.1	0	2
CAPA-18-147567	R-53 S2	REG	EPA:350.1	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147567	R-53 S2	REG	EPA:353.2	0	1
CAPA-18-147567	R-53 S2	REG	EPA:365.4	0	1
CAPA-18-147567	R-53 S2	REG	SM:A2340B	0	1
CAPA-18-147567	R-53 S2	REG	SW-846:6010C	0	17
CAPA-18-147567	R-53 S2	REG	SW-846:6020	0	11
CAPA-18-147567	R-53 S2	REG	SW-846:6850	0	1
CAPA-18-147592	R-53 S1	REG	EPA:170.0	0	1
CAPA-18-147592	R-53 S1	REG	EPA:245.2	0	1
CAPA-18-147592	R-53 S1	REG	EPA:335.4	0	1
CAPA-18-147592	R-53 S1	REG	EPA:351.2	0	1
CAPA-18-147592	R-53 S1	REG	EPA:900	0	2
CAPA-18-147592	R-53 S1	REG	EPA:901.1	0	5
CAPA-18-147592	R-53 S1	REG	EPA:905.0	0	1
CAPA-18-147592	R-53 S1	REG	HASL-300:AM-241	0	1
CAPA-18-147592	R-53 S1	REG	HASL-300:ISOPU	0	2
CAPA-18-147592	R-53 S1	REG	HASL-300:ISOU	0	3
CAPA-18-147592	R-53 S1	REG	SW-846:8260B	0	80
CAPA-18-147592	R-53 S1	REG	SW-846:8270D	0	80
CAPA-18-147592	R-53 S1	REG	SW-846:9060	0	1
CAPA-18-147593	R-53 S2	REG	EPA:170.0	0	1
CAPA-18-147593	R-53 S2	REG	EPA:245.2	0	1
CAPA-18-147593	R-53 S2	REG	EPA:335.4	0	1
CAPA-18-147593	R-53 S2	REG	EPA:351.2	0	1
CAPA-18-147593	R-53 S2	REG	EPA:900	0	2
CAPA-18-147593	R-53 S2	REG	EPA:901.1	0	5
CAPA-18-147593	R-53 S2	REG	EPA:905.0	0	1
CAPA-18-147593	R-53 S2	REG	HASL-300:AM-241	0	1
CAPA-18-147593	R-53 S2	REG	HASL-300:ISOPU	0	2
CAPA-18-147593	R-53 S2	REG	HASL-300:ISOU	0	3
CAPA-18-147593	R-53 S2	REG	SW-846:8260B	0	80
CAPA-18-147593	R-53 S2	REG	SW-846:8270D	0	80
CAPA-18-147593	R-53 S2	REG	SW-846:9060	0	1
CAPA-18-147617	R-53 S1	FTB	EPA:170.0	0	1
CAPA-18-147617	R-53 S1	FTB	SW-846:8260B	0	80
CAPA-18-147618	R-53 S2	FTB	EPA:170.0	0	1
CAPA-18-147618	R-53 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 27, 2017

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

Re: LANL- WQH Water Samples
Work Order: 436615
SDG: 2018-604

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on October 31, 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: 2018-604
Enclosures

ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 436615
SDG: 2018-604

Table of Contents

Case Narrative

Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 436615
SDG # : 2018-604

November 27, 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 31, 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). Sample CAPA-18-147617 received with Headspace. CAPA-18-148593 Received unpreserved*436615003(CAPA-18-147617), 436615005(CAPA-18-147593)*.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
436615001	CAPA-18-147566
436615002	CAPA-18-147592
436615003	CAPA-18-147617
436615004	CAPA-18-147567
436615005	CAPA-18-147593
436615006	CAPA-18-147618

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 27 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

General Engineering
Charleston SC

Chain of Custody/Analysis Request 436615

COC/Lab Request #: 2018-604
Page 1 of 1

Client Contact:

Lab Agreement #:

Site Name: Los Alamos National Laboratory

Project Number: ADEP

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

Rad Screening Info: Location NU

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-18-147566	Oct 27 2017	11:30	W				1		1		1		
CAPA-18-147592	Oct 27 2017	11:30	W	1	2	2		1		1		1	1
CAPA-18-147617	Oct 27 2017	11:30	W		2								
CAPA-18-147567	Oct 27 2017	13:15	W				1		1		1		
CAPA-18-147593	Oct 27 2017	13:15	W	1	2	2		1		1		1	1
CAPA-18-147618	Oct 27 2017	13:15	W		2								

Special Instructions:

Relinquished by:	Print Name: Rebecca Martin	Date/Time: 10/30/17 1230	Received by:	Print Name: Zac Worsham	Date/Time: 10/31/17 0855
Relinquished by:	Print Name:	Date/Time:	Received by:	Print Name:	Date/Time:
Relinquished by:	Print Name:	Date/Time:	Received by:	Print Name:	Date/Time:

TEST – Explosives	YES	NO
Samples collected from a WFO area		X

Field Test for Explosives Results	YES	NO	NA
Spot test shows presence of explosive residues. **If YES - Do not ship.**		X	

TEST – Field Screen	YES	NO
The sample has field screening measurements of alpha and beta activity.		X

Sample Activity (dpm/100cm²)	Shipment Activity (dpm*g/100cm²)	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/100cm² or Beta > 160,000,000 dpm*g/100cm². **If YES - Do not ship.**					NO
On the external surface of the sample container, alpha activity 24 dpm/cm², beta activity 240 dpm/cm², or surface activity 0.5 mR/hr. **If YES - Do not ship.**					NA
The sample is tentatively identified as DOT hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package – Limited Quantity Material - UN2910, based on field screening measurements of alpha and beta activity.					NO

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 sampling location within TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, Sediment/Soil from Effluent Canyon, Mortandad Canyon from Effluent Canyon to the Soil Contamination Area near the sediment traps, Bayo Canyon at TA-10, TA-35, TA-15, TA-36, TA-39, TA-48 or TA-49 **AND** does not have usable field screening measurements of alpha and beta activity available **AND** the sampling location or related sampling location(s) do not have prior reliable analytical measurements of radioactive isotopes available **AND** knowledge of sample is not acceptable to identify appropriate labeling.

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	10/30/17 300
(Signature)	

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) Paul Mark	10/30/2017 15:00
(Signature)	

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: ESHC	SDG/AR/COC/Work Order: 430615
Received By: ZKW	Date Received: 10/31/17
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 5908 1783 0850-1c 5908 1783 0840-1c 5908 1783 0839-18 (chem)

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 Above
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: WST-148593 rec'd unpreserved 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: -147617 rec'd w/ headspace
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 KHH Date 10/31/17 Page 1 of 1

GL-CHL-SR-001 Rev 5

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

LOS ALAMOS, NM 87545
UNITED STATES US

CAD: 0014176/CAFE2916

BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407
(843) 556-8171
REF: 21PDOASRGW04BAGWS0

12

FedEx Express

2 of 3
MPS# 0263 5908 1783 0840
Mstr# 5908 1783 0839 0201

TUE - 31 OCT 10:30
PRIORITY OVERNIGHT

X7 RBWA

29407
SC-US CHS

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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 300C
ACTWGT: 30.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407
(843) 556-8171
REF: 21PDOASRGW04BAGWS0

18

Fedl Exp

1 of 3
TRK# 0201 5908 1783 0839
MASTER

TUE - 31 OCT 10:3
PRIORITY OVERNIG

X7 RBWA

294
SC-US CH

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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 300CT17
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: 21PDOASRGW04BAGWS0

12

Fedl Exp

3 of 3
MPS# 0263 5908 1783 0850
Mstr# 5908 1783 0839 0201

TUE - 31 OCT 10:3
PRIORITY OVERNIG

X7 RBWA

294
SC-US CH

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 #: 2018-604
Work Order #: 436615

Method/Analysis Information

Procedure:	**Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer**
Analytical Method:	SW-846:8260B
Analytical Batch Number:	1717151

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
436615002	CAPA-18-147592
436615003	CAPA-18-147617
436615005	CAPA-18-147593
436615006	CAPA-18-147618
1203915326	Method Blank (MB)
1203915327	Method Blank (MB)
1203915328	Laboratory Control Sample (LCS)
1203915329	Laboratory Control Sample (LCS)
1203915330	Laboratory Control Sample (LCS)
1203915331	Laboratory Control Sample (LCS)
1203915332	436504006(CAPA-18-147596) Post Spike (PS)
1203915333	436504006(CAPA-18-147596) Post Spike (PS)
1203915334	436504006(CAPA-18-147596) Post Spike Duplicate (PSD)
1203915335	436504006(CAPA-18-147596) Post Spike Duplicate (PSD)

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

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

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

Calibration Information

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

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

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

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

Quality Control (QC) Information

Blank (MB) Statement
Target analytes were detected in the blanks 1203915326 (MB) and 1203915327 (MB) below the reporting limit.

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

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

QC Sample Designation
Spike analyses were not required for this SDG.

Matrix Spike/Matrix Spike Duplicate Recovery Statement
The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the required acceptance limits.

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

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

Technical Information

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

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

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

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

Miscellaneous Information

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

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

Additional Comments
Additional comments were not required for this SDG.

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

Electronic Package Comment

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

System Configuration

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOA6.I	Agilent 6890N/5975 GC/MS w/ OI 4560/Archon Autosampler	HP6890N/HP5975	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

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

Client SDG: 2018-604 GEL Work Order: 436615

The Qualifiers in this report are defined as follows:

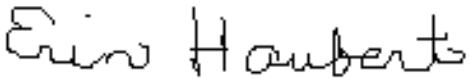
* A quality control analyte recovery is outside of specified acceptance criteria
** Analyte is a surrogate compound
B The target analyte was detected in the associated blank.
J Value is estimated
U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

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

Review/Validation

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

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

Signature:  **Name: Erin Haubert**

Date: 27 NOV 2017 **Title: Data Validator**

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615002**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147592**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 03:48**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 03:48**				
Data File:	**110917V6\6G439.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	BJ	0.510	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	BJ	0.380	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:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615002**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147592**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 03:48**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 03:48**				
Data File:	**110917V6\6G439.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	BJ	0.580	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:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615002**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147592**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 03:48**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 03:48**				
Data File:	**110917V6\6G439.D**	**Column:**	**DB-624**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.4	50.0	ug/L	103	(71%-134%)
Bromofluorobenzene	51.4	50.0	ug/L	103	(70%-131%)
Toluene-d8	49.2	50.0	ug/L	98	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.592	5.46	ug/L	0	J
	unknown siloxane	13.75	12	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615003**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147617**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 04:16**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 04:16**				
Data File:	**110917V6\6G440.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	BJ	0.320	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:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615003**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147617**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 04:16**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 04:16**				
Data File:	**110917V6\6G440.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	BJ	0.430	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:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615003**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147617**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 04:16**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 04:16**				
Data File:	**110917V6\6G440.D**	**Column:**	**DB-624**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.9	50.0	ug/L	102	(71%-134%)
Bromofluorobenzene	50.8	50.0	ug/L	102	(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
	unknown siloxane	13.75	7.78	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615005**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147593**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 04:44**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 04:44**				
Data File:	**110917V6\6G441.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:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615005**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147593**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 04:44**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 04:44**				
Data File:	**110917V6\6G441.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	BJ	0.330	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:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615005**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147593**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 04:44**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 04:44**				
Data File:	**110917V6\6G441.D**	**Column:**	**DB-624**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.6	50.0	ug/L	101	(71%-134%)
Bromofluorobenzene	50.1	50.0	ug/L	100	(70%-131%)
Toluene-d8	49.3	50.0	ug/L	99	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.584	5.79	ug/L	0	J
	unknown siloxane	13.75	15	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615006**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147618**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 05:12**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 05:12**				
Data File:	**110917V6\6G442.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:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615006**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147618**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 05:12**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 05:12**				
Data File:	**110917V6\6G442.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:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615006**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147618**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 05:12**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 05:12**				
Data File:	**110917V6\6G442.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	52.3	50.0	ug/L	105	(71%-134%)
Bromofluorobenzene	51.9	50.0	ug/L	104	(70%-131%)
Toluene-d8	51.4	50.0	ug/L	103	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.688	5.19	ug/L	0	J
	unknown siloxane	13.75	6.59	ug/L	0	J

Quality Control Summary

Volatile

Surrogate Recovery Report

SDG Number: 2018-604

Matrix Type: LIQUID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203915328	LCS for batch 1717151	100	100	101
1203915329	LCS for batch 1717151	101	98	101
1203915326	MB for batch 1717151	101	100	102
1203915332	CAPA-18-147596PS	101	100	100
1203915334	CAPA-18-147596PSD	100	100	99
1203915333	CAPA-18-147596PS	100	99	101
1203915335	CAPA-18-147596PSD	100	98	101
1203915330	LCS for batch 1717151	101	100	100
1203915331	LCS for batch 1717151	100	97	100
1203915327	MB for batch 1717151	102	97	101
436615002	CAPA-18-147592	103	98	103
436615003	CAPA-18-147617	102	99	102
436615005	CAPA-18-147593	101	99	100
436615006	CAPA-18-147618	105	103	104

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

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1717151
Matrix: WATER
Lab Sample ID 1203915328
Instrument: VOA6.I
Analysis Date: 11/08/2017 10:38
Dilution: 1
Analyst: JP1
Purge Vol: 5 mL
Batch ID: 1717151

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	102	102	71-127
75-05-8	LCS	Acetonitrile	1250	0.0	1280	102	61-125
67-64-1	LCS	Acetone	250	0.0	246	99	48-157
74-88-4	LCS	Iodomethane	250	0.0	248	99	72-128
75-15-0	LCS	Carbon disulfide	250	0.0	248	99	69-138
108-05-4	LCS	Vinyl acetate	250	0.0	247	99	67-125
78-93-3	LCS	2-Butanone	250	0.0	262	105	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	257	103	56-140
75-71-8	LCS	Dichlorodifluoromethane	50.0	0.0	57.5	115	40-160
74-87-3	LCS	Chloromethane	50.0	0.0	52.6	105	58-135
75-01-4	LCS	Vinyl chloride	50.0	0.0	50.7	101	65-137
74-83-9	LCS	Bromomethane	50.0	0.0	52.0	104	63-137
75-00-3	LCS	Chloroethane	50.0	0.0	50.1	100	69-129
75-69-4	LCS	Trichlorofluoromethane	50.0	0.0	51.3	103	69-138
60-29-7	LCS	Ethyl ether	50.0	0.0	49.2	98	72-125
75-35-4	LCS	1,1-Dichloroethylene	50.0	0.0	51.9	104	66-126
75-09-2	LCS	Methylene chloride	50.0	0.0	48.3	97	68-119
1634-04-4	LCS	tert-Butyl methyl ether	50.0	0.0	52.0	104	76-128
156-60-5	LCS	trans-1,2-Dichloroethylene	50.0	0.0	53.0	106	71-124
75-34-3	LCS	1,1-Dichloroethane	50.0	0.0	52.7	105	73-123
156-59-2	LCS	cis-1,2-Dichloroethylene	50.0	0.0	52.7	105	75-123

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1717151
Matrix: WATER
Lab Sample ID 1203915328
Instrument: VOA6.I
Analysis Date: 11/08/2017 10:38
Dilution: 1
Analyst: JP1
Purge Vol: 5 mL
Batch ID: 1717151

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	LCS	2,2-Dichloropropane	50.0	0.0	51.0	102	72-138
74-97-5	LCS	Bromochloromethane	50.0	0.0	52.8	106	76-125
67-66-3	LCS	Chloroform	50.0	0.0	51.4	103	76-123
71-55-6	LCS	1,1,1-Trichloroethane	50.0	0.0	50.7	101	74-136
563-58-6	LCS	1,1-Dichloropropene	50.0	0.0	49.1	98	72-129
56-23-5	LCS	Carbon tetrachloride	50.0	0.0	52.4	105	72-140
107-06-2	LCS	1,2-Dichloroethane	50.0	0.0	52.1	104	74-122
71-43-2	LCS	Benzene	50.0	0.0	50.5	101	72-121
79-01-6	LCS	Trichloroethylene	50.0	0.0	52.3	105	74-125
78-87-5	LCS	1,2-Dichloropropane	50.0	0.0	51.6	103	73-121
74-95-3	LCS	Dibromomethane	50.0	0.0	51.7	103	78-123
75-27-4	LCS	Bromodichloromethane	50.0	0.0	54.1	108	77-131
10061-01-5	LCS	cis-1,3-Dichloropropylene	50.0	0.0	52.6	105	78-131
108-88-3	LCS	Toluene	50.0	0.0	51.0	102	71-121
10061-02-6	LCS	trans-1,3-Dichloropropylene	50.0	0.0	54.6	109	78-131
79-00-5	LCS	1,1,2-Trichloroethane	50.0	0.0	52.6	105	74-118
142-28-9	LCS	1,3-Dichloropropane	50.0	0.0	51.4	103	74-118
127-18-4	LCS	Tetrachloroethylene	50.0	0.0	50.6	101	69-129
124-48-1	LCS	Dibromochloromethane	50.0	0.0	58.5	117	76-137
106-93-4	LCS	1,2-Dibromoethane	50.0	0.0	54.9	110	78-122
108-90-7	LCS	Chlorobenzene	50.0	0.0	51.1	102	74-120
100-41-4	LCS	Ethylbenzene	50.0	0.0	50.9	102	73-125

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1717151
Matrix: WATER
Lab Sample ID 1203915328
Instrument: VOA6.I
Analysis Date: 11/08/2017 10:38
Dilution: 1
Analyst: JP1
Purge Vol: 5 mL
Batch ID: 1717151

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	50.3	101	74-126
100-42-5	LCS	Styrene	50.0	0.0	52.6	105	72-130
75-25-2	LCS	Bromoform	50.0	0.0	60.0	120	72-136
98-82-8	LCS	Isopropylbenzene	50.0	0.0	50.4	101	70-130
79-34-5	LCS	1,1,2,2-Tetrachloroethane	50.0	0.0	52.5	105	70-126
96-18-4	LCS	1,2,3-Trichloropropane	50.0	0.0	53.6	107	74-122
108-86-1	LCS	Bromobenzene	50.0	0.0	51.5	103	74-120
103-65-1	LCS	n-Propylbenzene	50.0	0.0	49.4	99	67-128
108-67-8	LCS	1,3,5-Trimethylbenzene	50.0	0.0	51.0	102	70-129
95-49-8	LCS	2-Chlorotoluene	50.0	0.0	50.9	102	71-124
106-43-4	LCS	4-Chlorotoluene	50.0	0.0	50.2	100	69-125
98-06-6	LCS	tert-Butylbenzene	50.0	0.0	52.1	104	72-130
95-63-6	LCS	1,2,4-Trimethylbenzene	50.0	0.0	51.2	102	70-126
135-98-8	LCS	sec-Butylbenzene	50.0	0.0	50.6	101	70-131
99-87-6	LCS	4-Isopropyltoluene	50.0	0.0	50.8	102	71-131
541-73-1	LCS	1,3-Dichlorobenzene	50.0	0.0	50.6	101	72-121
106-46-7	LCS	1,4-Dichlorobenzene	50.0	0.0	50.3	101	71-120
104-51-8	LCS	n-Butylbenzene	50.0	0.0	49.7	99	68-134
96-12-8	LCS	1,2-Dibromo-3-chloropropane	50.0	0.0	58.3	117	68-141
87-68-3	LCS	Hexachlorobutadiene	50.0	0.0	50.4	101	72-136
91-20-3	LCS	Naphthalene	50.0	0.0	54.0	108	72-132
87-61-6	LCS	1,2,3-Trichlorobenzene	50.0	0.0	51.5	103	70-130

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1717151
Matrix: WATER
Lab Sample ID 1203915328
Instrument: VOA6.I
Analysis Date: 11/08/2017 10:38
Dilution: 1
Analyst: JP1
Purge Vol: 5 mL
Batch ID: 1717151

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	50.1	100	71-129
630-20-6	LCS	1,1,1,2-Tetrachloroethane	50.0	0.0	54.7	109	79-127
95-50-1	LCS	1,2-Dichlorobenzene	50.0	0.0	51.2	102	74-120
71-36-3	LCS	n-Butyl alcohol	5000	0.0	5380	108	63-138

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-604**
Sample Type: **Laboratory Control Sample**
Client ID: **LCS for batch 1717151**
Matrix: **WATER**
Lab Sample ID **1203915329**
Instrument: **VOA6.I**
Analysis Date: **11/08/2017 12:31**
Dilution: **1**
Analyst: **JP1**
Purge Vol: **5 mL**
Batch ID: **1717151**

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	221	88	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	220	88	61-148
107-05-1	LCS	Allyl chloride	250	0.0	225	90	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	242	97	65-122
107-12-0	LCS	Propionitrile	250	0.0	238	95	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	243	97	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	243	97	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	235	94	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2540	102	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	41.1	82	66-147

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1717151
Matrix: WATER
Lab Sample ID 1203915330
Instrument: VOA6.I
Analysis Date: 11/09/2017 23:06
Dilution: 1
Analyst: JP1
Purge Vol: 5 mL
Batch ID: 1717151

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	89.4	89	71-127
75-05-8	LCS	Acetonitrile	1250	0.0	1160	92	61-125
67-64-1	LCS	Acetone	250	0.0	184	74	48-157
74-88-4	LCS	Iodomethane	250	0.0	215	86	72-128
75-15-0	LCS	Carbon disulfide	250	0.0	213	85	69-138
108-05-4	LCS	Vinyl acetate	250	0.0	249	100	67-125
78-93-3	LCS	2-Butanone	250	0.0	200	80	55-138
108-10-1	LCS	4-Methyl-2-pentanone	250	0.0	218	87	66-124
591-78-6	LCS	2-Hexanone	250	0.0	181	72	56-140
75-71-8	LCS	Dichlorodifluoromethane	50.0	0.0	56.2	112	40-160
74-87-3	LCS	Chloromethane	50.0	0.0	49.8	100	58-135
75-01-4	LCS	Vinyl chloride	50.0	0.0	46.6	93	65-137
74-83-9	LCS	Bromomethane	50.0	0.0	50.9	102	63-137
75-00-3	LCS	Chloroethane	50.0	0.0	48.1	96	69-129
75-69-4	LCS	Trichlorofluoromethane	50.0	0.0	49.1	98	69-138
60-29-7	LCS	Ethyl ether	50.0	0.0	49.0	98	72-125
75-35-4	LCS	1,1-Dichloroethylene	50.0	0.0	43.9	88	66-126
75-09-2	LCS	Methylene chloride	50.0	0.0	42.9	86	68-119
1634-04-4	LCS	tert-Butyl methyl ether	50.0	0.0	46.1	92	76-128
156-60-5	LCS	trans-1,2-Dichloroethylene	50.0	0.0	46.0	92	71-124
75-34-3	LCS	1,1-Dichloroethane	50.0	0.0	46.0	92	73-123
156-59-2	LCS	cis-1,2-Dichloroethylene	50.0	0.0	46.1	92	75-123

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1717151
Matrix: WATER
Lab Sample ID 1203915330
Instrument: VOA6.I
Analysis Date: 11/09/2017 23:06
Dilution: 1
Analyst: JP1
Purge Vol: 5 mL
Batch ID: 1717151

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	42.0	84	72-138
74-97-5	LCS	Bromochloromethane	50.0	0.0	46.4	93	76-125
67-66-3	LCS	Chloroform	50.0	0.0	45.6	91	76-123
71-55-6	LCS	1,1,1-Trichloroethane	50.0	0.0	44.4	89	74-136
563-58-6	LCS	1,1-Dichloropropene	50.0	0.0	42.1	84	72-129
56-23-5	LCS	Carbon tetrachloride	50.0	0.0	44.9	90	72-140
107-06-2	LCS	1,2-Dichloroethane	50.0	0.0	47.4	95	74-122
71-43-2	LCS	Benzene	50.0	0.0	43.9	88	72-121
79-01-6	LCS	Trichloroethylene	50.0	0.0	44.9	90	74-125
78-87-5	LCS	1,2-Dichloropropane	50.0	0.0	45.6	91	73-121
74-95-3	LCS	Dibromomethane	50.0	0.0	46.1	92	78-123
75-27-4	LCS	Bromodichloromethane	50.0	0.0	47.3	95	77-131
10061-01-5	LCS	cis-1,3-Dichloropropylene	50.0	0.0	45.2	90	78-131
108-88-3	LCS	Toluene	50.0	0.0	44.5	89	71-121
10061-02-6	LCS	trans-1,3-Dichloropropylene	50.0	0.0	46.7	93	78-131
79-00-5	LCS	1,1,2-Trichloroethane	50.0	0.0	46.9	94	74-118
142-28-9	LCS	1,3-Dichloropropane	50.0	0.0	46.7	93	74-118
127-18-4	LCS	Tetrachloroethylene	50.0	0.0	43.7	87	69-129
124-48-1	LCS	Dibromochloromethane	50.0	0.0	49.7	99	76-137
106-93-4	LCS	1,2-Dibromoethane	50.0	0.0	48.2	96	78-122
108-90-7	LCS	Chlorobenzene	50.0	0.0	45.1	90	74-120
100-41-4	LCS	Ethylbenzene	50.0	0.0	44.5	89	73-125

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1717151
Matrix: WATER
Lab Sample ID 1203915330
Instrument: VOA6.I
Analysis Date: 11/09/2017 23:06
Dilution: 1
Analyst: JP1
Purge Vol: 5 mL
Batch ID: 1717151

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS	o-Xylene	50.0	0.0	44.4	89	74-126
100-42-5	LCS	Styrene	50.0	0.0	45.9	92	72-130
75-25-2	LCS	Bromoform	50.0	0.0	48.9	98	72-136
98-82-8	LCS	Isopropylbenzene	50.0	0.0	43.8	88	70-130
79-34-5	LCS	1,1,2,2-Tetrachloroethane	50.0	0.0	45.9	92	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	44.7	89	74-120
103-65-1	LCS	n-Propylbenzene	50.0	0.0	42.9	86	67-128
108-67-8	LCS	1,3,5-Trimethylbenzene	50.0	0.0	44.6	89	70-129
95-49-8	LCS	2-Chlorotoluene	50.0	0.0	44.1	88	71-124
106-43-4	LCS	4-Chlorotoluene	50.0	0.0	43.5	87	69-125
98-06-6	LCS	tert-Butylbenzene	50.0	0.0	44.8	90	72-130
95-63-6	LCS	1,2,4-Trimethylbenzene	50.0	0.0	44.7	89	70-126
135-98-8	LCS	sec-Butylbenzene	50.0	0.0	44.4	89	70-131
99-87-6	LCS	4-Isopropyltoluene	50.0	0.0	44.5	89	71-131
541-73-1	LCS	1,3-Dichlorobenzene	50.0	0.0	43.8	88	72-121
106-46-7	LCS	1,4-Dichlorobenzene	50.0	0.0	43.8	88	71-120
104-51-8	LCS	n-Butylbenzene	50.0	0.0	42.8	86	68-134
96-12-8	LCS	1,2-Dibromo-3-chloropropane	50.0	0.0	48.1	96	68-141
87-68-3	LCS	Hexachlorobutadiene	50.0	0.0	44.9	90	72-136
91-20-3	LCS	Naphthalene	50.0	0.0	49.0	98	72-132
87-61-6	LCS	1,2,3-Trichlorobenzene	50.0	0.0	46.2	92	70-130

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1717151
Matrix: WATER
Lab Sample ID 1203915330
Instrument: VOA6.I
Analysis Date: 11/09/2017 23:06
Dilution: 1
Analyst: JP1
Purge Vol: 5 mL
Batch ID: 1717151

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	43.9	88	71-129
630-20-6	LCS	1,1,1,2-Tetrachloroethane	50.0	0.0	48.2	96	79-127
95-50-1	LCS	1,2-Dichlorobenzene	50.0	0.0	44.9	90	74-120
71-36-3	LCS	n-Butyl alcohol	5000	0.0	4710	94	63-138

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1717151
Matrix: WATER
Lab Sample ID 1203915331
Instrument: VOA6.I
Analysis Date: 11/10/2017 00:02
Dilution: 1
Analyst: JP1
Purge Vol: 5 mL
Batch ID: 1717151

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	213	85	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	199	80	61-148
107-05-1	LCS	Allyl chloride	250	0.0	202	81	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	214	85	65-122
107-12-0	LCS	Propionitrile	250	0.0	208	83	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	215	86	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	214	85	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	210	84	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2130	85	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	36.6	73	66-147

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604 **Sample Type:** Post Spike

Client ID: CAPA-18-147596PS **Matrix:** W

Lab Sample ID 1203915332

Instrument: VOA6.I **Analysis Date:** 11/08/2017 19:06 **Dilution:** 1

Analyst: JP1

Purge Vol: 5 mL **Batch ID:** 1717151

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	91.3	91	59-132
75-05-8	PS	Acetonitrile	1250	0.00	U	1160	93	56-131
67-64-1	PS	Acetone	250	0.00	U	137	55	25-155
74-88-4	PS	Iodomethane	250	0.00	U	221	89	66-133
75-15-0	PS	Carbon disulfide	250	0.00	U	220	88	61-141
108-05-4	PS	Vinyl acetate	250	0.00	U	214	85	48-133
78-93-3	PS	2-Butanone	250	0.00	U	168	67	25-143
108-10-1	PS	4-Methyl-2-pentanone	250	0.00	U	225	90	61-127
591-78-6	PS	2-Hexanone	250	0.00	U	167	67	33-138
87-68-3	PS	Hexachlorobutadiene	50.0	0.970	BJ	44.6	87	40-147
87-61-6	PS	1,2,3-Trichlorobenzene	50.0	0.930	BJ	45.7	90	52-135
104-51-8	PS	n-Butylbenzene	50.0	0.320	J	43.5	86	43-142
91-20-3	PS	Naphthalene	50.0	0.740	J	48.4	95	62-134
120-82-1	PS	1,2,4-Trichlorobenzene	50.0	0.740	J	44.2	87	50-133
75-71-8	PS	Dichlorodifluoromethane	50.0	0.00	U	49.5	99	33-164
74-87-3	PS	Chloromethane	50.0	0.00	U	45.6	91	53-139
75-01-4	PS	Vinyl chloride	50.0	0.00	U	44.0	88	58-140
74-83-9	PS	Bromomethane	50.0	0.00	U	48.3	97	59-146
75-00-3	PS	Chloroethane	50.0	0.00	U	44.0	88	65-129
75-69-4	PS	Trichlorofluoromethane	50.0	0.00	U	45.3	91	65-141
60-29-7	PS	Ethyl ether	50.0	0.00	U	44.7	89	69-127
75-35-4	PS	1,1-Dichloroethylene	50.0	0.00	U	45.4	91	59-130

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604 **Sample Type:** Post Spike

Client ID: CAPA-18-147596PS **Matrix:** W

Lab Sample ID 1203915332

Instrument: VOA6.I **Analysis Date:** 11/08/2017 19:06 **Dilution:** 1

Analyst: JP1

Purge Vol: 5 mL **Batch ID:** 1717151

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
75-09-2	PS	Methylene chloride	50.0	0.00	U	43.4	87	62-123
1634-04-4	PS	tert-Butyl methyl ether	50.0	0.00	U	47.1	94	69-132
156-60-5	PS	trans-1,2-Dichloroethylene	50.0	0.00	U	47.5	95	65-127
75-34-3	PS	1,1-Dichloroethane	50.0	0.00	U	47.4	95	67-127
156-59-2	PS	cis-1,2-Dichloroethylene	50.0	0.00	U	47.4	95	69-127
594-20-7	PS	2,2-Dichloropropane	50.0	0.00	U	44.6	89	66-137
74-97-5	PS	Bromochloromethane	50.0	0.00	U	48.3	97	71-130
67-66-3	PS	Chloroform	50.0	0.00	U	47.0	94	71-129
71-55-6	PS	1,1,1-Trichloroethane	50.0	0.00	U	45.5	91	69-139
563-58-6	PS	1,1-Dichloropropene	50.0	0.00	U	43.8	88	67-130
56-23-5	PS	Carbon tetrachloride	50.0	0.00	U	46.6	93	66-143
107-06-2	PS	1,2-Dichloroethane	50.0	0.00	U	48.3	97	69-130
71-43-2	PS	Benzene	50.0	0.00	U	45.5	91	66-125
79-01-6	PS	Trichloroethylene	50.0	0.00	U	46.5	93	65-131
78-87-5	PS	1,2-Dichloropropane	50.0	0.00	U	47.2	94	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	48.8	98	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	45.9	92	60-126
10061-02-6	PS	trans-1,3-Dichloropropylene	50.0	0.00	U	49.3	99	69-135
79-00-5	PS	1,1,2-Trichloroethane	50.0	0.00	U	48.1	96	66-125
142-28-9	PS	1,3-Dichloropropane	50.0	0.00	U	47.7	95	67-124

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604 **Sample Type:** Post Spike

Client ID: CAPA-18-147596PS **Matrix:** W

Lab Sample ID 1203915332

Instrument: VOA6.I **Analysis Date:** 11/08/2017 19:06 **Dilution:** 1

Analyst: JP1

Purge Vol: 5 mL **Batch ID:** 1717151

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
127-18-4	PS	Tetrachloroethylene	50.0	0.00	U	45.7	91	60-130
124-48-1	PS	Dibromochloromethane	50.0	0.00	U	52.6	105	68-143
106-93-4	PS	1,2-Dibromoethane	50.0	0.00	U	50.1	100	71-127
108-90-7	PS	Chlorobenzene	50.0	0.00	U	46.2	92	64-124
100-41-4	PS	Ethylbenzene	50.0	0.00	U	45.6	91	61-130
95-47-6	PS	o-Xylene	50.0	0.00	U	45.8	92	62-131
100-42-5	PS	Styrene	50.0	0.00	U	47.3	95	59-135
75-25-2	PS	Bromoform	50.0	0.00	U	51.7	103	64-138
98-82-8	PS	Isopropylbenzene	50.0	0.00	U	45.2	90	55-133
79-34-5	PS	1,1,2,2-Tetrachloroethane	50.0	0.00	U	47.6	95	62-129
96-18-4	PS	1,2,3-Trichloropropane	50.0	0.00	U	48.1	96	70-124
108-86-1	PS	Bromobenzene	50.0	0.00	U	46.0	92	62-124
103-65-1	PS	n-Propylbenzene	50.0	0.00	U	44.0	88	50-133
108-67-8	PS	1,3,5-Trimethylbenzene	50.0	0.00	U	45.8	92	53-135
95-49-8	PS	2-Chlorotoluene	50.0	0.00	U	45.4	91	56-128
106-43-4	PS	4-Chlorotoluene	50.0	0.00	U	44.6	89	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	45.7	91	53-132
135-98-8	PS	sec-Butylbenzene	50.0	0.00	U	45.5	91	50-138
99-87-6	PS	4-Isopropyltoluene	50.0	0.00	U	45.8	92	49-138
541-73-1	PS	1,3-Dichlorobenzene	50.0	0.00	U	45.1	90	56-126
106-46-7	PS	1,4-Dichlorobenzene	50.0	0.00	U	44.9	90	55-125

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604 **Sample Type:** Post Spike

Client ID: CAPA-18-147596PS **Matrix:** W

Lab Sample ID 1203915332

Instrument: VOA6.I **Analysis Date:** 11/08/2017 19:06 **Dilution:** 1

Analyst: JP1

Purge Vol: 5 mL **Batch ID:** 1717151

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
96-12-8	PS	1,2-Dibromo-3-chloropropane	50.0	0.00	U	50.4	101	62-141
630-20-6	PS	1,1,1,2-Tetrachloroethane	50.0	0.00	U	49.9	100	71-133
95-50-1	PS	1,2-Dichlorobenzene	50.0	0.00	U	45.8	92	60-125
71-36-3	PS	n-Butyl alcohol	5000	0.00	U	4820	96	60-140

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604 **Sample Type:** Post Spike Duplicate

Client ID: CAPA-18-147596PSD **Matrix:** W

Lab Sample ID 1203915334

Instrument: VOA6.I **Analysis Date:** 11/08/2017 19:35 **Dilution:** 1

Analyst: JP1

Purge Vol: 5 mL **Batch ID:** 1717151

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	92.7	93	59-132	2	0-20
75-05-8	PSD	Acetonitrile	1250	0.00	U	1110	88	56-131	5	0-20
67-64-1	PSD	Acetone	250	0.00	U	128	51	25-155	7	0-20
74-88-4	PSD	Iodomethane	250	0.00	U	225	90	66-133	2	0-20
75-15-0	PSD	Carbon disulfide	250	0.00	U	225	90	61-141	3	0-20
108-05-4	PSD	Vinyl acetate	250	0.00	U	207	83	48-133	3	0-20
78-93-3	PSD	2-Butanone	250	0.00	U	156	62	25-143	8	0-20
108-10-1	PSD	4-Methyl-2-pentanone	250	0.00	U	209	83	61-127	7	0-20
591-78-6	PSD	2-Hexanone	250	0.00	U	153	61	33-138	9	0-20
87-68-3	PSD	Hexachlorobutadiene	50.0	0.970	BJ	46.0	90	40-147	3	0-20
87-61-6	PSD	1,2,3-Trichlorobenzene	50.0	0.930	BJ	46.4	91	52-135	2	0-20
104-51-8	PSD	n-Butylbenzene	50.0	0.320	J	44.9	89	43-142	3	0-20
91-20-3	PSD	Naphthalene	50.0	0.740	J	47.2	93	62-134	3	0-20
120-82-1	PSD	1,2,4-Trichlorobenzene	50.0	0.740	J	44.8	88	50-133	1	0-20
75-71-8	PSD	Dichlorodifluoromethane	50.0	0.00	U	50.7	101	33-164	2	0-20
74-87-3	PSD	Chloromethane	50.0	0.00	U	48.1	96	53-139	5	0-20
75-01-4	PSD	Vinyl chloride	50.0	0.00	U	46.3	93	58-140	5	0-20
74-83-9	PSD	Bromomethane	50.0	0.00	U	50.0	100	59-146	3	0-20
75-00-3	PSD	Chloroethane	50.0	0.00	U	45.2	90	65-129	3	0-20
75-69-4	PSD	Trichlorofluoromethane	50.0	0.00	U	46.4	93	65-141	2	0-20
60-29-7	PSD	Ethyl ether	50.0	0.00	U	43.7	87	69-127	2	0-20
75-35-4	PSD	1,1-Dichloroethylene	50.0	0.00	U	46.6	93	59-130	3	0-20

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604 **Sample Type:** Post Spike Duplicate

Client ID: CAPA-18-147596PSD **Matrix:** W

Lab Sample ID 1203915334

Instrument: VOA6.I **Analysis Date:** 11/08/2017 19:35 **Dilution:** 1

Analyst: JP1

Purge Vol: 5 mL **Batch ID:** 1717151

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
75-09-2	PSD	Methylene chloride	50.0	0.00	U	43.6	87	62-123	1	0-20
1634-04-4	PSD	tert-Butyl methyl ether	50.0	0.00	U	46.0	92	69-132	2	0-20
156-60-5	PSD	trans-1,2-Dichloroethylene	50.0	0.00	U	48.2	96	65-127	2	0-20
75-34-3	PSD	1,1-Dichloroethane	50.0	0.00	U	48.0	96	67-127	1	0-20
156-59-2	PSD	cis-1,2-Dichloroethylene	50.0	0.00	U	47.6	95	69-127	0	0-20
594-20-7	PSD	2,2-Dichloropropane	50.0	0.00	U	46.1	92	66-137	3	0-20
74-97-5	PSD	Bromochloromethane	50.0	0.00	U	47.9	96	71-130	1	0-20
67-66-3	PSD	Chloroform	50.0	0.00	U	46.9	94	71-129	0	0-20
71-55-6	PSD	1,1,1-Trichloroethane	50.0	0.00	U	46.6	93	69-139	2	0-20
563-58-6	PSD	1,1-Dichloropropene	50.0	0.00	U	44.7	89	67-130	2	0-20
56-23-5	PSD	Carbon tetrachloride	50.0	0.00	U	47.7	95	66-143	2	0-20
107-06-2	PSD	1,2-Dichloroethane	50.0	0.00	U	47.8	96	69-130	1	0-20
71-43-2	PSD	Benzene	50.0	0.00	U	46.2	92	66-125	1	0-20
79-01-6	PSD	Trichloroethylene	50.0	0.00	U	47.0	94	65-131	1	0-20
78-87-5	PSD	1,2-Dichloropropane	50.0	0.00	U	47.2	94	67-127	0	0-20
74-95-3	PSD	Dibromomethane	50.0	0.00	U	46.8	94	72-129	0	0-20
75-27-4	PSD	Bromodichloromethane	50.0	0.00	U	48.6	97	70-138	0	0-20
10061-01-5	PSD	cis-1,3-Dichloropropylene	50.0	0.00	U	46.9	94	70-134	0	0-20
108-88-3	PSD	Toluene	50.0	0.00	U	46.1	92	60-126	0	0-20
10061-02-6	PSD	trans-1,3-Dichloropropylene	50.0	0.00	U	48.2	96	69-135	2	0-20
79-00-5	PSD	1,1,2-Trichloroethane	50.0	0.00	U	46.3	93	66-125	4	0-20
142-28-9	PSD	1,3-Dichloropropane	50.0	0.00	U	46.7	93	67-124	2	0-20

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Sample Type: Post Spike Duplicate
Client ID: CAPA-18-147596PSD
Matrix: W
Lab Sample ID 1203915334
Instrument: VOA6.I
Analysis Date: 11/08/2017 19:35
Dilution: 1
Analyst: JP1
Purge Vol: 5 mL
Batch ID: 1717151

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
127-18-4	PSD	Tetrachloroethylene	50.0	0.00	U	46.6	93	60-130	2	0-20
124-48-1	PSD	Dibromochloromethane	50.0	0.00	U	51.1	102	68-143	3	0-20
106-93-4	PSD	1,2-Dibromoethane	50.0	0.00	U	48.0	96	71-127	4	0-20
108-90-7	PSD	Chlorobenzene	50.0	0.00	U	46.5	93	64-124	1	0-20
100-41-4	PSD	Ethylbenzene	50.0	0.00	U	46.3	93	61-130	1	0-20
95-47-6	PSD	o-Xylene	50.0	0.00	U	45.9	92	62-131	0	0-20
100-42-5	PSD	Styrene	50.0	0.00	U	47.1	94	59-135	0	0-20
75-25-2	PSD	Bromoform	50.0	0.00	U	50.5	101	64-138	2	0-20
98-82-8	PSD	Isopropylbenzene	50.0	0.00	U	45.9	92	55-133	1	0-20
79-34-5	PSD	1,1,2,2-Tetrachloroethane	50.0	0.00	U	45.7	91	62-129	4	0-20
96-18-4	PSD	1,2,3-Trichloropropane	50.0	0.00	U	46.4	93	70-124	4	0-20
108-86-1	PSD	Bromobenzene	50.0	0.00	U	46.0	92	62-124	0	0-20
103-65-1	PSD	n-Propylbenzene	50.0	0.00	U	45.0	90	50-133	2	0-20
108-67-8	PSD	1,3,5-Trimethylbenzene	50.0	0.00	U	46.8	94	53-135	2	0-20
95-49-8	PSD	2-Chlorotoluene	50.0	0.00	U	45.6	91	56-128	1	0-20
106-43-4	PSD	4-Chlorotoluene	50.0	0.00	U	45.4	91	53-130	2	0-20
98-06-6	PSD	tert-Butylbenzene	50.0	0.00	U	46.9	94	55-135	2	0-20
95-63-6	PSD	1,2,4-Trimethylbenzene	50.0	0.00	U	46.4	93	53-132	2	0-20
135-98-8	PSD	sec-Butylbenzene	50.0	0.00	U	46.5	93	50-138	2	0-20
99-87-6	PSD	4-Isopropyltoluene	50.0	0.00	U	47.0	94	49-138	3	0-20
541-73-1	PSD	1,3-Dichlorobenzene	50.0	0.00	U	45.4	91	56-126	1	0-20
106-46-7	PSD	1,4-Dichlorobenzene	50.0	0.00	U	45.1	90	55-125	0	0-20

Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604 **Sample Type:** Post Spike Duplicate

Client ID: CAPA-18-147596PSD **Matrix:** W

Lab Sample ID 1203915334

Instrument: VOA6.I **Analysis Date:** 11/08/2017 19:35 **Dilution:** 1

Analyst: JP1

Purge Vol: 5 mL **Batch ID:** 1717151

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
96-12-8	PSD	1,2-Dibromo-3-chloropropane	50.0	0.00	U	46.9	94	62-141	7	0-20
630-20-6	PSD	1,1,1,2-Tetrachloroethane	50.0	0.00	U	49.3	99	71-133	1	0-20
95-50-1	PSD	1,2-Dichlorobenzene	50.0	0.00	U	45.9	92	60-125	0	0-20
71-36-3	PSD	n-Butyl alcohol	5000	0.00	U	4410	88	60-140	9	0-20

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-604**
Sample Type: **Post Spike**
Client ID: **CAPA-18-147596PS**
Matrix: **W**
Lab Sample ID **1203915333**
Instrument: **VOA6.I**
Analysis Date: **11/08/2017 20:59**
Dilution: **1**
Analyst: **JP1**
Purge Vol: **5 mL**
Batch ID: **1717151**

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	200	80	49-141
76-13-1	PS	Trichlorotrifluoroethane	250	0.00	U	207	83	57-149
107-05-1	PS	Allyl chloride	250	0.00	U	213	85	54-128
107-13-1	PS	Acrylonitrile	250	0.00	U	227	91	59-129
107-12-0	PS	Propionitrile	250	0.00	U	223	89	58-131
126-98-7	PS	Methacrylonitrile	250	0.00	U	228	91	59-134
80-62-6	PS	Methyl methacrylate	250	0.00	U	228	91	62-135
97-63-2	PS	Ethyl methacrylate	250	0.00	U	221	89	60-136
78-83-1	PS	Isobutyl alcohol	2500	0.00	U	2340	93	60-143
126-99-8	PS	2-Chloro-1,3-butadiene	50.0	0.00	U	38.2	76	63-146

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604 **Sample Type:** Post Spike Duplicate

Client ID: CAPA-18-147596PSD **Matrix:** W

Lab Sample ID 1203915335

Instrument: VOA6.I **Analysis Date:** 11/08/2017 21:27 **Dilution:** 1

Analyst: JP1

Purge Vol: 5 mL **Batch ID:** 1717151

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	203	81	49-141	2	0-20
76-13-1	PSD	Trichlorotrifluoroethane	250	0.00	U	211	84	57-149	2	0-20
107-05-1	PSD	Allyl chloride	250	0.00	U	215	86	54-128	1	0-20
107-13-1	PSD	Acrylonitrile	250	0.00	U	232	93	59-129	2	0-20
107-12-0	PSD	Propionitrile	250	0.00	U	230	92	58-131	3	0-20
126-98-7	PSD	Methacrylonitrile	250	0.00	U	232	93	59-134	1	0-20
80-62-6	PSD	Methyl methacrylate	250	0.00	U	231	92	62-135	1	0-20
97-63-2	PSD	Ethyl methacrylate	250	0.00	U	224	90	60-136	1	0-20
78-83-1	PSD	Isobutyl alcohol	2500	0.00	U	2380	95	60-143	2	0-20
126-99-8	PSD	2-Chloro-1,3-butadiene	50.0	0.00	U	39.0	78	63-146	2	0-20

Method Blank Summary

SDG Number:	**2018-604**	**Client:**	**ARSL004**	**Matrix:**	**WATER**
Client ID:	**MB for batch 1717151**	**Instrument ID:**	**VOA6.I**	**Data File:**	**110817V6\6G308BA.D**
Lab Sample ID:	**1203915326**	**Prep Date:**	**11/08/2017 12:59**	**Analyzed:**	**11/08/17 12:59**
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 1717151	1203915328	110817V6\6G303LA.D	11/08/17	1038
02	LCS for batch 1717151	1203915329	110817V6\6G307LA.D	11/08/17	1231
03	CAPA-18-147596PS	1203915332	110817V6\6G321.D	11/08/17	1906
04	CAPA-18-147596PSD	1203915334	110817V6\6G322.D	11/08/17	1935
05	CAPA-18-147596PS	1203915333	110817V6\6G325.D	11/08/17	2059
06	CAPA-18-147596PSD	1203915335	110817V6\6G326.D	11/08/17	2127

Method Blank Summary

SDG Number:	**2018-604**	**Client:**	**ARSL004**	**Matrix:**	**WATER**
Client ID:	**MB for batch 1717151**	**Instrument ID:**	**VOA6.I**	**Data File:**	**110917V6\6G432BA.D**
Lab Sample ID:	**1203915327**	**Prep Date:**	**11/10/2017 00:30**	**Analyzed:**	**11/10/17 00:30**
Column:	**DB-624**				

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

	Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
08	LCS for batch 1717151	1203915330	110917V6\6G429LA.D	11/09/17	2306
09	LCS for batch 1717151	1203915331	110917V6\6G431LA.D	11/10/17	0002
10	CAPA-18-147592	436615002	110917V6\6G439.D	11/10/17	0348
11	CAPA-18-147617	436615003	110917V6\6G440.D	11/10/17	0416
12	CAPA-18-147593	436615005	110917V6\6G441.D	11/10/17	0444
13	CAPA-18-147618	436615006	110917V6\6G442.D	11/10/17	0512

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915326**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 12:59**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 12:59**				
Data File:	**110817V6\6G308BA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	J	0.330	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:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915326**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 12:59**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 12:59**				
Data File:	**110817V6\6G308BA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	J	0.410	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:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915326**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 12:59**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 12:59**				
Data File:	**110817V6\6G308BA.D**	**Column:**	**DB-624**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.7	50.0	ug/L	101	(71%-134%)
Bromofluorobenzene	51.0	50.0	ug/L	102	(70%-131%)
Toluene-d8	49.9	50.0	ug/L	100	(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:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915327**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 00:30**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 00:30**				
Data File:	**110917V6\6G432BA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	J	0.510	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	J	0.370	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:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915327**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 00:30**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 00:30**				
Data File:	**110917V6\6G432BA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	J	0.650	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:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915327**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 00:30**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 00:30**				
Data File:	**110917V6\6G432BA.D**	**Column:**	**DB-624**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.8	50.0	ug/L	102	(71%-134%)
Bromofluorobenzene	50.7	50.0	ug/L	101	(70%-131%)
Toluene-d8	48.7	50.0	ug/L	97	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915328**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 10:38**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 10:38**				
Data File:	**110817V6\6G303LA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		54.7	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		50.7	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		52.5	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		52.6	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		51.9	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		49.1	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	51.5	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		53.6	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		50.1	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		51.2	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		58.3	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		54.9	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		51.2	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		52.1	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		51.6	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		51.0	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		50.6	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		51.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		50.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		51.0	ug/L	0.300	1.00
78-93-3	2-Butanone		262	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		50.9	ug/L	0.300	1.00
591-78-6	2-Hexanone		257	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		50.2	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		50.8	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		253	ug/L	1.50	5.00
67-64-1	Acetone		246	ug/L	1.50	10.0
75-05-8	Acetonitrile		1280	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		50.5	ug/L	0.300	1.00
108-86-1	Bromobenzene		51.5	ug/L	0.300	1.00
74-97-5	Bromochloromethane		52.8	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		54.1	ug/L	0.300	1.00
75-25-2	Bromoform		60.0	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915328**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 10:38**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 10:38**				
Data File:	**110817V6\6G303LA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		52.0	ug/L	0.300	1.00
75-15-0	Carbon disulfide		248	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		52.4	ug/L	0.300	1.00
108-90-7	Chlorobenzene		51.1	ug/L	0.300	1.00
75-00-3	Chloroethane		50.1	ug/L	0.300	1.00
67-66-3	Chloroform		51.4	ug/L	0.300	1.00
74-87-3	Chloromethane		52.6	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		58.5	ug/L	0.300	1.00
74-95-3	Dibromomethane		51.7	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		57.5	ug/L	0.300	1.00
60-29-7	Ethyl ether		49.2	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		50.9	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	50.4	ug/L	0.300	1.00
74-88-4	Iodomethane		248	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		50.4	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		48.3	ug/L	1.00	10.0
91-20-3	Naphthalene		54.0	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		52.6	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		50.6	ug/L	0.300	1.00
108-88-3	Toluene		51.0	ug/L	0.300	1.00
79-01-6	Trichloroethylene		52.3	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		51.3	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		247	ug/L	1.50	5.00
75-01-4	Vinyl chloride		50.7	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		52.7	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		52.6	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		102	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5380	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		49.7	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		49.4	ug/L	0.300	1.00
95-47-6	o-Xylene		50.3	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		50.6	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915328**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 10:38**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 10:38**				
Data File:	**110817V6\6G303LA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		52.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		52.1	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		53.0	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		54.6	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.1	50.0	ug/L	100	(71%-134%)
Bromofluorobenzene	50.4	50.0	ug/L	101	(70%-131%)
Toluene-d8	50.2	50.0	ug/L	100	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915329**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 12:31**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 12:31**				
Data File:	**110817V6\6G307LA.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		41.1	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		221	ug/L	1.50	5.00
107-13-1	Acrylonitrile		242	ug/L	1.50	5.00
107-05-1	Allyl chloride		225	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:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915329**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 12:31**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 12:31**				
Data File:	**110817V6\6G307LA.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		235	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2540	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		243	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		243	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		238	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		220	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:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915329**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 12:31**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 12:31**				
Data File:	**110817V6\6G307LA.D**	**Column:**	**DB-624**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.3	50.0	ug/L	101	(71%-134%)
Bromofluorobenzene	50.5	50.0	ug/L	101	(70%-131%)
Toluene-d8	48.9	50.0	ug/L	98	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915330**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/09/2017 23:06**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/09/2017 23:06**				
Data File:	**110917V6\6G429LA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		48.2	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		44.4	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		45.9	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		46.9	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		46.0	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		43.9	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		42.1	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	46.2	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	B	43.9	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		44.7	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		48.1	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		48.2	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		44.9	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		47.4	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		45.6	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		44.6	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		43.8	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		46.7	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		43.8	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		42.0	ug/L	0.300	1.00
78-93-3	2-Butanone		200	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		44.1	ug/L	0.300	1.00
591-78-6	2-Hexanone		181	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		43.5	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		44.5	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		218	ug/L	1.50	5.00
67-64-1	Acetone		184	ug/L	1.50	10.0
75-05-8	Acetonitrile		1160	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		43.9	ug/L	0.300	1.00
108-86-1	Bromobenzene		44.7	ug/L	0.300	1.00
74-97-5	Bromochloromethane		46.4	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		47.3	ug/L	0.300	1.00
75-25-2	Bromoform		48.9	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915330**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/09/2017 23:06**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/09/2017 23:06**				
Data File:	**110917V6\6G429LA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		50.9	ug/L	0.300	1.00
75-15-0	Carbon disulfide		213	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		44.9	ug/L	0.300	1.00
108-90-7	Chlorobenzene		45.1	ug/L	0.300	1.00
75-00-3	Chloroethane		48.1	ug/L	0.300	1.00
67-66-3	Chloroform		45.6	ug/L	0.300	1.00
74-87-3	Chloromethane		49.8	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		49.7	ug/L	0.300	1.00
74-95-3	Dibromomethane		46.1	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		56.2	ug/L	0.300	1.00
60-29-7	Ethyl ether		49.0	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		44.5	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	44.9	ug/L	0.300	1.00
74-88-4	Iodomethane		215	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		43.8	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		42.9	ug/L	1.00	10.0
91-20-3	Naphthalene		49.0	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		45.9	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		43.7	ug/L	0.300	1.00
108-88-3	Toluene		44.5	ug/L	0.300	1.00
79-01-6	Trichloroethylene		44.9	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		49.1	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		249	ug/L	1.50	5.00
75-01-4	Vinyl chloride		46.6	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		46.1	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		45.2	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		89.4	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4710	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		42.8	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		42.9	ug/L	0.300	1.00
95-47-6	o-Xylene		44.4	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		44.4	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915330**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/09/2017 23:06**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/09/2017 23:06**				
Data File:	**110917V6\6G429LA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		46.1	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		44.8	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		46.0	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		46.7	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	49.9	50.0	ug/L	100	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915331**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 00:02**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 00:02**				
Data File:	**110917V6\6G431LA.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		36.6	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		213	ug/L	1.50	5.00
107-13-1	Acrylonitrile		214	ug/L	1.50	5.00
107-05-1	Allyl chloride		202	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:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915331**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 00:02**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 00:02**				
Data File:	**110917V6\6G431LA.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		210	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		2130	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		215	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		214	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		208	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		199	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:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203915331**				
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1717151**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/10/2017 00:02**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/10/2017 00:02**				
Data File:	**110917V6\6G431LA.D**	**Column:**	**DB-624**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.2	50.0	ug/L	100	(71%-134%)
Bromofluorobenzene	50.1	50.0	ug/L	100	(70%-131%)
Toluene-d8	48.4	50.0	ug/L	97	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203915332**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 19:06**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 19:06**				
Data File:	**110817V6\6G321.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		49.9	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		45.5	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		47.6	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		48.1	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		47.4	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		45.4	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		43.8	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	45.7	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		48.1	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		44.2	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		45.7	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		50.4	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		50.1	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		45.8	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		48.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		47.2	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		45.8	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		45.1	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		47.7	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		44.9	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		44.6	ug/L	0.300	1.00
78-93-3	2-Butanone		168	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		45.4	ug/L	0.300	1.00
591-78-6	2-Hexanone		167	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		44.6	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		45.8	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		225	ug/L	1.50	5.00
67-64-1	Acetone		137	ug/L	1.50	10.0
75-05-8	Acetonitrile		1160	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		45.5	ug/L	0.300	1.00
108-86-1	Bromobenzene		46.0	ug/L	0.300	1.00
74-97-5	Bromochloromethane		48.3	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		48.8	ug/L	0.300	1.00
75-25-2	Bromoform		51.7	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203915332**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 19:06**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 19:06**				
Data File:	**110817V6\6G321.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		48.3	ug/L	0.300	1.00
75-15-0	Carbon disulfide		220	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		46.6	ug/L	0.300	1.00
108-90-7	Chlorobenzene		46.2	ug/L	0.300	1.00
75-00-3	Chloroethane		44.0	ug/L	0.300	1.00
67-66-3	Chloroform		47.0	ug/L	0.300	1.00
74-87-3	Chloromethane		45.6	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		52.6	ug/L	0.300	1.00
74-95-3	Dibromomethane		46.9	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		49.5	ug/L	0.300	1.00
60-29-7	Ethyl ether		44.7	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		45.6	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	44.6	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		45.2	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		43.4	ug/L	1.00	10.0
91-20-3	Naphthalene		48.4	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		47.3	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		45.7	ug/L	0.300	1.00
108-88-3	Toluene		45.9	ug/L	0.300	1.00
79-01-6	Trichloroethylene		46.5	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		45.3	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		214	ug/L	1.50	5.00
75-01-4	Vinyl chloride		44.0	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		47.4	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		91.3	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4820	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		43.5	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		44.0	ug/L	0.300	1.00
95-47-6	o-Xylene		45.8	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		45.5	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203915332**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 19:06**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 19:06**				
Data File:	**110817V6\6G321.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		47.1	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		47.5	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		49.3	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.7	50.0	ug/L	101	(71%-134%)
Bromofluorobenzene	49.9	50.0	ug/L	100	(70%-131%)
Toluene-d8	49.9	50.0	ug/L	100	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203915333**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 20:59**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 20:59**				
Data File:	**110817V6\6G325.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		38.2	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		200	ug/L	1.50	5.00
107-13-1	Acrylonitrile		227	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:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203915333**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 20:59**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 20:59**				
Data File:	**110817V6\6G325.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		221	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		2340	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		228	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		228	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		223	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		207	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:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203915333**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 20:59**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 20:59**				
Data File:	**110817V6\6G325.D**	**Column:**	**DB-624**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.2	50.0	ug/L	100	(71%-134%)
Bromofluorobenzene	50.6	50.0	ug/L	101	(70%-131%)
Toluene-d8	49.3	50.0	ug/L	99	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203915334**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 19:35**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 19:35**				
Data File:	**110817V6\6G322.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		49.3	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		46.6	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		45.7	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		46.3	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		48.0	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		46.6	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		44.7	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	46.4	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		46.4	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		44.8	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		46.4	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		46.9	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		48.0	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		45.9	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		47.8	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		47.2	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		46.8	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		45.4	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		46.7	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		45.1	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		46.1	ug/L	0.300	1.00
78-93-3	2-Butanone		156	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		45.6	ug/L	0.300	1.00
591-78-6	2-Hexanone		153	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		45.4	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		47.0	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		209	ug/L	1.50	5.00
67-64-1	Acetone		128	ug/L	1.50	10.0
75-05-8	Acetonitrile		1110	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		46.2	ug/L	0.300	1.00
108-86-1	Bromobenzene		46.0	ug/L	0.300	1.00
74-97-5	Bromochloromethane		47.9	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		48.6	ug/L	0.300	1.00
75-25-2	Bromoform		50.5	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203915334**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 19:35**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 19:35**				
Data File:	**110817V6\6G322.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		50.0	ug/L	0.300	1.00
75-15-0	Carbon disulfide		225	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		47.7	ug/L	0.300	1.00
108-90-7	Chlorobenzene		46.5	ug/L	0.300	1.00
75-00-3	Chloroethane		45.2	ug/L	0.300	1.00
67-66-3	Chloroform		46.9	ug/L	0.300	1.00
74-87-3	Chloromethane		48.1	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		51.1	ug/L	0.300	1.00
74-95-3	Dibromomethane		46.8	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		50.7	ug/L	0.300	1.00
60-29-7	Ethyl ether		43.7	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		46.3	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	46.0	ug/L	0.300	1.00
74-88-4	Iodomethane		225	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		45.9	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		43.6	ug/L	1.00	10.0
91-20-3	Naphthalene		47.2	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		47.1	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		46.6	ug/L	0.300	1.00
108-88-3	Toluene		46.1	ug/L	0.300	1.00
79-01-6	Trichloroethylene		47.0	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		46.4	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		207	ug/L	1.50	5.00
75-01-4	Vinyl chloride		46.3	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		47.6	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		92.7	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4410	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		44.9	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		45.0	ug/L	0.300	1.00
95-47-6	o-Xylene		45.9	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		46.5	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203915334**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 19:35**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 19:35**				
Data File:	**110817V6\6G322.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		46.0	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		48.2	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		48.2	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	49.8	50.0	ug/L	100	(71%-134%)
Bromofluorobenzene	49.4	50.0	ug/L	99	(70%-131%)
Toluene-d8	49.9	50.0	ug/L	100	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203915335**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 21:27**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 21:27**				
Data File:	**110817V6\6G326.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		39.0	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		203	ug/L	1.50	5.00
107-13-1	Acrylonitrile		232	ug/L	1.50	5.00
107-05-1	Allyl chloride		215	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:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203915335**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 21:27**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 21:27**				
Data File:	**110817V6\6G326.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		2380	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		232	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		231	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		230	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		211	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:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203915335**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1717151**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1717151**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**11/08/2017 21:27**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**11/08/2017 21:27**				
Data File:	**110817V6\6G326.D**	**Column:**	**DB-624**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.2	50.0	ug/L	100	(71%-134%)
Bromofluorobenzene	50.4	50.0	ug/L	101	(70%-131%)
Toluene-d8	49.2	50.0	ug/L	98	(74%-124%)

Semi-Volatile Analysis

Case Narrative

GC/MS Semivolatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-604
Work Order #: 436615

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:	1715004
Prep Batch Number:	1715003

Sample Analysis

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

Sample ID	Client ID
436615002	CAPA-18-147592
436615005	CAPA-18-147593
1203910073	Method Blank (MB)
1203910074	Laboratory Control Sample (LCS)
1203910075	436504006(CAPA-18-147596) Matrix Spike (MS)
1203910076	436504006(CAPA-18-147596) 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 436615002 (CAPA-18-147592) and 436615005 (CAPA-18-147593) 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 436504006 (CAPA-18-147596) was selected for analysis as the matrix spike and matrix spike duplicate.

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

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

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

Technical Information:

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

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

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

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

Miscellaneous Information:

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

TIC Comment
Tentatively identified compounds (TIC) were requested for samples 436615002 (CAPA-18-147592) and 436615005 (CAPA-18-147593) 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
MSD1.I	Agilent 6890N/5973 GC/MS w/ 7683 Autosampler	HP6890/HP5973	DB-5MS	25m x 0.2mm, 0.33um (5% Polysilarylene-95% Polydimethylsiloxane)

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the

requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

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

Client SDG: 2018-604 GEL Work Order: 436615

The Qualifiers in this report are defined as follows:

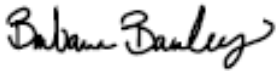
* A quality control analyte recovery is outside of specified acceptance criteria
** Analyte is a surrogate compound
U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

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

Review/Validation

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

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

Signature:  **Name: Barbara Bailey**

Date: 09 NOV 2017 **Title: Data Validator**

Sample Data Summary

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615002**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147592**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 18:16**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**910 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0219.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.30	ug/L	3.30	11.0
120-82-1	1,2,4-Trichlorobenzene	U	3.30	ug/L	3.30	11.0
95-50-1	1,2-Dichlorobenzene	U	3.30	ug/L	3.30	11.0
122-66-7	Azobenzene	U	3.30	ug/L	3.30	11.0
	1,2-Diphenylhydrazine					
541-73-1	1,3-Dichlorobenzene	U	3.30	ug/L	3.30	11.0
106-46-7	1,4-Dichlorobenzene	U	3.30	ug/L	3.30	11.0
123-91-1	1,4-Dioxane	U	3.30	ug/L	3.30	11.0
90-12-0	1-Methylnaphthalene	U	0.330	ug/L	0.330	1.10
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.30	ug/L	3.30	11.0
95-95-4	2,4,5-Trichlorophenol	U	3.30	ug/L	3.30	11.0
88-06-2	2,4,6-Trichlorophenol	U	3.30	ug/L	3.30	11.0
120-83-2	2,4-Dichlorophenol	U	3.30	ug/L	3.30	11.0
105-67-9	2,4-Dimethylphenol	U	3.30	ug/L	3.30	11.0
51-28-5	2,4-Dinitrophenol	U	5.49	ug/L	5.49	22.0
121-14-2	2,4-Dinitrotoluene	U	3.30	ug/L	3.30	11.0
606-20-2	2,6-Dinitrotoluene	U	3.30	ug/L	3.30	11.0
91-58-7	2-Chloronaphthalene	U	0.451	ug/L	0.451	1.10
95-57-8	2-Chlorophenol	U	3.30	ug/L	3.30	11.0
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.30	ug/L	3.30	11.0
91-57-6	2-Methylnaphthalene	U	0.330	ug/L	0.330	1.10
88-75-5	2-Nitrophenol	U	3.30	ug/L	3.30	11.0
91-94-1	3,3'-Dichlorobenzidine	U	3.30	ug/L	3.30	11.0
101-55-3	4-Bromophenylphenylether	U	3.30	ug/L	3.30	11.0
59-50-7	Parachlorometa cresol	U	3.30	ug/L	3.30	11.0
	4-Chloro-3-methylphenol					
106-47-8	4-Chloroaniline	U	3.63	ug/L	3.63	11.0
7005-72-3	4-Chlorophenylphenylether	U	3.30	ug/L	3.30	11.0
100-02-7	4-Nitrophenol	U	3.30	ug/L	3.30	11.0
83-32-9	Acenaphthene	U	0.330	ug/L	0.330	1.10
208-96-8	Acenaphthylene	U	0.330	ug/L	0.330	1.10
62-53-3	Aniline	U	4.62	ug/L	4.62	11.0
120-12-7	Anthracene	U	0.330	ug/L	0.330	1.10
1912-24-9	Atrazine	U	3.30	ug/L	3.30	11.0
92-87-5	Benzidine	U	4.29	ug/L	4.29	11.0
56-55-3	Benzo(a)anthracene	U	0.330	ug/L	0.330	1.10
50-32-8	Benzo(a)pyrene	U	0.330	ug/L	0.330	1.10
205-99-2	Benzo(b)fluoranthene	U	0.330	ug/L	0.330	1.10
191-24-2	Benzo(ghi)perylene	U	0.330	ug/L	0.330	1.10

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615002**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147592**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 18:16**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**910 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0219.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.330	ug/L	0.330	1.10
65-85-0	Benzoic acid	U	6.59	ug/L	6.59	22.0
100-51-6	Benzyl alcohol	U	3.30	ug/L	3.30	11.0
85-68-7	Butylbenzylphthalate	U	3.30	ug/L	3.30	11.0
218-01-9	Chrysene	U	0.330	ug/L	0.330	1.10
84-74-2	Di-n-butylphthalate	U	3.30	ug/L	3.30	11.0
117-84-0	Di-n-octylphthalate	U	3.30	ug/L	3.30	11.0
53-70-3	Dibenzo(a,h)anthracene	U	0.330	ug/L	0.330	1.10
132-64-9	Dibenzofuran	U	3.30	ug/L	3.30	11.0
84-66-2	Diethylphthalate	U	3.30	ug/L	3.30	11.0
131-11-3	Dimethylphthalate	U	3.30	ug/L	3.30	11.0
88-85-7	Dinoseb	U	3.30	ug/L	3.30	11.0
122-39-4	Diphenylamine	U	3.30	ug/L	3.30	11.0
206-44-0	Fluoranthene	U	0.330	ug/L	0.330	1.10
86-73-7	Fluorene	U	0.330	ug/L	0.330	1.10
118-74-1	Hexachlorobenzene	U	3.30	ug/L	3.30	11.0
87-68-3	Hexachlorobutadiene	U	3.30	ug/L	3.30	11.0
77-47-4	Hexachlorocyclopentadiene	U	3.30	ug/L	3.30	11.0
67-72-1	Hexachloroethane	U	3.30	ug/L	3.30	11.0
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.330	ug/L	0.330	1.10
78-59-1	Isophorone	U	3.85	ug/L	3.85	11.0
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.30	ug/L	3.30	11.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.30	ug/L	3.30	11.0
55-18-5	N-Nitrosodiethylamine	U	3.30	ug/L	3.30	11.0
621-64-7	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*	U	3.30	ug/L	3.30	11.0
930-55-2	N-Nitrosopyrrolidine	U	3.30	ug/L	3.30	11.0
91-20-3	Naphthalene	U	0.330	ug/L	0.330	1.10
98-95-3	Nitrobenzene	U	3.30	ug/L	3.30	11.0
608-93-5	Pentachlorobenzene	U	3.30	ug/L	3.30	11.0
87-86-5	Pentachlorophenol	U	3.30	ug/L	3.30	11.0
85-01-8	Phenanthrene	U	0.330	ug/L	0.330	1.10
108-95-2	Phenol	U	3.30	ug/L	3.30	11.0
129-00-0	Pyrene	U	0.330	ug/L	0.330	1.10
110-86-1	Pyridine	U	3.30	ug/L	3.30	11.0
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.30	ug/L	3.30	11.0
111-91-1	bis(2-Chloroethoxy)methane	U	3.30	ug/L	3.30	11.0
111-44-4	bis(2-Chloroethyl) ether	U	3.30	ug/L	3.30	11.0
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.30	ug/L	3.30	11.0

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615002**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147592**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 18:16**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**910 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0219.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	4.07	ug/L	4.07	11.0
99-09-2	3-Nitroaniline *m-Nitroaniline*	U	3.30	ug/L	3.30	11.0
95-48-7	o-Cresol	U	3.30	ug/L	3.30	11.0
88-74-4	2-Nitroaniline *o-Nitroaniline*	U	3.30	ug/L	3.30	11.0
100-01-6	4-Nitroaniline *p-Nitroaniline*	U	3.30	ug/L	3.30	11.0

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	64.5	110	ug/L	59	(32%-124%)
2-Fluorobiphenyl	44.6	54.9	ug/L	81	(32%-112%)
2-Fluorophenol	43.6	110	ug/L	40	(15%-88%)
Nitrobenzene-d5	47.1	54.9	ug/L	86	(36%-115%)
Phenol-d5	29.6	110	ug/L	27	(15%-91%)
p-Terphenyl-d14	41.6	54.9	ug/L	76	(36%-121%)

Tentatively Identified Compound Summary

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

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615005**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147593**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 18:47**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**900 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0220.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.33	ug/L	3.33	11.1
120-82-1	1,2,4-Trichlorobenzene	U	3.33	ug/L	3.33	11.1
95-50-1	1,2-Dichlorobenzene	U	3.33	ug/L	3.33	11.1
122-66-7	Azobenzene	U	3.33	ug/L	3.33	11.1
	1,2-Diphenylhydrazine					
541-73-1	1,3-Dichlorobenzene	U	3.33	ug/L	3.33	11.1
106-46-7	1,4-Dichlorobenzene	U	3.33	ug/L	3.33	11.1
123-91-1	1,4-Dioxane	U	3.33	ug/L	3.33	11.1
90-12-0	1-Methylnaphthalene	U	0.333	ug/L	0.333	1.11
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.33	ug/L	3.33	11.1
95-95-4	2,4,5-Trichlorophenol	U	3.33	ug/L	3.33	11.1
88-06-2	2,4,6-Trichlorophenol	U	3.33	ug/L	3.33	11.1
120-83-2	2,4-Dichlorophenol	U	3.33	ug/L	3.33	11.1
105-67-9	2,4-Dimethylphenol	U	3.33	ug/L	3.33	11.1
51-28-5	2,4-Dinitrophenol	U	5.56	ug/L	5.56	22.2
121-14-2	2,4-Dinitrotoluene	U	3.33	ug/L	3.33	11.1
606-20-2	2,6-Dinitrotoluene	U	3.33	ug/L	3.33	11.1
91-58-7	2-Chloronaphthalene	U	0.456	ug/L	0.456	1.11
95-57-8	2-Chlorophenol	U	3.33	ug/L	3.33	11.1
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.33	ug/L	3.33	11.1
91-57-6	2-Methylnaphthalene	U	0.333	ug/L	0.333	1.11
88-75-5	2-Nitrophenol	U	3.33	ug/L	3.33	11.1
91-94-1	3,3'-Dichlorobenzidine	U	3.33	ug/L	3.33	11.1
101-55-3	4-Bromophenylphenylether	U	3.33	ug/L	3.33	11.1
59-50-7	Parachlorometa cresol	U	3.33	ug/L	3.33	11.1
	4-Chloro-3-methylphenol					
106-47-8	4-Chloroaniline	U	3.67	ug/L	3.67	11.1
7005-72-3	4-Chlorophenylphenylether	U	3.33	ug/L	3.33	11.1
100-02-7	4-Nitrophenol	U	3.33	ug/L	3.33	11.1
83-32-9	Acenaphthene	U	0.333	ug/L	0.333	1.11
208-96-8	Acenaphthylene	U	0.333	ug/L	0.333	1.11
62-53-3	Aniline	U	4.67	ug/L	4.67	11.1
120-12-7	Anthracene	U	0.333	ug/L	0.333	1.11
1912-24-9	Atrazine	U	3.33	ug/L	3.33	11.1
92-87-5	Benzidine	U	4.33	ug/L	4.33	11.1
56-55-3	Benzo(a)anthracene	U	0.333	ug/L	0.333	1.11
50-32-8	Benzo(a)pyrene	U	0.333	ug/L	0.333	1.11
205-99-2	Benzo(b)fluoranthene	U	0.333	ug/L	0.333	1.11
191-24-2	Benzo(ghi)perylene	U	0.333	ug/L	0.333	1.11

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615005**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147593**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 18:47**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**900 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0220.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.333	ug/L	0.333	1.11
65-85-0	Benzoic acid	U	6.67	ug/L	6.67	22.2
100-51-6	Benzyl alcohol	U	3.33	ug/L	3.33	11.1
85-68-7	Butylbenzylphthalate	U	3.33	ug/L	3.33	11.1
218-01-9	Chrysene	U	0.333	ug/L	0.333	1.11
84-74-2	Di-n-butylphthalate	U	3.33	ug/L	3.33	11.1
117-84-0	Di-n-octylphthalate	U	3.33	ug/L	3.33	11.1
53-70-3	Dibenzo(a,h)anthracene	U	0.333	ug/L	0.333	1.11
132-64-9	Dibenzofuran	U	3.33	ug/L	3.33	11.1
84-66-2	Diethylphthalate	U	3.33	ug/L	3.33	11.1
131-11-3	Dimethylphthalate	U	3.33	ug/L	3.33	11.1
88-85-7	Dinoseb	U	3.33	ug/L	3.33	11.1
122-39-4	Diphenylamine	U	3.33	ug/L	3.33	11.1
206-44-0	Fluoranthene	U	0.333	ug/L	0.333	1.11
86-73-7	Fluorene	U	0.333	ug/L	0.333	1.11
118-74-1	Hexachlorobenzene	U	3.33	ug/L	3.33	11.1
87-68-3	Hexachlorobutadiene	U	3.33	ug/L	3.33	11.1
77-47-4	Hexachlorocyclopentadiene	U	3.33	ug/L	3.33	11.1
67-72-1	Hexachloroethane	U	3.33	ug/L	3.33	11.1
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.333	ug/L	0.333	1.11
78-59-1	Isophorone	U	3.89	ug/L	3.89	11.1
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.33	ug/L	3.33	11.1
924-16-3	N-Nitrosodi-n-butylamine	U	3.33	ug/L	3.33	11.1
55-18-5	N-Nitrosodiethylamine	U	3.33	ug/L	3.33	11.1
621-64-7	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*	U	3.33	ug/L	3.33	11.1
930-55-2	N-Nitrosopyrrolidine	U	3.33	ug/L	3.33	11.1
91-20-3	Naphthalene	U	0.333	ug/L	0.333	1.11
98-95-3	Nitrobenzene	U	3.33	ug/L	3.33	11.1
608-93-5	Pentachlorobenzene	U	3.33	ug/L	3.33	11.1
87-86-5	Pentachlorophenol	U	3.33	ug/L	3.33	11.1
85-01-8	Phenanthrene	U	0.333	ug/L	0.333	1.11
108-95-2	Phenol	U	3.33	ug/L	3.33	11.1
129-00-0	Pyrene	U	0.333	ug/L	0.333	1.11
110-86-1	Pyridine	U	3.33	ug/L	3.33	11.1
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.33	ug/L	3.33	11.1
111-91-1	bis(2-Chloroethoxy)methane	U	3.33	ug/L	3.33	11.1
111-44-4	bis(2-Chloroethyl) ether	U	3.33	ug/L	3.33	11.1
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.33	ug/L	3.33	11.1

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/27/2017 11:30**	**Matrix:**	**W**
Lab Sample ID:	**436615005**	**Date Received:**	**10/31/2017 08:55**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAPA-18-147593**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 18:47**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**900 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0220.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	4.11	ug/L	4.11	11.1
99-09-2	3-Nitroaniline *m-Nitroaniline*	U	3.33	ug/L	3.33	11.1
95-48-7	o-Cresol	U	3.33	ug/L	3.33	11.1
88-74-4	2-Nitroaniline *o-Nitroaniline*	U	3.33	ug/L	3.33	11.1
100-01-6	4-Nitroaniline *p-Nitroaniline*	U	3.33	ug/L	3.33	11.1

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	69.7	111	ug/L	63	(32%-124%)
2-Fluorobiphenyl	46.5	55.6	ug/L	84	(32%-112%)
2-Fluorophenol	46.1	111	ug/L	42	(15%-88%)
Nitrobenzene-d5	49.2	55.6	ug/L	89	(36%-115%)
Phenol-d5	32.3	111	ug/L	29	(15%-91%)
p-Terphenyl-d14	41.5	55.6	ug/L	75	(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: 2018-604

Matrix Type: LIQUID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203910073	MB for batch 1715003	46	31	87	75	64	70
1203910074	LCS for batch 1715003	50	32	82	74	72	84
1203910075	CAPA-18-147596MS	53	41	76	70	64	73
1203910076	CAPA-18-147596MSD	63	47	90	80	73	91
436615002	CAPA-18-147592	40	27	86	81	59	76
436615005	CAPA-18-147593	42	29	89	84	63	75

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: 2018-604
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1715003
Matrix: WATER
Lab Sample ID 1203910074
Instrument: MSD1.I
Analysis Date: 11/02/2017 13:06
Dilution: 1
Analyst: JLD1
Prep Batch ID: 1715003
Inj. Vol: 1 uL
Batch ID: 1715004

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	27.2	54	30-88
110-86-1	LCS	Pyridine	50.0	0.0	27.5	55	27-89
62-53-3	LCS	Aniline	50.0	0.0	38.3	77	49-112
108-95-2	LCS	Phenol	50.0	0.0	17.4	35	16-82
111-44-4	LCS	bis(2-Chloroethyl) ether	50.0	0.0	45.6	91	51-111
95-57-8	LCS	2-Chlorophenol	50.0	0.0	38.3	77	49-105
541-73-1	LCS	1,3-Dichlorobenzene	50.0	0.0	32.8	66	37-95
106-46-7	LCS	1,4-Dichlorobenzene	50.0	0.0	31.0	62	38-96
95-50-1	LCS	1,2-Dichlorobenzene	50.0	0.0	32.9	66	39-97
108-60-1	LCS	bis(2-Chloro-1-methylethyl)et	50.0	0.0	55.1	110	44-123
100-51-6	LCS	Benzyl alcohol	50.0	0.0	37.4	75	44-102
95-48-7	LCS	o-Cresol	50.0	0.0	36.1	72	41-101
65794-96-9	LCS	m,p-Cresols	50.0	0.0	35.6	71	43-102
621-64-7	LCS	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*	50.0	0.0	41.8	84	54-115
67-72-1	LCS	Hexachloroethane	50.0	0.0	28.9	58	36-96
98-95-3	LCS	Nitrobenzene	50.0	0.0	45.1	90	53-115
78-59-1	LCS	Isophorone	50.0	0.0	41.0	82	56-117
88-75-5	LCS	2-Nitrophenol	50.0	0.0	42.5	85	51-113
105-67-9	LCS	2,4-Dimethylphenol	50.0	0.0	34.6	69	51-104
111-91-1	LCS	bis(2-Chloroethoxy)methane	50.0	0.0	43.4	87	55-114
120-83-2	LCS	2,4-Dichlorophenol	50.0	0.0	40.3	81	53-109
65-85-0	LCS	Benzoic acid	100	0.0	29.9	30	21-74

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1715003
Matrix: WATER
Lab Sample ID 1203910074
Instrument: MSD1.I
Analysis Date: 11/02/2017 13:06
Dilution: 1
Analyst: JLD1
Prep Batch ID: 1715003
Inj. Vol: 1 uL
Batch ID: 1715004

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	44.5	89	65-136
87-68-3	LCS	Hexachlorobutadiene	50.0	0.0	25.5	51	35-98
59-50-7	LCS	Parachlorometa cresol *4-Chloro-3-methylphenol*	50.0	0.0	41.8	84	55-115
91-57-6	LCS	2-Methylnaphthalene	50.0	0.0	35.5	71	42-103
91-20-3	LCS	Naphthalene	50.0	0.0	35.5	71	44-102
90-12-0	LCS	1-Methylnaphthalene	50.0	0.0	35.6	71	45-108
77-47-4	LCS	Hexachlorocyclopentadiene	50.0	0.0	23.3	47	34-89
88-06-2	LCS	2,4,6-Trichlorophenol	50.0	0.0	39.5	79	55-120
95-95-4	LCS	2,4,5-Trichlorophenol	50.0	0.0	39.8	80	55-116
91-58-7	LCS	2-Chloronaphthalene	50.0	0.0	33.9	68	44-107
88-74-4	LCS	2-Nitroaniline *o-Nitroaniline*	50.0	0.0	48.4	97	53-121
99-09-2	LCS	3-Nitroaniline *m-Nitroaniline*	50.0	0.0	47.6	95	61-139
131-11-3	LCS	Dimethylphthalate	50.0	0.0	43.7	87	60-122
606-20-2	LCS	2,6-Dinitrotoluene	50.0	0.0	42.0	84	59-122
121-14-2	LCS	2,4-Dinitrotoluene	50.0	0.0	43.4	87	57-124
208-96-8	LCS	Acenaphthylene	50.0	0.0	40.3	81	50-113
83-32-9	LCS	Acenaphthene	50.0	0.0	39.8	80	49-112
51-28-5	LCS	2,4-Dinitrophenol	50.0	0.0	32.9	66	34-122
132-64-9	LCS	Dibenzofuran	50.0	0.0	39.7	79	50-111
58-90-2	LCS	2,3,4,6-Tetrachlorophenol	50.0	0.0	40.0	80	54-122
84-66-2	LCS	Diethylphthalate	50.0	0.0	41.3	83	57-122
100-02-7	LCS	4-Nitrophenol	50.0	0.0	14.7	29	15-137

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Sample Type: Laboratory Control Sample
Client ID: LCS for batch 1715003
Matrix: WATER
Lab Sample ID 1203910074
Instrument: MSD1.I
Analysis Date: 11/02/2017 13:06
Dilution: 1
Analyst: JLD1
Prep Batch ID: 1715003
Inj. Vol: 1 uL
Batch ID: 1715004

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	37.7	75	52-114
7005-72-3	LCS	4-Chlorophenylphenylether	50.0	0.0	38.7	77	52-121
100-01-6	LCS	4-Nitroaniline *p-Nitroaniline*	50.0	0.0	38.7	77	44-137
534-52-1	LCS	2-Methyl-4,6-dinitrophenol	50.0	0.0	36.4	73	45-124
122-39-4	LCS	Diphenylamine	50.0	0.0	38.1	76	55-113
122-66-7	LCS	Azobenzene *1,2-Diphenylhydrazine*	50.0	0.0	45.8	92	53-115
101-55-3	LCS	4-Bromophenylphenylether	50.0	0.0	41.3	83	54-116
118-74-1	LCS	Hexachlorobenzene	50.0	0.0	40.8	82	54-115
87-86-5	LCS	Pentachlorophenol	50.0	0.0	34.1	68	41-116
85-01-8	LCS	Phenanthrene	50.0	0.0	39.9	80	55-110
120-12-7	LCS	Anthracene	50.0	0.0	39.6	79	56-112
84-74-2	LCS	Di-n-butylphthalate	50.0	0.0	43.0	86	57-123
206-44-0	LCS	Fluoranthene	50.0	0.0	44.1	88	54-118
129-00-0	LCS	Pyrene	50.0	0.0	41.8	84	49-121
85-68-7	LCS	Butylbenzylphthalate	50.0	0.0	43.3	87	52-125
117-81-7	LCS	bis(2-Ethylhexyl)phthalate	50.0	0.0	39.8	80	52-125
56-55-3	LCS	Benzo(a)anthracene	50.0	0.0	43.0	86	57-112
218-01-9	LCS	Chrysene	50.0	0.0	41.8	84	58-117
117-84-0	LCS	Di-n-octylphthalate	50.0	0.0	38.0	76	50-129
205-99-2	LCS	Benzo(b)fluoranthene	50.0	0.0	41.0	82	41-118
207-08-9	LCS	Benzo(k)fluoranthene	50.0	0.0	40.8	82	42-121
50-32-8	LCS	Benzo(a)pyrene	50.0	0.0	41.9	84	40-118

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Client ID: LCS for batch 1715003
Lab Sample ID 1203910074
Instrument: MSD1.I
Analvst: JLD1
Inj. Vol: 1 uL

Sample Type: Laboratory Control Sample
Matrix: WATER
Analvsis Date: 11/02/2017 13:06
Dilution: 1
Prep Batch ID: 1715003
Batch ID: 1715004

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	49.1	98	34-125
53-70-3	LCS	Dibenzo(a,h)anthracene	50.0	0.0	48.6	97	38-129
191-24-2	LCS	Benzo(ghi)perylene	50.0	0.0	50.7	101	33-131
123-91-1	LCS	1,4-Dioxane	50.0	0.0	29.4	59	38-78
930-55-2	LCS	N-Nitrosopyrrolidine	50.0	0.0	41.3	83	54-113
95-94-3	LCS	1,2,4,5-Tetrachlorobenzene	50.0	0.0	33.8	68	44-102
1912-24-9	LCS	Atrazine	50.0	0.0	44.3	89	60-131
92-87-5	LCS	Benzidine	100	0.0	73.2	73	20-144
91-94-1	LCS	3,3'-Dichlorobenzidine	50.0	0.0	50.8	102	43-127
120-82-1	LCS	1,2,4-Trichlorobenzene	50.0	0.0	32.2	64	39-99

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Client ID: CAPA-18-147596MS
Lab Sample ID 1203910075
Instrument: MSD1.I
Analvst: JLD1
Inj. Vol: 1 uL

Sample Type: Matrix Spike
Matrix: W
Analvsis Date: 11/02/2017 14:08
Prep Batch ID: 1715003
Batch ID: 1715004
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	111	0.00	U	72.1	65	25-106
110-86-1	MS	Pyridine	111	0.00	U	63.6	57	24-93
62-53-3	MS	Aniline	111	0.00	U	82.2	74	37-113
108-95-2	MS	Phenol	111	0.00	U	49.8	45	23-82
111-44-4	MS	bis(2-Chloroethyl) ether	111	0.00	U	94.4	85	39-114
95-57-8	MS	2-Chlorophenol	111	0.00	U	78.8	71	37-108
541-73-1	MS	1,3-Dichlorobenzene	111	0.00	U	68.9	62	27-97
106-46-7	MS	1,4-Dichlorobenzene	111	0.00	U	67.8	61	28-97
95-50-1	MS	1,2-Dichlorobenzene	111	0.00	U	70.6	64	28-99
108-60-1	MS	bis(2-Chloro-1-methylethyl)et	111	0.00	U	115	104	32-127
100-51-6	MS	Benzyl alcohol	111	0.00	U	84.9	76	37-116
95-48-7	MS	o-Cresol	111	0.00	U	76.8	69	34-109
65794-96-9	MS	m,p-Cresols	111	0.00	U	79.6	72	36-120
621-64-7	MS	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*	111	0.00	U	86.7	78	42-118
67-72-1	MS	Hexachloroethane	111	0.00	U	64.6	58	29-94
98-95-3	MS	Nitrobenzene	111	0.00	U	92.6	83	38-123
78-59-1	MS	Isophorone	111	0.00	U	86.7	78	43-120
88-75-5	MS	2-Nitrophenol	111	0.00	U	88.6	80	39-115
105-67-9	MS	2,4-Dimethylphenol	111	0.00	U	71.2	64	39-107
111-91-1	MS	bis(2-Chloroethoxy)methane	111	0.00	U	92.1	83	42-118
120-83-2	MS	2,4-Dichlorophenol	111	0.00	U	80.5	72	40-111
65-85-0	MS	Benzoic acid	222	0.00	U	89.2	40	17-95

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Client ID: CAPA-18-147596MS
Lab Sample ID 1203910075
Instrument: MSD1.I
Analyst: JLD1
Inj. Vol: 1 uL

Sample Type: Matrix Spike
Matrix: W
Analysis Date: 11/02/2017 14:08
Prep Batch ID: 1715003
Batch ID: 1715004
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	111	0.00	U	89.2	80	44-138
87-68-3	MS	Hexachlorobutadiene	111	0.00	U	57.9	52	26-98
59-50-7	MS	Parachlorometa cresol *4-Chloro-3-methylphenol*	111	0.00	U	85.0	76	41-122
91-57-6	MS	2-Methylnaphthalene	111	0.00	U	75.4	68	29-109
91-20-3	MS	Naphthalene	111	0.00	U	76.3	69	31-108
90-12-0	MS	1-Methylnaphthalene	111	0.00	U	78.3	70	33-112
77-47-4	MS	Hexachlorocyclopentadiene	111	0.00	U	49.3	44	26-79
88-06-2	MS	2,4,6-Trichlorophenol	111	0.00	U	80.2	72	39-124
95-95-4	MS	2,4,5-Trichlorophenol	111	0.00	U	80.5	72	42-120
91-58-7	MS	2-Chloronaphthalene	111	0.00	U	72.8	65	29-113
88-74-4	MS	2-Nitroaniline *o-Nitroaniline*	111	0.00	U	96.4	87	41-121
99-09-2	MS	3-Nitroaniline *m-Nitroaniline*	111	0.00	U	96.0	86	42-144
131-11-3	MS	Dimethylphthalate	111	0.00	U	89.7	81	45-128
606-20-2	MS	2,6-Dinitrotoluene	111	0.00	U	85.3	77	46-124
121-14-2	MS	2,4-Dinitrotoluene	111	0.00	U	84.1	76	45-125
208-96-8	MS	Acenaphthylene	111	0.00	U	83.9	76	35-120
83-32-9	MS	Acenaphthene	111	0.00	U	84.2	76	35-117
51-28-5	MS	2,4-Dinitrophenol	111	0.00	U	71.3	64	27-122
132-64-9	MS	Dibenzofuran	111	0.00	U	81.6	73	38-113
58-90-2	MS	2,3,4,6-Tetrachlorophenol	111	0.00	U	79.8	72	40-128
84-66-2	MS	Diethylphthalate	111	0.00	U	85.9	77	43-127
100-02-7	MS	4-Nitrophenol	111	0.00	U	43.7	39	17-85

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Client ID: CAPA-18-147596MS
Lab Sample ID 1203910075
Instrument: MSD1.I
Analyst: JLD1
Inj. Vol: 1 uL

Sample Type: Matrix Spike
Matrix: W
Analysis Date: 11/02/2017 14:08
Prep Batch ID: 1715003
Batch ID: 1715004
Dilution: 1

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS	Fluorene	111	0.00	U	77.5	70	39-117
7005-72-3	MS	4-Chlorophenylphenylether	111	0.00	U	81.7	74	39-121
100-01-6	MS	4-Nitroaniline *p-Nitroaniline*	111	0.00	U	73.5	66	30-133
534-52-1	MS	2-Methyl-4,6-dinitrophenol	111	0.00	U	72.3	65	32-126
122-39-4	MS	Diphenylamine	111	0.00	U	79.1	71	37-118
122-66-7	MS	Azobenzene *1,2-Diphenylhydrazine*	111	0.00	U	96.4	87	38-120
101-55-3	MS	4-Bromophenylphenylether	111	0.00	U	87.8	79	39-121
118-74-1	MS	Hexachlorobenzene	111	0.00	U	84.4	76	40-118
87-86-5	MS	Pentachlorophenol	111	0.00	U	69.7	63	35-121
85-01-8	MS	Phenanthrene	111	0.00	U	81.0	73	40-115
120-12-7	MS	Anthracene	111	0.00	U	80.7	73	38-120
84-74-2	MS	Di-n-butylphthalate	111	0.00	U	90.2	81	41-128
206-44-0	MS	Fluoranthene	111	0.00	U	86.9	78	41-119
129-00-0	MS	Pyrene	111	0.00	U	82.8	75	35-128
85-68-7	MS	Butylbenzylphthalate	111	0.00	U	87.4	79	40-129
117-81-7	MS	bis(2-Ethylhexyl)phthalate	111	0.00	U	80.3	72	38-131
56-55-3	MS	Benzo(a)anthracene	111	0.00	U	86.9	78	39-120
218-01-9	MS	Chrysene	111	0.00	U	86.2	78	41-124
117-84-0	MS	Di-n-octylphthalate	111	0.00	U	77.3	70	37-134
205-99-2	MS	Benzo(b)fluoranthene	111	0.00	U	83.0	75	31-122
207-08-9	MS	Benzo(k)fluoranthene	111	0.00	U	84.1	76	33-123
50-32-8	MS	Benzo(a)pyrene	111	0.00	U	86.1	77	32-118

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Client ID: CAPA-18-147596MS
Lab Sample ID 1203910075
Instrument: MSD1.I
Analyst: JLD1
Inj. Vol: 1 uL

Sample Type: Matrix Spike
Matrix: W
Analysis Date: 11/02/2017 14:08
Prep Batch ID: 1715003
Batch ID: 1715004
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	111	0.00	U	99.0	89	27-121
53-70-3	MS	Dibenzo(a,h)anthracene	111	0.00	U	100	90	30-125
191-24-2	MS	Benzo(ghi)perylene	111	0.00	U	104	94	24-126
123-91-1	MS	1,4-Dioxane	111	0.00	U	76.7	69	24-110
930-55-2	MS	N-Nitrosopyrrolidine	111	0.00	U	89.9	81	47-119
95-94-3	MS	1,2,4,5-Tetrachlorobenzene	111	0.00	U	76.2	69	32-101
1912-24-9	MS	Atrazine	111	0.00	U	91.8	83	42-129
92-87-5	MS	Benzidine	222	0.00	U	127	57	15-130
91-94-1	MS	3,3'-Dichlorobenzidine	111	0.00	U	104	94	34-124
120-82-1	MS	1,2,4-Trichlorobenzene	111	0.00	U	71.8	65	26-102

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Client ID: CAPA-18-147596MSD
Lab Sample ID 1203910076
Instrument: MSD1.I
Analvst: JLD1
Inj. Vol: 1 uL

Sample Type: Matrix Spike Duplicate
Matrix: W
Analvsis Date: 11/02/2017 14:39
Prep Batch ID: 1715003
Batch ID: 1715004
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	111	0.00	U	84.9	76	25-106	16	0-30
110-86-1	MSD	Pyridine	111	0.00	U	77.6	70	24-93	20	0-30
62-53-3	MSD	Aniline	111	0.00	U	93.7	84	37-113	13	0-30
108-95-2	MSD	Phenol	111	0.00	U	55.0	50	23-82	10	0-30
111-44-4	MSD	bis(2-Chloroethyl) ether	111	0.00	U	109	98	39-114	14	0-30
95-57-8	MSD	2-Chlorophenol	111	0.00	U	89.3	80	37-108	13	0-30
541-73-1	MSD	1,3-Dichlorobenzene	111	0.00	U	77.3	70	27-97	11	0-30
106-46-7	MSD	1,4-Dichlorobenzene	111	0.00	U	76.6	69	28-97	12	0-30
95-50-1	MSD	1,2-Dichlorobenzene	111	0.00	U	80.4	72	28-99	13	0-30
108-60-1	MSD	bis(2-Chloro-1-methylethyl)et	111	0.00	U	133	120	32-127	14	0-30
100-51-6	MSD	Benzyl alcohol	111	0.00	U	96.0	86	37-116	12	0-30
95-48-7	MSD	o-Cresol	111	0.00	U	87.4	79	34-109	13	0-30
65794-96-9	MSD	m,p-Cresols	111	0.00	U	87.8	79	36-120	10	0-30
621-64-7	MSD	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*	111	0.00	U	97.3	88	42-118	11	0-30
67-72-1	MSD	Hexachloroethane	111	0.00	U	71.0	64	29-94	9	0-30
98-95-3	MSD	Nitrobenzene	111	0.00	U	108	97	38-123	15	0-30
78-59-1	MSD	Isophorone	111	0.00	U	98.7	89	43-120	13	0-30
88-75-5	MSD	2-Nitrophenol	111	0.00	U	100	90	39-115	12	0-30
105-67-9	MSD	2,4-Dimethylphenol	111	0.00	U	80.6	73	39-107	12	0-30
111-91-1	MSD	bis(2-Chloroethoxy)methane	111	0.00	U	104	94	42-118	13	0-30
120-83-2	MSD	2,4-Dichlorophenol	111	0.00	U	91.3	82	40-111	13	0-30
65-85-0	MSD	Benzoic acid	222	0.00	U	91.3	41	17-95	2	0-30

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Client ID: CAPA-18-147596MSD
Lab Sample ID 1203910076
Instrument: MSD1.I
Analvst: JLD1
Inj. Vol: 1 uL

Sample Type: Matrix Spike Duplicate
Matrix: W
Analvsis Date: 11/02/2017 14:39
Prep Batch ID: 1715003
Batch ID: 1715004
Dilution: 1

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	111	0.00	U	100	90	44-138	12	0-30
87-68-3	MSD	Hexachlorobutadiene	111	0.00	U	63.3	57	26-98	9	0-30
59-50-7	MSD	Parachlorometa cresol *4-Chloro-3-methylphenol*	111	0.00	U	93.2	84	41-122	9	0-30
91-57-6	MSD	2-Methylnaphthalene	111	0.00	U	84.9	76	29-109	12	0-30
91-20-3	MSD	Naphthalene	111	0.00	U	86.1	77	31-108	12	0-30
90-12-0	MSD	1-Methylnaphthalene	111	0.00	U	88.4	80	33-112	12	0-30
77-47-4	MSD	Hexachlorocyclopentadiene	111	0.00	U	48.1	43	26-79	2	0-30
88-06-2	MSD	2,4,6-Trichlorophenol	111	0.00	U	90.2	81	39-124	12	0-30
95-95-4	MSD	2,4,5-Trichlorophenol	111	0.00	U	89.9	81	42-120	11	0-30
91-58-7	MSD	2-Chloronaphthalene	111	0.00	U	82.2	74	29-113	12	0-30
88-74-4	MSD	2-Nitroaniline *o-Nitroaniline*	111	0.00	U	106	95	41-121	9	0-30
99-09-2	MSD	3-Nitroaniline *m-Nitroaniline*	111	0.00	U	101	91	42-144	6	0-30
131-11-3	MSD	Dimethylphthalate	111	0.00	U	99.4	90	45-128	10	0-30
606-20-2	MSD	2,6-Dinitrotoluene	111	0.00	U	95.8	86	46-124	12	0-30
121-14-2	MSD	2,4-Dinitrotoluene	111	0.00	U	92.5	83	45-125	10	0-30
208-96-8	MSD	Acenaphthylene	111	0.00	U	93.6	84	35-120	11	0-30
83-32-9	MSD	Acenaphthene	111	0.00	U	95.2	86	35-117	12	0-30
51-28-5	MSD	2,4-Dinitrophenol	111	0.00	U	70.1	63	27-122	2	0-30
132-64-9	MSD	Dibenzofuran	111	0.00	U	89.8	81	38-113	10	0-30
58-90-2	MSD	2,3,4,6-Tetrachlorophenol	111	0.00	U	86.4	78	40-128	8	0-30
84-66-2	MSD	Diethylphthalate	111	0.00	U	95.1	86	43-127	10	0-30
100-02-7	MSD	4-Nitrophenol	111	0.00	U	46.2	42	17-85	6	0-30

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Sample Type: Matrix Spike Duplicate
Client ID: CAPA-18-147596MSD
Matrix: W
Lab Sample ID 1203910076
Instrument: MSD1.I
Analysis Date: 11/02/2017 14:39
Dilution: 1
Analyst: JLD1
Prep Batch ID: 1715003
Inj. Vol: 1 uL
Batch ID: 1715004

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	111	0.00	U	85.9	77	39-117	10	0-30
7005-72-3	MSD	4-Chlorophenylphenylether	111	0.00	U	90.3	81	39-121	10	0-30
100-01-6	MSD	4-Nitroaniline *p-Nitroaniline*	111	0.00	U	78.7	71	30-133	7	0-30
534-52-1	MSD	2-Methyl-4,6-dinitrophenol	111	0.00	U	79.2	71	32-126	9	0-30
122-39-4	MSD	Diphenylamine	111	0.00	U	89.3	80	37-118	12	0-30
122-66-7	MSD	Azobenzene *1,2-Diphenylhydrazine*	111	0.00	U	112	101	38-120	15	0-30
101-55-3	MSD	4-Bromophenylphenylether	111	0.00	U	103	93	39-121	16	0-30
118-74-1	MSD	Hexachlorobenzene	111	0.00	U	98.6	89	40-118	16	0-30
87-86-5	MSD	Pentachlorophenol	111	0.00	U	78.5	71	35-121	12	0-30
85-01-8	MSD	Phenanthrene	111	0.00	U	91.7	83	40-115	12	0-30
120-12-7	MSD	Anthracene	111	0.00	U	90.0	81	38-120	11	0-30
84-74-2	MSD	Di-n-butylphthalate	111	0.00	U	102	92	41-128	13	0-30
206-44-0	MSD	Fluoranthene	111	0.00	U	94.4	85	41-119	8	0-30
129-00-0	MSD	Pyrene	111	0.00	U	99.8	90	35-128	19	0-30
85-68-7	MSD	Butylbenzylphthalate	111	0.00	U	102	92	40-129	16	0-30
117-81-7	MSD	bis(2-Ethylhexyl)phthalate	111	0.00	U	94.0	85	38-131	16	0-30
56-55-3	MSD	Benzo(a)anthracene	111	0.00	U	96.9	87	39-120	11	0-30
218-01-9	MSD	Chrysene	111	0.00	U	96.6	87	41-124	11	0-30
117-84-0	MSD	Di-n-octylphthalate	111	0.00	U	86.9	78	37-134	12	0-30
205-99-2	MSD	Benzo(b)fluoranthene	111	0.00	U	92.8	84	31-122	11	0-30
207-08-9	MSD	Benzo(k)fluoranthene	111	0.00	U	94.0	85	33-123	11	0-30
50-32-8	MSD	Benzo(a)pyrene	111	0.00	U	93.3	84	32-118	8	0-30

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-604
Client ID: CAPA-18-147596MSD
Lab Sample ID 1203910076
Instrument: MSD1.I
Analvst: JLD1
Inj. Vol: 1 uL

Sample Type: Matrix Spike Duplicate
Matrix: W
Analvsis Date: 11/02/2017 14:39
Prep Batch ID: 1715003
Batch ID: 1715004
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	111	0.00	U	115	104	27-121	15	0-30
53-70-3	MSD Dibenzo(a,h)anthracene	111	0.00	U	114	103	30-125	13	0-30
191-24-2	MSD Benzo(ghi)perylene	111	0.00	U	121	109	24-126	15	0-30
123-91-1	MSD 1,4-Dioxane	111	0.00	U	88.5	80	24-110	14	0-30
930-55-2	MSD N-Nitrosopyrrolidine	111	0.00	U	97.3	88	47-119	8	0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	111	0.00	U	85.3	77	32-101	11	0-30
1912-24-9	MSD Atrazine	111	0.00	U	108	97	42-129	16	0-30
92-87-5	MSD Benzidine	222	0.00	U	134	60	15-130	6	0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	111	0.00	U	108	97	34-124	4	0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	111	0.00	U	79.8	72	26-102	11	0-30

Method Blank Summary

SDG Number:	**2018-604**	**Client:**	**ARSL004**	**Matrix:**	**WATER**
Client ID:	**MB for batch 1715003**	**Instrument ID:**	**MSD1.I**	**Data File:**	**s110217.B\s1h0208.D**
Lab Sample ID:	**1203910073**	**Prep Date:**	**11/02/2017 06:11**	**Analyzed:**	**11/02/17 12:35**
Column:	**25x.20x.33**				

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

	Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01	LCS for batch 1715003	1203910074	s110217.B\s1h0209.D	11/02/17	1306
02	CAPA-18-147596MS	1203910075	s110217.B\s1h0211.D	11/02/17	1408
03	CAPA-18-147596MSD	1203910076	s110217.B\s1h0212.D	11/02/17	1439
04	CAPA-18-147592	436615002	s110217.B\s1h0219.D	11/02/17	1816
05	CAPA-18-147593	436615005	s110217.B\s1h0220.D	11/02/17	1847

Quality Control Data

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910073**				
Client Sample:	**QC for batch 1715003**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1715003**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 12:35**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0208.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.00	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene	U	3.00	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
122-66-7	Azobenzene	U	3.00	ug/L	3.00	10.0
	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:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910073**				
Client Sample:	**QC for batch 1715003**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1715003**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 12:35**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0208.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.300	ug/L	0.300	1.00
65-85-0	Benzoic acid	U	6.00	ug/L	6.00	20.0
100-51-6	Benzyl alcohol	U	3.00	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate	U	3.00	ug/L	3.00	10.0
218-01-9	Chrysene	U	0.300	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate	U	3.00	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate	U	3.00	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene	U	0.300	ug/L	0.300	1.00
132-64-9	Dibenzofuran	U	3.00	ug/L	3.00	10.0
84-66-2	Diethylphthalate	U	3.00	ug/L	3.00	10.0
131-11-3	Dimethylphthalate	U	3.00	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine	U	3.00	ug/L	3.00	10.0
206-44-0	Fluoranthene	U	0.300	ug/L	0.300	1.00
86-73-7	Fluorene	U	0.300	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene	U	3.00	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene	U	3.00	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene	U	3.00	ug/L	3.00	10.0
67-72-1	Hexachloroethane	U	3.00	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.300	ug/L	0.300	1.00
78-59-1	Isophorone	U	3.50	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.00	ug/L	3.00	10.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.00	ug/L	3.00	10.0
55-18-5	N-Nitrosodiethylamine	U	3.00	ug/L	3.00	10.0
621-64-7	N-Nitrosodi--n-propylamine *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:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910073**				
Client Sample:	**QC for batch 1715003**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1715003**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 12:35**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0208.D**	**Column:**	**25x.20x.33**		

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	64.5	100	ug/L	64	(32%-124%)
2-Fluorobiphenyl	37.6	50.0	ug/L	75	(32%-112%)
2-Fluorophenol	45.5	100	ug/L	46	(15%-88%)
Nitrobenzene-d5	43.3	50.0	ug/L	87	(36%-115%)
Phenol-d5	31.1	100	ug/L	31	(15%-91%)
p-Terphenyl-d14	35.2	50.0	ug/L	70	(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:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910074**				
Client Sample:	**QC for batch 1715003**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1715003**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 13:06**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0209.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		33.8	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		32.2	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		32.9	ug/L	3.00	10.0
122-66-7	Azobenzene		45.8	ug/L	3.00	10.0
	1,2-Diphenylhydrazine					
541-73-1	1,3-Dichlorobenzene		32.8	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		31.0	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		29.4	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		35.6	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		40.0	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		39.8	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		39.5	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		40.3	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		34.6	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		32.9	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		43.4	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		42.0	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		33.9	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		38.3	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		36.4	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		35.5	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		42.5	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		50.8	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		41.3	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		41.8	ug/L	3.00	10.0
	4-Chloro-3-methylphenol					
106-47-8	4-Chloroaniline		44.5	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		38.7	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		14.7	ug/L	3.00	10.0
83-32-9	Acenaphthene		39.8	ug/L	0.300	1.00
208-96-8	Acenaphthylene		40.3	ug/L	0.300	1.00
62-53-3	Aniline		38.3	ug/L	4.20	10.0
120-12-7	Anthracene		39.6	ug/L	0.300	1.00
1912-24-9	Atrazine		44.3	ug/L	3.00	10.0
92-87-5	Benzidine		73.2	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		43.0	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		41.9	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		41.0	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		50.7	ug/L	0.300	1.00

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910074**				
Client Sample:	**QC for batch 1715003**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1715003**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 13:06**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0209.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		40.8	ug/L	0.300	1.00
65-85-0	Benzoic acid		29.9	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		37.4	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		43.3	ug/L	3.00	10.0
218-01-9	Chrysene		41.8	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		43.0	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		38.0	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		48.6	ug/L	0.300	1.00
132-64-9	Dibenzofuran		39.7	ug/L	3.00	10.0
84-66-2	Diethylphthalate		41.3	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		43.7	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		38.1	ug/L	3.00	10.0
206-44-0	Fluoranthene		44.1	ug/L	0.300	1.00
86-73-7	Fluorene		37.7	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		40.8	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		25.5	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		23.3	ug/L	3.00	10.0
67-72-1	Hexachloroethane		28.9	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		49.1	ug/L	0.300	1.00
78-59-1	Isophorone		41.0	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		27.2	ug/L	3.00	10.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.00	ug/L	3.00	10.0
55-18-5	N-Nitrosodiethylamine	U	3.00	ug/L	3.00	10.0
621-64-7	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*		41.8	ug/L	3.00	10.0
930-55-2	N-Nitrosopyrrolidine		41.3	ug/L	3.00	10.0
91-20-3	Naphthalene		35.5	ug/L	0.300	1.00
98-95-3	Nitrobenzene		45.1	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		34.1	ug/L	3.00	10.0
85-01-8	Phenanthrene		39.9	ug/L	0.300	1.00
108-95-2	Phenol		17.4	ug/L	3.00	10.0
129-00-0	Pyrene		41.8	ug/L	0.300	1.00
110-86-1	Pyridine		27.5	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		55.1	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		43.4	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		45.6	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		39.8	ug/L	3.00	10.0

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**			**Matrix:**	**WATER**
Lab Sample ID:	**1203910074**				
Client Sample:	**QC for batch 1715003**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1715003**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 13:06**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0209.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		35.6	ug/L	3.70	10.0
99-09-2	3-Nitroaniline *m-Nitroaniline*		47.6	ug/L	3.00	10.0
95-48-7	o-Cresol		36.1	ug/L	3.00	10.0
88-74-4	2-Nitroaniline *o-Nitroaniline*		48.4	ug/L	3.00	10.0
100-01-6	4-Nitroaniline *p-Nitroaniline*		38.7	ug/L	3.00	10.0

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	71.8	100	ug/L	72	(32%-124%)
2-Fluorobiphenyl	37.1	50.0	ug/L	74	(32%-112%)
2-Fluorophenol	50.1	100	ug/L	50	(15%-88%)
Nitrobenzene-d5	41.1	50.0	ug/L	82	(36%-115%)
Phenol-d5	32.0	100	ug/L	32	(15%-91%)
p-Terphenyl-d14	41.9	50.0	ug/L	84	(36%-121%)

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203910075**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1715003**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596MS**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 14:08**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**450 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0211.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		76.2	ug/L	6.67	22.2
120-82-1	1,2,4-Trichlorobenzene		71.8	ug/L	6.67	22.2
95-50-1	1,2-Dichlorobenzene		70.6	ug/L	6.67	22.2
122-66-7	Azobenzene		96.4	ug/L	6.67	22.2
	1,2-Diphenylhydrazine					
541-73-1	1,3-Dichlorobenzene		68.9	ug/L	6.67	22.2
106-46-7	1,4-Dichlorobenzene		67.8	ug/L	6.67	22.2
123-91-1	1,4-Dioxane		76.7	ug/L	6.67	22.2
90-12-0	1-Methylnaphthalene		78.3	ug/L	0.667	2.22
58-90-2	2,3,4,6-Tetrachlorophenol		79.8	ug/L	6.67	22.2
95-95-4	2,4,5-Trichlorophenol		80.5	ug/L	6.67	22.2
88-06-2	2,4,6-Trichlorophenol		80.2	ug/L	6.67	22.2
120-83-2	2,4-Dichlorophenol		80.5	ug/L	6.67	22.2
105-67-9	2,4-Dimethylphenol		71.2	ug/L	6.67	22.2
51-28-5	2,4-Dinitrophenol		71.3	ug/L	11.1	44.4
121-14-2	2,4-Dinitrotoluene		84.1	ug/L	6.67	22.2
606-20-2	2,6-Dinitrotoluene		85.3	ug/L	6.67	22.2
91-58-7	2-Chloronaphthalene		72.8	ug/L	0.911	2.22
95-57-8	2-Chlorophenol		78.8	ug/L	6.67	22.2
534-52-1	2-Methyl-4,6-dinitrophenol		72.3	ug/L	6.67	22.2
91-57-6	2-Methylnaphthalene		75.4	ug/L	0.667	2.22
88-75-5	2-Nitrophenol		88.6	ug/L	6.67	22.2
91-94-1	3,3'-Dichlorobenzidine		104	ug/L	6.67	22.2
101-55-3	4-Bromophenylphenylether		87.8	ug/L	6.67	22.2
59-50-7	Parachlorometa cresol		85.0	ug/L	6.67	22.2
	4-Chloro-3-methylphenol					
106-47-8	4-Chloroaniline		89.2	ug/L	7.33	22.2
7005-72-3	4-Chlorophenylphenylether		81.7	ug/L	6.67	22.2
100-02-7	4-Nitrophenol		43.7	ug/L	6.67	22.2
83-32-9	Acenaphthene		84.2	ug/L	0.667	2.22
208-96-8	Acenaphthylene		83.9	ug/L	0.667	2.22
62-53-3	Aniline		82.2	ug/L	9.33	22.2
120-12-7	Anthracene		80.7	ug/L	0.667	2.22
1912-24-9	Atrazine		91.8	ug/L	6.67	22.2
92-87-5	Benzidine		127	ug/L	8.67	22.2
56-55-3	Benzo(a)anthracene		86.9	ug/L	0.667	2.22
50-32-8	Benzo(a)pyrene		86.1	ug/L	0.667	2.22
205-99-2	Benzo(b)fluoranthene		83.0	ug/L	0.667	2.22
191-24-2	Benzo(ghi)perylene		104	ug/L	0.667	2.22

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203910075**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1715003**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596MS**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 14:08**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**450 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0211.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		84.1	ug/L	0.667	2.22
65-85-0	Benzoic acid		89.2	ug/L	13.3	44.4
100-51-6	Benzyl alcohol		84.9	ug/L	6.67	22.2
85-68-7	Butylbenzylphthalate		87.4	ug/L	6.67	22.2
218-01-9	Chrysene		86.2	ug/L	0.667	2.22
84-74-2	Di-n-butylphthalate		90.2	ug/L	6.67	22.2
117-84-0	Di-n-octylphthalate		77.3	ug/L	6.67	22.2
53-70-3	Dibenzo(a,h)anthracene		100	ug/L	0.667	2.22
132-64-9	Dibenzofuran		81.6	ug/L	6.67	22.2
84-66-2	Diethylphthalate		85.9	ug/L	6.67	22.2
131-11-3	Dimethylphthalate		89.7	ug/L	6.67	22.2
88-85-7	Dinoseb	U	6.67	ug/L	6.67	22.2
122-39-4	Diphenylamine		79.1	ug/L	6.67	22.2
206-44-0	Fluoranthene		86.9	ug/L	0.667	2.22
86-73-7	Fluorene		77.5	ug/L	0.667	2.22
118-74-1	Hexachlorobenzene		84.4	ug/L	6.67	22.2
87-68-3	Hexachlorobutadiene		57.9	ug/L	6.67	22.2
77-47-4	Hexachlorocyclopentadiene		49.3	ug/L	6.67	22.2
67-72-1	Hexachloroethane		64.6	ug/L	6.67	22.2
193-39-5	Indeno(1,2,3-cd)pyrene		99.0	ug/L	0.667	2.22
78-59-1	Isophorone		86.7	ug/L	7.78	22.2
62-75-9	N-Methyl-N-nitrosomethylamine		72.1	ug/L	6.67	22.2
924-16-3	N-Nitrosodi-n-butylamine	U	6.67	ug/L	6.67	22.2
55-18-5	N-Nitrosodiethylamine	U	6.67	ug/L	6.67	22.2
621-64-7	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*		86.7	ug/L	6.67	22.2
930-55-2	N-Nitrosopyrrolidine		89.9	ug/L	6.67	22.2
91-20-3	Naphthalene		76.3	ug/L	0.667	2.22
98-95-3	Nitrobenzene		92.6	ug/L	6.67	22.2
608-93-5	Pentachlorobenzene	U	6.67	ug/L	6.67	22.2
87-86-5	Pentachlorophenol		69.7	ug/L	6.67	22.2
85-01-8	Phenanthrene		81.0	ug/L	0.667	2.22
108-95-2	Phenol		49.8	ug/L	6.67	22.2
129-00-0	Pyrene		82.8	ug/L	0.667	2.22
110-86-1	Pyridine		63.6	ug/L	6.67	22.2
108-60-1	bis(2-Chloro-1-methylethyl)ether		115	ug/L	6.67	22.2
111-91-1	bis(2-Chloroethoxy)methane		92.1	ug/L	6.67	22.2
111-44-4	bis(2-Chloroethyl) ether		94.4	ug/L	6.67	22.2
117-81-7	bis(2-Ethylhexyl)phthalate		80.3	ug/L	6.67	22.2

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203910075**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1715003**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596MS**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 14:08**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**450 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0211.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		79.6	ug/L	8.22	22.2
99-09-2	3-Nitroaniline *m-Nitroaniline*		96.0	ug/L	6.67	22.2
95-48-7	o-Cresol		76.8	ug/L	6.67	22.2
88-74-4	2-Nitroaniline *o-Nitroaniline*		96.4	ug/L	6.67	22.2
100-01-6	4-Nitroaniline *p-Nitroaniline*		73.5	ug/L	6.67	22.2

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	143	222	ug/L	64	(32%-124%)
2-Fluorobiphenyl	77.3	111	ug/L	70	(32%-112%)
2-Fluorophenol	118	222	ug/L	53	(15%-88%)
Nitrobenzene-d5	84.2	111	ug/L	76	(36%-115%)
Phenol-d5	91.3	222	ug/L	41	(15%-91%)
p-Terphenyl-d14	81.4	111	ug/L	73	(36%-121%)

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203910076**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1715003**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596MSD**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 14:39**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**450 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0212.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		85.3	ug/L	6.67	22.2
120-82-1	1,2,4-Trichlorobenzene		79.8	ug/L	6.67	22.2
95-50-1	1,2-Dichlorobenzene		80.4	ug/L	6.67	22.2
122-66-7	Azobenzene		112	ug/L	6.67	22.2
	1,2-Diphenylhydrazine					
541-73-1	1,3-Dichlorobenzene		77.3	ug/L	6.67	22.2
106-46-7	1,4-Dichlorobenzene		76.6	ug/L	6.67	22.2
123-91-1	1,4-Dioxane		88.5	ug/L	6.67	22.2
90-12-0	1-Methylnaphthalene		88.4	ug/L	0.667	2.22
58-90-2	2,3,4,6-Tetrachlorophenol		86.4	ug/L	6.67	22.2
95-95-4	2,4,5-Trichlorophenol		89.9	ug/L	6.67	22.2
88-06-2	2,4,6-Trichlorophenol		90.2	ug/L	6.67	22.2
120-83-2	2,4-Dichlorophenol		91.3	ug/L	6.67	22.2
105-67-9	2,4-Dimethylphenol		80.6	ug/L	6.67	22.2
51-28-5	2,4-Dinitrophenol		70.1	ug/L	11.1	44.4
121-14-2	2,4-Dinitrotoluene		92.5	ug/L	6.67	22.2
606-20-2	2,6-Dinitrotoluene		95.8	ug/L	6.67	22.2
91-58-7	2-Chloronaphthalene		82.2	ug/L	0.911	2.22
95-57-8	2-Chlorophenol		89.3	ug/L	6.67	22.2
534-52-1	2-Methyl-4,6-dinitrophenol		79.2	ug/L	6.67	22.2
91-57-6	2-Methylnaphthalene		84.9	ug/L	0.667	2.22
88-75-5	2-Nitrophenol		100	ug/L	6.67	22.2
91-94-1	3,3'-Dichlorobenzidine		108	ug/L	6.67	22.2
101-55-3	4-Bromophenylphenylether		103	ug/L	6.67	22.2
59-50-7	Parachlorometa cresol		93.2	ug/L	6.67	22.2
	4-Chloro-3-methylphenol					
106-47-8	4-Chloroaniline		100	ug/L	7.33	22.2
7005-72-3	4-Chlorophenylphenylether		90.3	ug/L	6.67	22.2
100-02-7	4-Nitrophenol		46.2	ug/L	6.67	22.2
83-32-9	Acenaphthene		95.2	ug/L	0.667	2.22
208-96-8	Acenaphthylene		93.6	ug/L	0.667	2.22
62-53-3	Aniline		93.7	ug/L	9.33	22.2
120-12-7	Anthracene		90.0	ug/L	0.667	2.22
1912-24-9	Atrazine		108	ug/L	6.67	22.2
92-87-5	Benzidine		134	ug/L	8.67	22.2
56-55-3	Benzo(a)anthracene		96.9	ug/L	0.667	2.22
50-32-8	Benzo(a)pyrene		93.3	ug/L	0.667	2.22
205-99-2	Benzo(b)fluoranthene		92.8	ug/L	0.667	2.22
191-24-2	Benzo(ghi)perylene		121	ug/L	0.667	2.22

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203910076**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1715003**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596MSD**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 14:39**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**450 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0212.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		94.0	ug/L	0.667	2.22
65-85-0	Benzoic acid		91.3	ug/L	13.3	44.4
100-51-6	Benzyl alcohol		96.0	ug/L	6.67	22.2
85-68-7	Butylbenzylphthalate		102	ug/L	6.67	22.2
218-01-9	Chrysene		96.6	ug/L	0.667	2.22
84-74-2	Di-n-butylphthalate		102	ug/L	6.67	22.2
117-84-0	Di-n-octylphthalate		86.9	ug/L	6.67	22.2
53-70-3	Dibenzo(a,h)anthracene		114	ug/L	0.667	2.22
132-64-9	Dibenzofuran		89.8	ug/L	6.67	22.2
84-66-2	Diethylphthalate		95.1	ug/L	6.67	22.2
131-11-3	Dimethylphthalate		99.4	ug/L	6.67	22.2
88-85-7	Dinoseb	U	6.67	ug/L	6.67	22.2
122-39-4	Diphenylamine		89.3	ug/L	6.67	22.2
206-44-0	Fluoranthene		94.4	ug/L	0.667	2.22
86-73-7	Fluorene		85.9	ug/L	0.667	2.22
118-74-1	Hexachlorobenzene		98.6	ug/L	6.67	22.2
87-68-3	Hexachlorobutadiene		63.3	ug/L	6.67	22.2
77-47-4	Hexachlorocyclopentadiene		48.1	ug/L	6.67	22.2
67-72-1	Hexachloroethane		71.0	ug/L	6.67	22.2
193-39-5	Indeno(1,2,3-cd)pyrene		115	ug/L	0.667	2.22
78-59-1	Isophorone		98.7	ug/L	7.78	22.2
62-75-9	N-Methyl-N-nitrosomethylamine		84.9	ug/L	6.67	22.2
924-16-3	N-Nitrosodi-n-butylamine	U	6.67	ug/L	6.67	22.2
55-18-5	N-Nitrosodiethylamine	U	6.67	ug/L	6.67	22.2
621-64-7	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*		97.3	ug/L	6.67	22.2
930-55-2	N-Nitrosopyrrolidine		97.3	ug/L	6.67	22.2
91-20-3	Naphthalene		86.1	ug/L	0.667	2.22
98-95-3	Nitrobenzene		108	ug/L	6.67	22.2
608-93-5	Pentachlorobenzene	U	6.67	ug/L	6.67	22.2
87-86-5	Pentachlorophenol		78.5	ug/L	6.67	22.2
85-01-8	Phenanthrene		91.7	ug/L	0.667	2.22
108-95-2	Phenol		55.0	ug/L	6.67	22.2
129-00-0	Pyrene		99.8	ug/L	0.667	2.22
110-86-1	Pyridine		77.6	ug/L	6.67	22.2
108-60-1	bis(2-Chloro-1-methylethyl)ether		133	ug/L	6.67	22.2
111-91-1	bis(2-Chloroethoxy)methane		104	ug/L	6.67	22.2
111-44-4	bis(2-Chloroethyl) ether		109	ug/L	6.67	22.2
117-81-7	bis(2-Ethylhexyl)phthalate		94.0	ug/L	6.67	22.2

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-604**	**Date Collected:**	**10/26/2017 10:38**	**Matrix:**	**W**
Lab Sample ID:	**1203910076**	**Date Received:**	**10/28/2017 08:50**		
Client Sample:	**QC for batch 1715003**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAPA-18-147596MSD**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1715004**	**Inst:**	**MSD1.I**	**Dilution:**	**1**
Run Date:	**11/02/2017 14:39**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**11/02/2017 06:11**	**Aliquot:**	**450 mL**	**Final Volume:**	**1 mL**
Data File:	**s110217.B\s1h0212.D**	**Column:**	**25x.20x.33**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		87.8	ug/L	8.22	22.2
99-09-2	3-Nitroaniline *m-Nitroaniline*		101	ug/L	6.67	22.2
95-48-7	o-Cresol		87.4	ug/L	6.67	22.2
88-74-4	2-Nitroaniline *o-Nitroaniline*		106	ug/L	6.67	22.2
100-01-6	4-Nitroaniline *p-Nitroaniline*		78.7	ug/L	6.67	22.2

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	161	222	ug/L	73	(32%-124%)
2-Fluorobiphenyl	88.7	111	ug/L	80	(32%-112%)
2-Fluorophenol	141	222	ug/L	63	(15%-88%)
Nitrobenzene-d5	99.9	111	ug/L	90	(36%-115%)
Phenol-d5	105	222	ug/L	47	(15%-91%)
p-Terphenyl-d14	101	111	ug/L	91	(36%-121%)

Perchlorates by LCMSMS Analysis

Case Narrative

Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-604
Work Order #: 436615

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
436615001	436615001 (CAPA-18-147566)
436615004	436615004 (CAPA-18-147567)
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: 2018-604 GEL Work Order: 436615

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-18-147566

Date Received: 31-OCT-17

GEL Job No (SDG): 2018-604

GEL Sample ID: 436615001

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	0.278	ug/L		1	03-NOV-17 21:29	per1103032a
	Perchlorate Isotope Ratio			2.86			1	03-NOV-17 21:29	per1103032a
14797-73-0	Perchlorate-101	.05	.2	0.295	ug/L		1	03-NOV-17 21:29	per1103032a
	Perchlorate-O(18)			0.340	ug/L		1	03-NOV-17 21:29	per1103032a

^ 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-18-147567

Date Received: 31-OCT-17

GEL Job No (SDG): 2018-604

GEL Sample ID: 436615004

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	0.290	ug/L		1	03-NOV-17 21:39	per1103033a
	Perchlorate Isotope Ratio			3.03			1	03-NOV-17 21:39	per1103033a
14797-73-0	Perchlorate-101	.05	.2	0.290	ug/L		1	03-NOV-17 21:39	per1103033a
	Perchlorate-O(18)			0.334	ug/L		1	03-NOV-17 21:39	per1103033a

^ 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 $\frac{1}{\%\text{Solids}}$

Quality Control Summary

Perchlorate Laboratory Control Sample

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No. (SDG): 2018-604

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): 2018-604

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): 2018-604

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): 2018-604

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 = 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.
ICS

Date Received:

GEL Job No (SDG): 2018-604

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): 2018-604

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): 2018-604

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 #: 2018-604
Work Order #: 436615

Sample ID	Client ID
436615001	CAPA-18-147566
436615002	CAPA-18-147592
436615004	CAPA-18-147567
436615005	CAPA-18-147593
1203908911	Method Blank (MB)**ICP**
1203908912	Laboratory Control Sample (LCS)
1203908915	436615001(CAPA-18-147566L) Serial Dilution (SD)
1203908913	436615001(CAPA-18-147566D) Sample Duplicate (DUP)
1203908914	436615001(CAPA-18-147566S) Matrix Spike (MS)
1203908951	Method Blank (MB)**ICP-MS**
1203908952	Laboratory Control Sample (LCS)
1203908955	436615001(CAPA-18-147566L) Serial Dilution (SD)
1203908953	436615001(CAPA-18-147566D) Sample Duplicate (DUP)
1203908954	436615001(CAPA-18-147566S) Matrix Spike (MS)
1203920275	Method Blank (MB)**CVAA**
1203920276	Laboratory Control Sample (LCS)
1203920282	436615001(CAPA-18-147566L) Serial Dilution (SD)
1203920278	436615001(CAPA-18-147566D) Sample Duplicate (DUP)
1203920280	436615001(CAPA-18-147566S) Matrix Spike (MS)

Sample Analysis

Samples 436615001,002,004 and 005 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1714505, 1714517, 1719070 and 1721823
Prep Batch :	1714502, 1714516 and 1719065
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 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 PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 436615001 (CAPA-18-147566) and 436615004 (CAPA-18-147567)-ICP.

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

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

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

Quality Control (QC) Information

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

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

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

Quality Control (QC) Sample Statement
The following samples were selected as the quality control (QC) samples for this SDG: 436615001 (CAPA-18-147566)-ICP, ICP-MS and CVAA.

Matrix Spike (MS/MSD) Recovery Statement
The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike met the recommended quality

control acceptance criteria for percent recoveries for all applicable analytes.

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

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

Technical Information

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

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

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

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

Miscellaneous Information

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

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

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: 2018-604 GEL Work Order: 436615

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: Nik-Cole A. Elmore **Name: Nik-Cole Elmore**

Date: 27 NOV 2017 **Title: Data Validator**

Sample Data Summary

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−604 **CONTRACT:** ESHL00114 **METHOD TYPE:** EPA

SAMPLE ID: 436615001 **BASIS:** As Received **DATE COLLECTED** 27−OCT−17

CLIENT ID: CAPA−18−147566 **LEVEL:** Low **DATE RECEIVED** 31−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	11/16/17 11:53	111617W4−4	1719070

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−604 **CONTRACT:** ESHL00114 **METHOD TYPE:** SW846

SAMPLE ID: 436615001 **BASIS:** As Received **DATE COLLECTED** 27−OCT−17

CLIENT ID: CAPA−18−147566 **LEVEL:** Low **DATE RECEIVED** 31−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	JWJ	11/24/17 18:57	112417A−1	1714505
7440−36−0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	11/02/17 08:01	171101−2	1714517
7440−38−2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	11/02/17 08:01	171101−2	1714517
7440−39−3	Barium	24.2	ug/L		1	5	5	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7440−41−7	Beryllium	1	ug/L	U	1	5	5	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7440−42−8	Boron	15	ug/L	U	15	50	50	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7440−43−9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/02/17 08:01	171101−2	1714517
7440−70−2	Calcium	10800	ug/L		50	200	200	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7440−47−3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	11/02/17 08:01	171101−2	1714517
7440−48−4	Cobalt	1	ug/L	U	1	5	5	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7440−50−8	Copper	3	ug/L	U	3	10	10	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7439−89−6	Iron	30	ug/L	U	30	100	100	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7439−92−1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	11/02/17 08:01	171101−2	1714517
7439−95−4	Magnesium	3040	ug/L		110	300	300	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7439−96−5	Manganese	2	ug/L	U	2	10	10	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7439−98−7	Molybdenum	1.03	ug/L		0.2	0.5	0.5	1	MS	BAJ	11/02/17 13:04	171102−3	1714517
7440−02−0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/02/17 08:01	171101−2	1714517
7440−09−7	Potassium	1460	ug/L		50	150	150	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7782−49−2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	11/02/17 08:01	171101−2	1714517
7631−86−9	Silica	65200	ug/L		53	213	213	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7440−22−4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/02/17 08:01	171101−2	1714517
7440−23−5	Sodium	9790	ug/L		100	300	300	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7440−24−6	Strontium	45.3	ug/L		1	5	5	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7440−28−0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/02/17 08:01	171101−2	1714517
7440−31−5	Tin	2.5	ug/L	U	2.5	10	10	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7440−61−1	Uranium	0.370	ug/L		0.067	0.2	0.2	1	MS	BAJ	11/02/17 08:01	171101−2	1714517
7440−62−2	Vanadium	4.53	ug/L	J	1	5	5	1	P	JWJ	11/24/17 18:57	112417A−1	1714505
7440−66−6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	JWJ	11/24/17 18:57	112417A−1	1714505

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−604 **CONTRACT:** ESHL00114 **METHOD TYPE:**

SAMPLE ID: 436615001 **BASIS:** As Received **DATE COLLECTED** 27−OCT−17

CLIENT ID: CAPA−18−147566 **LEVEL:** Low **DATE RECEIVED** 31−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	39.4	mg/L		0.453	1.24	1.24	1		JJ2	11/27/17 14:12		1721823

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1714505	1714502	SW846 3005A	50	mL	50	mL	10/31/17	JXM8
1714517	1714516	SW846 3005A	50	mL	50	mL	10/31/17	JXM8
1719070	1719065	EPA 245.1/245.2 Prep	20	mL	20	mL	11/15/17	AXS5

***Analytical Methods:**

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

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−604 **CONTRACT:** ESHL00114 **METHOD TYPE:** EPA

SAMPLE ID: 436615002 **BASIS:** As Received **DATE COLLECTED** 27−OCT−17

CLIENT ID: CAPA−18−147592 **LEVEL:** Low **DATE RECEIVED** 31−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	11/16/17 12:01	111617W4−4	1719070

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1719070	1719065	EPA 245.1/245.2 Prep	20	mL	20	mL	11/15/17	AXS5

***Analytical Methods:**

AV **EPA 245.2 1974**

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−604 **CONTRACT:** ESHL00114 **METHOD TYPE:** EPA

SAMPLE ID: 436615004 **BASIS:** As Received **DATE COLLECTED** 27−OCT−17

CLIENT ID: CAPA−18−147567 **LEVEL:** Low **DATE RECEIVED** 31−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	11/16/17 12:06	111617W4−4	1719070

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−604 **CONTRACT:** ESHL00114 **METHOD TYPE:** SW846

SAMPLE ID: 436615004 **BASIS:** As Received **DATE COLLECTED** 27−OCT−17

CLIENT ID: CAPA−18−147567 **LEVEL:** Low **DATE RECEIVED** 31−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	JWJ	11/24/17 19:08	112417A−1	1714505
7440−36−0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	11/02/17 08:18	171101−2	1714517
7440−38−2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	11/02/17 08:18	171101−2	1714517
7440−39−3	Barium	27.9	ug/L		1	5	5	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7440−41−7	Beryllium	1	ug/L	U	1	5	5	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7440−42−8	Boron	15	ug/L	U	15	50	50	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7440−43−9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/02/17 08:18	171101−2	1714517
7440−70−2	Calcium	10600	ug/L		50	200	200	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7440−47−3	Chromium	4.1	ug/L	J	3	10	10	1	MS	BAJ	11/02/17 08:18	171101−2	1714517
7440−48−4	Cobalt	1	ug/L	U	1	5	5	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7440−50−8	Copper	3	ug/L	U	3	10	10	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7439−89−6	Iron	30	ug/L	U	30	100	100	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7439−92−1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	11/02/17 08:18	171101−2	1714517
7439−95−4	Magnesium	2950	ug/L		110	300	300	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7439−96−5	Manganese	2	ug/L	U	2	10	10	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7439−98−7	Molybdenum	1.03	ug/L		0.2	0.5	0.5	1	MS	BAJ	11/02/17 13:10	171102−3	1714517
7440−02−0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/02/17 08:18	171101−2	1714517
7440−09−7	Potassium	1680	ug/L		50	150	150	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7782−49−2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	11/02/17 08:18	171101−2	1714517
7631−86−9	Silica	67600	ug/L		53	213	213	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7440−22−4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/02/17 08:18	171101−2	1714517
7440−23−5	Sodium	9300	ug/L		100	300	300	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7440−24−6	Strontium	43.8	ug/L		1	5	5	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7440−28−0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/02/17 08:18	171101−2	1714517
7440−31−5	Tin	2.51	ug/L	J	2.5	10	10	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7440−61−1	Uranium	0.298	ug/L		0.067	0.2	0.2	1	MS	BAJ	11/02/17 08:18	171101−2	1714517
7440−62−2	Vanadium	4.68	ug/L	J	1	5	5	1	P	JWJ	11/24/17 19:08	112417A−1	1714505
7440−66−6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	JWJ	11/24/17 19:08	112417A−1	1714505

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−604 **CONTRACT:** ESHL00114 **METHOD TYPE:**

SAMPLE ID: 436615004 **BASIS:** As Received **DATE COLLECTED** 27−OCT−17

CLIENT ID: CAPA−18−147567 **LEVEL:** Low **DATE RECEIVED** 31−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	38.5	mg/L		0.453	1.24	1.24	1		JJ2	11/27/17 14:12		1721823

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1714505	1714502	SW846 3005A	50	mL	50	mL	10/31/17	JXM8
1714517	1714516	SW846 3005A	50	mL	50	mL	10/31/17	JXM8
1719070	1719065	EPA 245.1/245.2 Prep	20	mL	20	mL	11/15/17	AXS5

***Analytical Methods:**

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

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−604 **CONTRACT:** ESHL00114 **METHOD TYPE:** EPA

SAMPLE ID: 436615005 **BASIS:** As Received **DATE COLLECTED** 27−OCT−17

CLIENT ID: CAPA−18−147593 **LEVEL:** Low **DATE RECEIVED** 31−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	11/16/17 12:08	111617W4−4	1719070

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1719070	1719065	EPA 245.1/245.2 Prep	20	mL	20	mL	11/15/17	AXS5

***Analytical Methods:**

AV **EPA 245.2 1974**

Quality Control Summary

METALS
−3b−
PREPARATION BLANK SUMMARY

SDG NO. 2018−604
Contract: ESHL00114
Matrix: W

Sample ID	Analyte	Result	Units	Acceptance Window	Conc Qual	M*	MDL	RDL
1203908911								
	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
	Magnesium	110	ug/L	+/−300	U	P	110	300
	Manganese	2	ug/L	+/−10	U	P	2	10
	Iron	30	ug/L	+/−100	U	P	30	100
	Potassium	50	ug/L	+/−150	U	P	50	150
	Silica	53	ug/L	+/−213	U	P	53	213
	Sodium	100	ug/L	+/−300	U	P	100	300
	Strontium	1	ug/L	+/−5	U	P	1	5
	Tin	2.5	ug/L	+/−10	U	P	2.5	10
	Vanadium	1	ug/L	+/−5	U	P	1	5
	Zinc	3.3	ug/L	+/−10	U	P	3.3	10
1203908951								
	Antimony	1	ug/L	+/−3	U	MS	1	3
	Arsenic	2	ug/L	+/−5	U	MS	2	5
	Cadmium	0.3	ug/L	+/−1	U	MS	0.3	1
	Chromium	3	ug/L	+/−10	U	MS	3	10
	Lead	0.5	ug/L	+/−2	U	MS	0.5	2
	Molybdenum	0.2	ug/L	+/−0.5	U	MS	0.2	0.5
	Nickel	0.6	ug/L	+/−2	U	MS	0.6	2
	Selenium	2	ug/L	+/−5	U	MS	2	5
	Silver	0.3	ug/L	+/−1	U	MS	0.3	1
	Thallium	0.6	ug/L	+/−2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/−0.2	U	MS	0.067	0.2
1203920275								
	Mercury	−0.131	ug/L	+/−0.2	J	AV	0.067	0.2

***Analytical Methods:**

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

METALS
−5a−

Matrix Spike Summary

SDG NO. 2018−604 **Client ID** CAPA−18−147566S

Contract: ESHL00114 **Level:** Low

Matrix: WATER **% Solids:**

Sample ID: 436615001 **Spike ID:** 1203908914

Analyte	Units	Acceptance Limit	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M*
Vanadium	ug/L	75−125	483		4.53	J	500	95.6		P
Zinc	ug/L	75−125	487		3.3	U	500	96.8		P
Aluminum	ug/L	75−125	4980		68	U	5000	99.5		P
Barium	ug/L	75−125	503		24.2		500	95.9		P
Beryllium	ug/L	75−125	482		1	U	500	96.4		P
Boron	ug/L	75−125	485		15	U	500	94.7		P
Calcium	ug/L	75−125	15300		10800		5000	89.9		P
Cobalt	ug/L	75−125	483		1	U	500	96.5		P
Copper	ug/L	75−125	490		3	U	500	97.9		P
Iron	ug/L	75−125	4970		30	U	5000	99.3		P
Magnesium	ug/L	75−125	7930		3040		5000	97.7		P
Manganese	ug/L	75−125	479		2	U	500	95.7		P
Potassium	ug/L	75−125	6210		1460		5000	95.1		P
Silica	ug/L		72900		65200		10700	71.7	N/A	P
Sodium	ug/L	75−125	14100		9790		5000	86.3		P
Strontium	ug/L	75−125	523		45.3		500	95.5		P
Tin	ug/L	75−125	477		2.5	U	500	95.4		P

***Analytical Methods:**

P **SW846 3005A/6010C**

METALS
−5a−

Matrix Spike Summary

SDG NO. 2018−604 **Client ID** CAPA−18−147566S

Contract: ESHL00114 **Level:** Low

Matrix: WATER **% Solids:**

Sample ID: 436615001 **Spike ID:** 1203908954

Analyte	Units	Acceptance Limit	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M*
Antimony	ug/L	75−125	47.5		1	U	50	94.6		MS
Arsenic	ug/L	75−125	50.1		2	U	50	97.9		MS
Cadmium	ug/L	75−125	46.6		0.3	U	50	93.2		MS
Chromium	ug/L	75−125	50.9		3	U	50	96		MS
Lead	ug/L	75−125	45.9		0.5	U	50	91.8		MS
Molybdenum	ug/L	75−125	49.2		1.03		50	96.3		MS
Nickel	ug/L	75−125	49.4		0.6	U	50	98.1		MS
Selenium	ug/L	75−125	50		2	U	50	99.1		MS
Silver	ug/L	75−125	47.5		0.3	U	50	94.9		MS
Thallium	ug/L	75−125	45.2		0.6	U	50	90.5		MS
Uranium	ug/L	75−125	44.1		0.37		50	87.4		MS

***Analytical Methods:**

MS SW846 3005A/6020A

METALS
−5a−

Matrix Spike Summary

SDG NO. 2018−604 **Client ID** CAPA−18−147566S

Contract: ESHL00114 **Level:** Low

Matrix: WATER **% Solids:**

Sample ID: 436615001 **Spike ID:** 1203920280

Analyte	Units	Acceptance Limit	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M*
Mercury	ug/L	75−125	2		0.067	U	2	100		AV

***Analytical Methods:**

AV **EPA 245.1/245.2**

Metals
−6−
Duplicate Sample Summary

SDG No.: 2018−604 **Lab Code:** GEL

Contract: ESHL00114 **Client ID:** CAPA−18−147566D

Matrix: WATER **Level:** Low

Sample ID: 436615001 **Duplicate ID:** 1203908913 **Percent Solids for Dup:** N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68	U	68	U			P
Barium	ug/L	+/−5	24.2		23.9		1.33		P
Beryllium	ug/L		1	U	1	U			P
Boron	ug/L		15	U	15	U			P
Calcium	ug/L	+/−20%	10800		10600		1.22		P
Cobalt	ug/L		1	U	1	U			P
Copper	ug/L		3	U	3	U			P
Iron	ug/L		30	U	30	U			P
Magnesium	ug/L	+/−20%	3040		3000		1.43		P
Manganese	ug/L		2	U	2	U			P
Potassium	ug/L	+/−20%	1460		1460		.219		P
Silica	ug/L	+/−20%	65200		64500		1.08		P
Sodium	ug/L	+/−20%	9790		9630		1.65		P
Strontium	ug/L	+/−20%	45.3		44.8		1.13		P
Tin	ug/L		2.5	U	2.5	U			P
Vanadium	ug/L	+/−5	4.53	J	4.34	J	4.26		P
Zinc	ug/L		3.3	U	3.3	U			P

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

Metals
−6−
Duplicate Sample Summary

SDG No.: 2018−604 **Lab Code:** GEL

Contract: ESHL00114 **Client ID:** CAPA−18−147566D

Matrix: WATER **Level:** Low

Sample ID: 436615001 **Duplicate ID:** 1203908953 **Percent Solids for Dup:** N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1	U	1	U			MS
Arsenic	ug/L		2	U	2	U			MS
Cadmium	ug/L		0.3	U	0.3	U			MS
Chromium	ug/L		3	U	3	U			MS
Lead	ug/L		0.5	U	0.5	U			MS
Molybdenum	ug/L	+/−.5	1.03		0.992		3.76		MS
Nickel	ug/L		0.6	U	0.6	U			MS
Selenium	ug/L		2	U	2	U			MS
Silver	ug/L		0.3	U	0.3	U			MS
Thallium	ug/L		0.6	U	0.6	U			MS
Uranium	ug/L	+/−.2	0.37		0.356		3.86		MS

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

Metals
−6−
Duplicate Sample Summary

SDG No.: 2018−604 **Lab Code:** GEL

Contract: ESHL00114 **Client ID:** CAPA−18−147566D

Matrix: WATER **Level:** Low

Sample ID: 436615001 **Duplicate ID:** 1203920278 **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. 2018−604

Contract: ESHL00114

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

Sample ID	Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limit	M*
1203908912								
	Aluminum	ug/L	5000	5030		101	80−120	P
	Barium	ug/L	500	489		97.8	80−120	P
	Beryllium	ug/L	500	484		96.8	80−120	P
	Boron	ug/L	500	479		95.8	80−120	P
	Calcium	ug/L	5000	5080		102	80−120	P
	Cobalt	ug/L	500	496		99.2	80−120	P
	Copper	ug/L	500	488		97.7	80−120	P
	Iron	ug/L	5000	5010		100	80−120	P
	Magnesium	ug/L	5000	5130		103	80−120	P
	Manganese	ug/L	500	487		97.5	80−120	P
	Potassium	ug/L	5000	4710		94.2	80−120	P
	Silica	ug/L	10700	9850		92.1	80−120	P
	Sodium	ug/L	5000	4800		96	80−120	P
	Strontium	ug/L	500	486		97.3	80−120	P
	Tin	ug/L	500	485		97.1	80−120	P
	Vanadium	ug/L	500	483		96.6	80−120	P
	Zinc	ug/L	500	491		98.2	80−120	P

***Analytical Methods:**

P **SW846 3005A/6010C**

METALS
−7−
Laboratory Control Sample Summary

SDG NO. 2018−604

Contract: ESHL00114

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

Sample ID	Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limit	M*
1203908952								
	Antimony	ug/L	50	45.8		91.5	80−120	MS
	Arsenic	ug/L	50	50		100	80−120	MS
	Cadmium	ug/L	50	47.9		95.7	80−120	MS
	Chromium	ug/L	50	50.9		102	80−120	MS
	Lead	ug/L	50	47.1		94.1	80−120	MS
	Molybdenum	ug/L	50	47.5		95	80−120	MS
	Nickel	ug/L	50	51.2		102	80−120	MS
	Selenium	ug/L	50	51.3		103	80−120	MS
	Silver	ug/L	50	48.5		96.9	80−120	MS
	Thallium	ug/L	50	46.3		92.7	80−120	MS
	Uranium	ug/L	50	43.6		87.3	80−120	MS

***Analytical Methods:**

MS **SW846 3005A/6020A**

METALS
−7−
Laboratory Control Sample Summary

SDG NO. 2018−604

Contract: ESHL00114

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

Sample ID	Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limit	M*
1203920276								
	Mercury	ug/L	2	2.04		102	85−115	AV

***Analytical Methods:**

AV **EPA 245.1/245.2**

METALS
−9−
Serial Dilution Sample Summary

SDG NO. 2018−604 **Client ID** CAPA−18−147566L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 436615001 **Serial Dilution ID:** 1203908915

Analyte	Initial Value ug/L	C	Serial Value ug/L	C	% Difference	Qual	Acceptance Limit	M*
Aluminum	68	U	340	U				P
Barium	24.2		25	J	3.292			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	10800		11200		4.196		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3040		3140		3.157			P
Manganese	2	U	10	U				P
Potassium	1460		1910		30.927			P
Silica	65200		67600		3.648		10	P
Sodium	9790		10100		3.563		10	P
Strontium	45.3		46.1		1.868			P
Tin	2.5	U	12.5	U				P
Vanadium	4.53	J	5	U	14.049			P
Zinc	3.3	U	22.3	J				P

***Analytical Methods:**

P **SW846 3005A/6010C**

METALS
−9−
Serial Dilution Sample Summary

SDG NO. 2018−604 **Client ID** CAPA−18−147566L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 436615001 **Serial Dilution ID:** 1203908955

Analyte	Initial Value ug/L	C	Serial Value ug/L	C	% Difference	Qual	Acceptance Limit	M*
Antimony	1	U	5	U				MS
Arsenic	2	U	10	U				MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.03		1	U	18.932			MS
Nickel	.6	U	3	U				MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.37		.51	J	37.838			MS

***Analytical Methods:**

MS **SW846 3005A/6020A**

METALS
−9−
Serial Dilution Sample Summary

SDG NO. 2018−604 **Client ID** CAPA−18−147566L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 436615001 **Serial Dilution ID:** 1203920282

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 #: 2018-604
Work Order #: 436615

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
436615002	CAPA-18-147592
436615005	CAPA-18-147593
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:	1714507	**Method:**	WSP-CN(T)
Prep Batch :	1714503	**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
436615002	CAPA-18-147592
436615005	CAPA-18-147593
1203908916	Method Blank (MB)
1203908917	Laboratory Control Sample (LCS)
1203908918	436615002(CAPA-18-147592) Sample Duplicate (DUP)
1203908920	436615002(CAPA-18-147592) 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 436615002 (CAPA-18-147592) was selected for QC analysis.

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

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

Technical Information

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

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

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

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

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

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

Product:	**Ion Chromatography**		
Analytical Batch:	1715632	**Method:**	WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
436615001	CAPA-18-147566
436615004	CAPA-18-147567
1203911576	Method Blank (MB)
1203911577	Laboratory Control Sample (LCS)
1203911578	436689005(CAMO-18-147648) Sample Duplicate (DUP)
1203911579	436689005(CAMO-18-147648) 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 436689005 (CAMO-18-147648) was selected for QC analysis.

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

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

Technical Information

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

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

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

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

Miscellaneous Information

Manual Integrations
Samples 1203911578 (CAMO-18-147648DUP), 436615001 (CAPA-18-147566) and 436615004 (CAPA-18-147567) 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:	1715525	**Method:**	NH3
Prep Batch :	1715524	**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
436615001	CAPA-18-147566
436615004	CAPA-18-147567
1203911273	Method Blank (MB)
1203911274	Laboratory Control Sample (LCS)
1203911275	436504001(CAMO-18-147642) Sample Duplicate (DUP)
1203911276	436504001(CAMO-18-147642) 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 436504001 (CAMO-18-147642) 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:	1715519	**Method:**	TKN
Prep Batch :	1715516	**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
436615002	CAPA-18-147592
436615005	CAPA-18-147593
1203911261	Method Blank (MB)
1203911262	Laboratory Control Sample (LCS)
1203911263	436504002(CAMO-18-147657) Sample Duplicate (DUP)
1203911264	436504004(CAMO-18-147658) Sample Duplicate (DUP)
1203911265	436504002(CAMO-18-147657) Matrix Spike (MS)
1203911266	436504004(CAMO-18-147658) 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
Samples 436504002 (CAMO-18-147657) and 436504004 (CAMO-18-147658) were selected for QC analysis.

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

Analyte	Sample	Value
Nitrogen, Total Kjeldahl	1203911265 (CAMO-18-147657MS)	116* (90%-110%)
	1203911266 (CAMO-18-147658MS)	115* (90%-110%)

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

Technical Information

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

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

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

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

Sample Re-analysis

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

Electronic Packaging Comment
This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:
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:	1715194	**Method:**	NO3NO2

Sample Analysis

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

Sample ID	Client ID
436615001	CAPA-18-147566
436615004	CAPA-18-147567
1203910561	Method Blank (MB)
1203910562	Laboratory Control Sample (LCS)
1203910564	436615001(CAPA-18-147566) Sample Duplicate (DUP)
1203910569	436615001(CAPA-18-147566) 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 436615001 (CAPA-18-147566) 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:	**Total Phosphorus**		
Analytical Batch:	1714723	**Method:**	PO4
Prep Batch :	1714722	**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
436615001	CAPA-18-147566
436615004	CAPA-18-147567
1203909436	Method Blank (MB)
1203909437	Laboratory Control Sample (LCS)
1203909440	436463001(CAPA-18-147550) Sample Duplicate (DUP)
1203909442	436463001(CAPA-18-147550) 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 436463001 (CAPA-18-147550) 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:	1714739	**Method:**	TDS

Sample Analysis

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

Sample ID	Client ID
436615001	CAPA-18-147566
436615004	CAPA-18-147567
1203909470	Method Blank (MB)
1203909471	Laboratory Control Sample (LCS)
1203909472	436615004(CAPA-18-147567) 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 436615004 (CAPA-18-147567) was selected for QC analysis.

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

Technical Information

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

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

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

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

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

Method/Analysis Information

Product:	**Specific Conductivity**		
Analytical Batch:	1717163	**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
436615001	CAPA-18-147566
436615004	CAPA-18-147567
1203915374	Laboratory Control Sample (LCS)
1203915375	436504008(CAPA-18-147571) 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 436504008 (CAPA-18-147571) 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: 1715386 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
436615001	CAPA-18-147566
436615004	CAPA-18-147567
1203910983	Laboratory Control Sample (LCS)
1203910984	436615004(CAPA-18-147567) Sample Duplicate (DUP)
1203911838	435335001(NonSDG) Sample Duplicate (DUP)

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

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

Preparation/Analytical Method Verification

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

Calibration Information

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

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

Initial Standardization
The titrant was properly standardized

Quality Control (QC) Information

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

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

Quality Control (QC) Designation
Samples 435335001 (NonSDG) and 436615004 (CAPA-18-147567) were selected for QC analysis.

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

Technical Information

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

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

Sample	Analyte	Value
1203910984 (CAPA-18-147567DUP)	pH	Received 31-OCT-17, out of holding 27-OCT-17
1203911838 (Non SDG 435335001DUP)	pH	Received 17-OCT-17, out of holding 05-OCT-17
436615001 (CAPA-18-147566)	pH	Received 31-OCT-17, out of holding 27-OCT-17
436615004 (CAPA-18-147567)	pH	Received 31-OCT-17, out of holding 27-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:	1715371	**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
436615001	CAPA-18-147566
436615004	CAPA-18-147567
1203910950	Laboratory Control Sample (LCS)
1203910953	436615004(CAPA-18-147567) Sample Duplicate (DUP)
1203910955	436615004(CAPA-18-147567) 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 436615004 (CAPA-18-147567) was selected for QC analysis.

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

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

Technical Information

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

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

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

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

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

Client SDG: 2018-604 GEL Work Order: 436615

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: 17 NOV 2017 **Title: Analyst I**

Sample Data Summary

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

Certificate of Analysis

Report Date: November 17, 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: 2018-604

Client Sample ID: CAPA-18-147566
Sample ID: 436615001
Matrix: W
Collect Date: 27-OCT-17 11:30
Receive Date: 31-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MAR1	11/03/17	2022	1715632	1
Chloride		1.88	0.067	0.200	mg/L		1					
Fluoride		0.195	0.033	0.100	mg/L		1					
Sulfate		1.86	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0638	0.017	0.050	mg/L	1.00	1	KLP1	11/06/17	1520	1715525	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.388	0.017	0.050	mg/L		1	KLP1	11/02/17	1048	1715194	3
PO4 "As Received"												
Phosphorus, Total as P	U	ND	0.020	0.050	mg/L	1.00	1	KLP1	11/02/17	1303	1714723	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		137	3.40	14.3	mg/L			KLP1	11/02/17	1301	1714739	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		61.1	1.45	4.00	mg/L			RXB5	11/07/17	1435	1715371	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		147	1.00	1.00	umhos/cm		1	VH1	11/14/17	1337	1717163	7
PH "As Received"												
pH at Temp 18.6C	H	8.08	0.010	0.100	SU		1	RXB5	11/07/17	1433	1715386	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	11/06/17	0910	1715524
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	11/01/17	1600	1714722

GEL LABORATORIES LLC
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Certificate of Analysis

Report Date: November 17, 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: 2018-604

Client Sample ID:	CAPA-18-147566	Project:	ESHL00114
Sample ID:	436615001	Client ID:	ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA:300.0	
2	EPA:350.1	
3	EPA:353.2	
4	EPA 365.4 1974	
5	EPA:160.1	
6	EPA:310.1	
7	EPA:120.1	
8	EPA 150.1 1982	

Notes:

Column headers are defined as follows:

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

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Certificate of Analysis

Report Date: November 17, 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: 2018-604

Client Sample ID: CAPA-18-147592
Sample ID: 436615002
Matrix: W
Collect Date: 27-OCT-17 11:30
Receive Date: 31-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L		1	TSM	11/05/17	1649	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	0855	1714507	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	11/07/17	1259	1715519	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	1714503
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	11/06/17	1700	1715516

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 17, 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: 2018-604

Client Sample ID: CAPA-18-147567
Sample ID: 436615004
Matrix: W
Collect Date: 27-OCT-17 11:30
Receive Date: 31-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MAR1	11/03/17	2050	1715632	1
Chloride		1.84	0.067	0.200	mg/L		1					
Fluoride		0.207	0.033	0.100	mg/L		1					
Sulfate		1.88	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0751	0.017	0.050	mg/L	1.00	1	KLP1	11/06/17	1521	1715525	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.402	0.017	0.050	mg/L		1	KLP1	11/02/17	1051	1715194	3
PO4 "As Received"												
Phosphorus, Total as P	U	ND	0.020	0.050	mg/L	1.00	1	KLP1	11/02/17	1304	1714723	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		136	3.40	14.3	mg/L			KLP1	11/02/17	1301	1714739	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		59.9	1.45	4.00	mg/L			RXB5	11/07/17	1438	1715371	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		144	1.00	1.00	umhos/cm		1	VH1	11/14/17	1337	1717163	7
PH "As Received"												
pH at Temp 18.5C	H	8.12	0.010	0.100	SU		1	RXB5	11/07/17	1436	1715386	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	11/06/17	0910	1715524
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	11/01/17	1600	1714722

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Certificate of Analysis

Report Date: November 17, 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: 2018-604

Client Sample ID:	CAPA-18-147567	Project:	ESHL00114
Sample ID:	436615004	Client ID:	ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA:300.0	
2	EPA:350.1	
3	EPA:353.2	
4	EPA 365.4 1974	
5	EPA:160.1	
6	EPA:310.1	
7	EPA:120.1	
8	EPA 150.1 1982	

Notes:

Column headers are defined as follows:

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

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Certificate of Analysis

Report Date: November 17, 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: 2018-604

Client Sample ID: CAPA-18-147593
Sample ID: 436615005
Matrix: W
Collect Date: 27-OCT-17 11:30
Receive Date: 31-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L		1	TSM	11/05/17	1736	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	0858	1714507	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	11/07/17	1300	1715519	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	1714503
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	11/06/17	1700	1715516

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 17, 2017

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

Contact: **Ms. Nita Patel**

Workorder: **436615**

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 1714507										
QC1203908918 436615002 DUP										
Cyanide, Total	U	ND	U	ND	ug/L	N/A			AXH3	11/02/17 08:56
QC1203908917 LCS										
Cyanide, Total	50.0			45.2	ug/L		90.4	(90%-110%)		11/02/17 08:34
QC1203908916 MB										
Cyanide, Total			U	ND	ug/L					11/02/17 08:33
QC1203908920 436615002 MS										
Cyanide, Total	100 U	ND		101	ug/L		101	(90%-110%)		11/02/17 08:57
Ion Chromatography										
Batch 1715632										
QC1203911578 436689005 DUP										
Bromide	U	ND	U	ND	mg/L	N/A			MAR1	11/03/17 23:44

QC Summary

Workorder: **436615**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography										
Batch 1715632										
Chloride		2.24		2.23	mg/L	0.277		(0%-20%)	MAR1	11/03/17 23:44
Fluoride		0.191		0.162	mg/L	16.4 ^		(+/-0.100)		
Sulfate		2.88		2.89	mg/L	0.329		(0%-20%)		
QC1203911577 LCS										
Bromide	1.25			1.22	mg/L		97.8	(80%-120%)		11/03/17 18:26
Chloride	5.00			4.86	mg/L		97.3	(80%-120%)		
Fluoride	2.50			2.58	mg/L		103	(80%-120%)		
Sulfate	10.0			9.99	mg/L		99.9	(80%-120%)		
QC1203911576 MB										
Bromide			U	ND	mg/L					11/03/17 17:57
Chloride			U	ND	mg/L					
Fluoride			U	ND	mg/L					
Sulfate			U	ND	mg/L					
QC1203911579 436689005 PS										
Bromide	1.25 U	ND		1.28	mg/L		99.4	(75%-125%)		11/04/17 00:13
Chloride	5.00	2.24		7.60	mg/L		107	(75%-125%)		
Fluoride	2.50	0.191		2.92	mg/L		109	(75%-125%)		
Sulfate	10.0	2.88		13.2	mg/L		103	(75%-125%)		

QC Summary

Workorder: **436615**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Nutrient Analysis											
Batch 1714723											
QC1203909440 436463001 DUP											
Phosphorus, Total as P		U	ND	U	ND	mg/L	N/A			KLP1	11/02/17 12:54
QC1203909437 LCS											
Phosphorus, Total as P	1.00				1.06	mg/L		106	(80%-124%)		11/02/17 12:51
QC1203909436 MB											
Phosphorus, Total as P				J	0.0207	mg/L					11/02/17 12:51
QC1203909442 436463001 MS											
Phosphorus, Total as P	1.00	U	ND		1.07	mg/L		105	(63%-139%)		11/02/17 12:55
Batch 1715194											
QC1203910564 436615001 DUP											
Nitrogen, Nitrate/Nitrite			0.388		0.388	mg/L	0		(0%-20%)	KLP1	11/02/17 10:49
QC1203910562 LCS											
Nitrogen, Nitrate/Nitrite	1.00				1.08	mg/L		108	(90%-110%)		11/02/17 10:28
QC1203910561 MB											
Nitrogen, Nitrate/Nitrite				U	ND	mg/L					11/02/17 10:27
QC1203910569 436615001 PS											
Nitrogen, Nitrate/Nitrite	1.00		0.388		1.49	mg/L		110	(90%-110%)		11/02/17 10:50
Batch 1715519											
QC1203911263 436504002 DUP											
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A			KLP1	11/07/17 12:49
QC1203911264 436504004 DUP											
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A				11/07/17 12:52
QC1203911262 LCS											
Nitrogen, Total Kjeldahl	1.00				1.05	mg/L		105	(90%-110%)		11/07/17 12:47

QC Summary

Workorder: **436615**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Nutrient Analysis											
Batch 1715519											
QC1203911261 MB											
Nitrogen, Total Kjeldahl				U	ND	mg/L				KLP1	11/07/17 12:47
QC1203911265 436504002 MS											
Nitrogen, Total Kjeldahl	1.00	U	ND		1.16	mg/L		116*	(90%-110%)		11/07/17 12:50
QC1203911266 436504004 MS											
Nitrogen, Total Kjeldahl	1.00	U	ND		1.16	mg/L		115*	(90%-110%)		11/07/17 12:52
Batch 1715525											
QC1203911275 436504001 DUP											
Nitrogen, Ammonia		J	0.018	U	ND	mg/L	200 ^			KLP1	11/06/17 15:16
QC1203911274 LCS											
Nitrogen, Ammonia	1.00				1.08	mg/L		108	(90%-110%)		11/06/17 15:11
QC1203911273 MB											
Nitrogen, Ammonia				U	ND	mg/L					11/06/17 15:10
QC1203911276 436504001 MS											
Nitrogen, Ammonia	1.00	J	0.018		1.04	mg/L		102	(90%-110%)		11/06/17 15:17
Solids Analysis											
Batch 1714739											
QC1203909472 436615004 DUP											
Total Dissolved Solids			136		131	mg/L	3.21		(0%-5%)	KLP1	11/02/17 13:01
QC1203909471 LCS											
Total Dissolved Solids	300				299	mg/L		99.5	(95%-105%)		11/02/17 13:01
QC1203909470 MB											
Total Dissolved Solids				U	ND	mg/L					11/02/17 13:01

QC Summary

Workorder: **436615**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis												
Batch 1715371												
QC1203910953 436615004 DUP												
Alkalinity, Total as CaCO3			59.9		61.3	mg/L	2.31		(0%-20%)	RXB5	11/07/17	14:40
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A					
QC1203910950 LCS												
Alkalinity, Total as CaCO3	100				107	mg/L		107	(90%-110%)		11/07/17	12:44
QC1203910955 436615004 MS												
Alkalinity, Total as CaCO3	100		59.9		162	mg/L		102	(80%-120%)		11/07/17	14:41
Batch 1715386												
QC1203910984 436615004 DUP												
pH		H	8.12	H	8.13	SU	0.123		(0%-5%)	RXB5	11/07/17	14:37
QC1203911838 435335001 DUP												
pH		H	7.63	H	7.62	SU	0.131		(0%-5%)		11/07/17	13:38
QC1203910983 LCS												
pH	7.00				7.00	SU		100	(99%-101%)		11/07/17	12:44
Batch 1717163												
QC1203915375 436504008 DUP												
Conductivity			149		145	umhos/cm	2.18		(0%-10%)	VH1	11/14/17	13:31
QC1203915374 LCS												
Conductivity	1410				1390	umhos/cm		98.5	(95%-105%)		11/14/17	13:29

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

QC Summary

Workorder: **436615**

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

J	Value is estimated
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
d	5-day BOD--The 2:1 depletion requirement was not met for this sample
e	5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-604
Work Order #: 436615

Method/Analysis Information

Product:	**Alphaspec Am241 Liquid**
Analytical Method:	HASL-300:AM-241
Analytical Batch Number:	1715443

Sample ID	Client ID
436615002	CAPA-18-147592
436615005	CAPA-18-147593
1203911096	Method Blank (MB)
1203911098	Laboratory Control Sample (LCS)
1203911097	436463002(CAPA-18-147576) 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 1203911096 (MB) and 1203911098 (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: 436463002 (CAPA-18-147576). The QC was from ARSL work order 436463.

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

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

Sample	Analyte	Value
436615005 (CAPA-18-147593)	Americium-241	Result 0.00712 < MDA 0.0624 > 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
None of the samples in this sample set were recounted.

Miscellaneous Information:

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

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

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

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	**ISOPU**
Analytical Method:	HASL-300:ISOPU
Analytical Batch Number:	1715444

Sample ID	Client ID
436615002	CAPA-18-147592
436615005	CAPA-18-147593
1203911099	Method Blank (MB)
1203911101	Laboratory Control Sample (LCS)
1203911100	436463002(CAPA-18-147576) 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 1203911099 (MB) and 1203911101 (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: 436463002 (CAPA-18-147576). The QC was from ARSL work order 436463.

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

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

Sample	Analyte	Value
1203911100 (CAPA-18-147576DUP)	Plutonium-239/240	Result 0.0273 < MDA 0.0576 > 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 436615002 (CAPA-18-147592) and 436615005 (CAPA-18-147593) were recounted due to a peak shift. The recounts are reported.

Miscellaneous Information:

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

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

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

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	**IsoU**
Analytical Method:	HASL-300:ISOU
Analytical Batch Number:	1715445

Sample ID	Client ID
436615002	CAPA-18-147592
436615005	CAPA-18-147593
1203911103	Method Blank (MB)
1203911105	Laboratory Control Sample (LCS)
1203911104	436463002(CAPA-18-147576) 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 November 2017.

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

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

Quality Control (QC) Information:

Blank Information
Aliquots for samples 1203911103 (MB) and 1203911105 (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: 436463002 (CAPA-18-147576). The QC was from ARSL work order 436463.

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

RDL Met
The method RDL has been met.

Technical Information:

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

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

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

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

Miscellaneous Information:

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

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

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

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	**Gammaspec**
Analytical Method:	EPA:901.1
Analytical Batch Number:	1716271

Sample ID	Client ID
436615002	CAPA-18-147592
436615005	CAPA-18-147593
1203913158	Method Blank (MB)
1203913160	Laboratory Control Sample (LCS)
1203913159	436463002(CAPA-18-147576) Sample Duplicate (DUP)

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

SOP Reference
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 27.

Calibration Information:

Calibration Information
All initial and continuing calibration requirements have been met. The initial Calibrations were performed in August 2017, July 2017, March 2017, May 2017 and September 2017.

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

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

Quality Control (QC) Information:

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

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

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

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

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

Designated QC
The following sample was used for QC: 436463002 (CAPA-18-147576). The QC was from ARSL work order 436463.

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

Sample ID	Client ID
436615002	CAPA-18-147592
436615005	CAPA-18-147593
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.

Method/Analysis Information

Product:	**GFPC, Sr90, liquid**
Analytical Method:	EPA:905.0
Analytical Batch Number:	1717217

Sample ID	Client ID
436615002	CAPA-18-147592
436615005	CAPA-18-147593

1203915510	Method Blank (MB)
1203915513	Laboratory Control Sample (LCS)
1203915511	436615005(CAPA-18-147593) Sample Duplicate (DUP)
1203915512	436615005(CAPA-18-147593) 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 1203915510 (MB) and 1203915513 (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: 436615005 (CAPA-18-147593). The QC was from ARSL work order 436615.

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 436615002 (CAPA-18-147592) was recounted due to results more negative than the three sigma TPU. The second count is reported.

Miscellaneous Information:

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

Additional Comments
The matrix spike, 1203915512 (CAPA-18-147593MS), aliquot was reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Certification Statement

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

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Qualifier Definition Report
for

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

Client SDG: 2018-604 GEL Work Order: 436615

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: 22 NOV 2017 **Title: Analyst II**

Sample Data Summary

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Certificate of Analysis

Company : Los Alamos National Laboratory
Address : TA-00, SM1237, Rm104C
Los Alamos, New Mexico 87545
Report Date: November 22, 2017
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147592
Sample ID: 436615002
Matrix: W
Collect Date: 27-OCT-17
Receive Date: 31-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	0.00269	+/-0.00712	0.0472	0.0199	+/-0.00712	0.050	pCi/L			HAKB	11/16/17	1522	1715443	1
ISOPU "As Received"															
Plutonium-238	U	0.0159	+/-0.0082	0.0335	0.0137	+/-0.00825	0.050	pCi/L			HAKB	11/20/17	1328	1715444	2
Plutonium-239/240	U	-0.0114	+/-0.00991	0.0479	0.0209	+/-0.00991	0.050	pCi/L							
IsoU "As Received"															
Uranium-234		0.378	+/-0.0381	0.068	0.0291	+/-0.043	1.00	pCi/L			HAKB	11/16/17	0731	1715445	3
Uranium-235/236	U	0.0561	+/-0.0171	0.0726	0.0302	+/-0.0174	1.00	pCi/L							
Uranium-238		0.104	+/-0.0206	0.0658	0.028	+/-0.0213	0.500	pCi/L							
Rad Gamma Spec Analysis															
Gammaspec "As Received"															
Cesium-137	U	-0.709	+/-1.34	4.31	1.88	+/-1.35	8.00	pCi/L			BSW1	11/16/17	0908	1716271	4
Cobalt-60	U	-0.18	+/-0.999	4.11	1.63	+/-1.00	8.00	pCi/L							
Neptunium-237	U	-1.69	+/-2.11	7.56	3.41	+/-2.15		pCi/L							
Potassium-40	U	16.6	+/-13.0	40.1	15.8	+/-13.0		pCi/L							
Sodium-22	U	0.615	+/-1.00	4.47	1.82	+/-1.01		pCi/L							
Rad Gas Flow Proportional Counting															
GFPC, Sr90, liquid "As Received"															
Strontium-90	U	-0.0249	+/-0.122	0.476	0.204	+/-0.122	0.500	pCi/L			KSD1	11/17/17	0755	1717217	5
WSP-GrossA/B "As Received"															
Beta		5.97	+/-0.956	2.45	1.11	+/-1.08	3.00	pCi/L			AXH4	11/15/17	1141	1716449	6
Alpha	U	0.159	+/-0.547	2.16	0.864	+/-0.547	3.00	pCi/L			AXH4	11/15/17	1649	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"	1715443	92.8	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1715444	76.9	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1715445	95.4	(50%-105%)

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Certificate of Analysis

Company : Los Alamos National Laboratory
Address : TA-00, SM1237, Rm104C
Los Alamos, New Mexico 87545
Report Date: November 22, 2017
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples
Client Sample ID: CAPA-18-147592
Sample ID: 436615002
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"										1717217	81.5	(50%-105%)	

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 68% confidence level (1-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Report Date: November 22, 2017

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

Client Sample ID: CAPA-18-147593
Sample ID: 436615005
Matrix: W
Collect Date: 27-OCT-17
Receive Date: 31-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	0.00712	+/-0.00872	0.0624	0.0264	+/-0.00873	0.050	pCi/L			HAKB	11/16/17	1523	1715443	1
ISOPU "As Received"															
Plutonium-238	U	-0.00213	+/-0.00705	0.0313	0.0128	+/-0.00705	0.050	pCi/L			HAKB	11/20/17	1328	1715444	2
Plutonium-239/240	U	-0.0106	+/-0.00766	0.0448	0.0195	+/-0.00766	0.050	pCi/L							
IsoU "As Received"															
Uranium-234		0.248	+/-0.032	0.0719	0.0307	+/-0.0347	1.00	pCi/L			HAKB	11/16/17	0731	1715445	3
Uranium-235/236	U	0.0332	+/-0.0136	0.0767	0.0319	+/-0.0138	1.00	pCi/L							
Uranium-238		0.123	+/-0.0226	0.0696	0.0296	+/-0.0236	0.500	pCi/L							
Rad Gamma Spec Analysis															
Gammaspec "As Received"															
Cesium-137	U	1.52	+/-2.02	6.81	2.89	+/-2.02	8.00	pCi/L			BSW1	11/16/17	0908	1716271	4
Cobalt-60	U	0.682	+/-1.78	7.88	3.13	+/-1.78	8.00	pCi/L							
Neptunium-237	U	4.35	+/-6.26	11.0	4.87	+/-6.34		pCi/L							
Potassium-40	U	-38	+/-26.9	93.0	38.3	+/-28.4		pCi/L							
Sodium-22	U	1.83	+/-2.05	9.20	3.81	+/-2.10		pCi/L							
Rad Gas Flow Proportional Counting															
GFPC, Sr90, liquid "As Received"															
Strontium-90	U	0.110	+/-0.0726	0.241	0.115	+/-0.0731	0.500	pCi/L			KSD1	11/16/17	1856	1717217	5
WSP-GrossA/B "As Received"															
Beta	U	2.03	+/-0.787	2.47	1.12	+/-0.806	3.00	pCi/L			AXH4	11/15/17	1141	1716449	6
Alpha	U	1.54	+/-0.701	2.08	0.783	+/-0.714	3.00	pCi/L			AXH4	11/15/17	1649	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"	1715443	63.9	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1715444	75.1	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1715445	91	(50%-105%)
Strontium Carrier	GFPC, Sr90, liquid "As Received"	1717217	80.3	(50%-105%)

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Certificate of Analysis

Company : Los Alamos National Laboratory
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Los Alamos, New Mexico 87545
Report Date: November 22, 2017
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147593
Sample ID: 436615005
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: **436615**

Report Date: November 22, 2017

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1715443										
QC1203911097 436463002 DUP										
Americium-241	U	0.00533	U	0.0101	pCi/L	0.164		(0-1)	HAKB	11/16/17 16:22
	Uncert:	+/-0.00653		+/-0.00798						
	TPU:	+/-0.00653		+/-0.00799						
**Americium-243 Tracer	5.24	2.53		5.26	pCi/L		100	(50%-105%)		
	Uncert:	+/-0.0833		+/-0.115						
	TPU:	+/-0.147		+/-0.240						
QC1203911098 LCS										
Americium-241	1.97			1.94	pCi/L		98.4	(80%-120%)	HAKB	11/16/17 16:23
	Uncert:			+/-0.0635						
	TPU:			+/-0.110						
**Americium-243 Tracer	2.10			1.81	pCi/L		86.2	(50%-105%)		
	Uncert:			+/-0.0658						
	TPU:			+/-0.117						
QC1203911096 MB										
Americium-241			U	0.00	pCi/L				HAKB	11/16/17 16:22
	Uncert:			+/-0.0054						
	TPU:			+/-0.0054						
**Americium-243 Tracer	2.10			1.99	pCi/L		94.8	(50%-105%)		
	Uncert:			+/-0.0631						
	TPU:			+/-0.114						
Batch 1715444										
QC1203911100 436463002 DUP										
Plutonium-238	U	0.0041	U	0.0109	pCi/L	0.23		(0-1)	HAKB	11/19/17 10:59
	Uncert:	+/-0.0071		+/-0.00773						
	TPU:	+/-0.0071		+/-0.00775						
Plutonium-239/240	U	0.00	U	0.0273	pCi/L	0.587		(0-1)		
	Uncert:	+/-0.013		+/-0.0102						
	TPU:	+/-0.013		+/-0.0103						
**Plutonium-242 Tracer	2.47	1.34		1.94	pCi/L		78.7	(50%-105%)		
	Uncert:	+/-0.101		+/-0.0826						
	TPU:	+/-0.179		+/-0.160						
QC1203911101 LCS										
Plutonium-238			U	0.0216	pCi/L			(80%-120%)	HAKB	11/19/17 10:59
	Uncert:			+/-0.00864						
	TPU:			+/-0.00872						
Plutonium-239/240	1.98			2.03	pCi/L		103	(80%-120%)		
	Uncert:			+/-0.0663						
	TPU:			+/-0.130						
**Plutonium-242 Tracer	1.97			1.57	pCi/L		79.4	(50%-105%)		
	Uncert:			+/-0.0657						
	TPU:			+/-0.127						

QC Summary

Workorder: **436615**

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1715444										
QC1203911099 MB										
Plutonium-238			U	0.007	pCi/L				HAKB	11/19/1710:59
Uncert:				+/-0.00617						
TPU:				+/-0.00618						
Plutonium-239/240			U	0.00933	pCi/L					
Uncert:				+/-0.00738						
TPU:				+/-0.00739						
**Plutonium-242 Tracer	1.97			1.49	pCi/L		75.3	(50%-105%)		
Uncert:				+/-0.0682						
TPU:				+/-0.130						
Batch 1715445										
QC1203911104 436463002 DUP										
Uranium-234		0.442		0.292	pCi/L	0.857		(0-1)	HAKB	11/16/1707:31
Uncert:		+/-0.0414		+/-0.0367						
TPU:		+/-0.0477		+/-0.0401						
Uranium-235/236	U	0.0536	U	0.0152	pCi/L	0.594		(0-1)		
Uncert:		+/-0.0198		+/-0.0122						
TPU:		+/-0.020		+/-0.0122						
Uranium-238		0.164		0.168	pCi/L	0.035		(0-1)		
Uncert:		+/-0.0267		+/-0.029						
TPU:		+/-0.0281		+/-0.0304						
**Uranium-232 Tracer	2.62	2.23		2.27	pCi/L		86.5	(50%-105%)		
Uncert:		+/-0.101		+/-0.106						
TPU:		+/-0.173		+/-0.178						
QC1203911105 LCS										
Uranium-234				2.48	pCi/L				HAKB	11/16/1707:31
Uncert:				+/-0.0861						
TPU:				+/-0.158						
Uranium-235/236				0.141	pCi/L					
Uncert:				+/-0.0233						
TPU:				+/-0.0245						
Uranium-238	2.70			2.71	pCi/L		100	(80%-120%)		
Uncert:				+/-0.0902						
TPU:				+/-0.171						
**Uranium-232 Tracer	2.09			2.12	pCi/L		101	(50%-105%)		
Uncert:				+/-0.0802						
TPU:				+/-0.138						
QC1203911103 MB										
Uranium-234			U	0.00781	pCi/L				HAKB	11/16/1707:31
Uncert:				+/-0.0118						
TPU:				+/-0.0118						
Uranium-235/236			U	0.0138	pCi/L					
Uncert:				+/-0.0105						
TPU:				+/-0.0105						
Uranium-238			U	0.00476	pCi/L					
Uncert:				+/-0.00718						
TPU:				+/-0.00719						

QC Summary

Workorder: **436615**

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1715445										
**Uranium-232 Tracer	2.09			1.93	pCi/L		92.2	(50%-105%)		
	Uncert:			+/-0.0835						
	TPU:			+/-0.141						
Rad Gamma Spec										
Batch 1716271										
QC1203913159 436463002 DUP										
Cesium-137	U	-0.569	U	-0.885	pCi/L	0.0607		(0-1)	BSW1	11/16/1711:06
	Uncert:	+/-1.26		+/-1.32						
	TPU:	+/-1.27		+/-1.33						
Cobalt-60	U	-0.55	U	0.470	pCi/L	0.179		(0-1)		
	Uncert:	+/-1.57		+/-1.27						
	TPU:	+/-1.58		+/-1.27						
Neptunium-237	U	-0.691	U	6.70	pCi/L	0.536		(0-1)		
	Uncert:	+/-2.90		+/-3.98						
	TPU:	+/-2.90		+/-3.99						
Potassium-40	U	6.14	U	-10.4	pCi/L	0.183		(0-1)		
	Uncert:	+/-24.3		+/-20.7						
	TPU:	+/-24.3		+/-20.9						
Sodium-22	U	1.59	U	0.0529	pCi/L	0.299		(0-1)		
	Uncert:	+/-1.26		+/-1.26						
	TPU:	+/-1.31		+/-1.26						
QC1203913160 LCS										
Americium-241	34300			34900	pCi/L		102	(80%-120%)	BSW1	11/16/1709:58
	Uncert:			+/-878						
	TPU:			+/-3420						
Cesium-137	13000			13700	pCi/L		105	(80%-120%)		
	Uncert:			+/-180						
	TPU:			+/-915						
Cobalt-60	11300			11100	pCi/L		98.4	(80%-120%)		
	Uncert:			+/-173						
	TPU:			+/-497						
Neptunium-237			U	43.2	pCi/L					
	Uncert:			+/-60.5						
	TPU:			+/-61.4						
Potassium-40			U	36.1	pCi/L					
	Uncert:			+/-96.2						
	TPU:			+/-96.6						
Sodium-22			U	-22.8	pCi/L					
	Uncert:			+/-19.0						
	TPU:			+/-19.7						
QC1203913158 MB										
Cesium-137			U	0.201	pCi/L				BSW1	11/16/1709:57
	Uncert:			+/-1.21						
	TPU:			+/-1.21						
Cobalt-60			U	0.757	pCi/L					
	Uncert:			+/-1.26						

QC Summary

Workorder: **436615**

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 1716271										
	TPU:			+/-1.27						
Neptunium-237			U	-0.0134	pCi/L					
	Uncert:			+/-1.88						
	TPU:			+/-1.88						
Potassium-40			U	15.3	pCi/L					
	Uncert:			+/-12.7						
	TPU:			+/-13.2						
Sodium-22			U	0.346	pCi/L					
	Uncert:			+/-1.15						
	TPU:			+/-1.16						
Rad Gas Flow										
Batch 1716449										
QC1203913665 437078009 DUP										
Alpha		2.35	U	1.11	pCi/L	0.36		(0-1)	AXH4	11/15/17 16:48
	Uncert:	+/-0.879		+/-0.802						
	TPU:	+/-0.901		+/-0.808						
Beta	U	2.54		4.00	pCi/L	0.363		(0-1)		11/15/17 11:42
	Uncert:	+/-0.959		+/-0.980						
	TPU:	+/-0.982		+/-1.04						
QC1203913668 LCS										
Alpha	12.1			11.6	pCi/L		95.6	(80%-120%)	AXH4	11/15/17 16:50
	Uncert:			+/-0.557						
	TPU:			+/-1.12						
Beta	47.4			49.7	pCi/L		105	(80%-120%)		11/15/17 12:09
	Uncert:			+/-0.878						
	TPU:			+/-4.21						
QC1203913664 MB										
Alpha			U	0.235	pCi/L				AXH4	11/15/17 16:48
	Uncert:			+/-0.124						
	TPU:			+/-0.125						
Beta			U	0.276	pCi/L					11/15/17 12:08
	Uncert:			+/-0.130						
	TPU:			+/-0.132						
QC1203913666 437078009 MS										
Alpha	483	2.35		371	pCi/L		76.3	(75%-125%)	AXH4	11/16/17 10:18
	Uncert:	+/-0.879		+/-20.9						
	TPU:	+/-0.901		+/-39.2						
Beta	1900 U	2.54		2020	pCi/L		107	(75%-125%)		11/15/17 12:08
	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	11/15/17 16:50
	Uncert:	+/-0.879		+/-21.9						
	TPU:	+/-0.901		+/-43.6						
Beta	1900 U	2.54		1790	pCi/L	0.364	94.2	(0-1)		11/15/17 12:08
	Uncert:	+/-0.959		+/-33.2						

QC Summary

Workorder: **436615**

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Gas Flow										
Batch 1716449										
	TPU:	+/-0.982		+/-152						
Batch 1717217										
QC1203915511 436615005 DUP										
Strontium-90	U	0.110	U	0.0423	pCi/L	0.262		(0-1)	KSD1	11/16/17 18:56
	Uncert:	+/-0.0726		+/-0.0553						
	TPU:	+/-0.0731		+/-0.0554						
**Strontium Carrier	7.85	6.30		7.50	mg		95.5	(50%-105%)		
QC1203915513 LCS										
Strontium-90	23.7			22.5	pCi/L		95.1	(80%-120%)	KSD1	11/16/17 18:56
	Uncert:			+/-0.646						
	TPU:			+/-1.93						
**Strontium Carrier	7.85			7.90	mg		101	(50%-105%)		
QC1203915510 MB										
Strontium-90			U	-0.689	pCi/L				KSD1	11/16/17 18:56
	Uncert:			+/-0.0522						
	TPU:			+/-0.0522						
**Strontium Carrier	7.85			6.70	mg		85.4	(50%-105%)		
QC1203915512 436615005 MS										
Strontium-90	237 U	0.110		210	pCi/L		88.4	(75%-125%)	KSD1	11/16/17 18:56
	Uncert:	+/-0.0726		+/-6.05						
	TPU:	+/-0.0731		+/-17.9						
**Strontium Carrier	7.85	6.30		7.50	mg		95.5	(50%-105%)		

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.
R	Sample results are rejected

QC Summary

Workorder: **436615**

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

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.