

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:

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11508

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

SAMPLE ID: CAPA-18-147548

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-23-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1419		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	RSP	
LOCATION ID:	R-20 S1		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <input checked="" type="checkbox"/>

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): A. Vigil

RELINQUISHED BY (Printed Name) Tanya VanderVis (Signature) Tanya VanderVis	Date/Time 10-23-17 1500	RECEIVED BY (Printed Name) S. Sherwood (Signature) S. Sherwood	Date/Time 10/23/17 1500
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-18-147574

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-23-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1419		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	RSP	
LOCATION ID:	R-20 S1		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	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: none

LOCATION COMMENTS: none

FIELD PARAMETERS:

Sample Time 1419 HH:MM
 Oxidation-Reduction Potential 132.9 mV
 Temperature 18.50C

Dissolved Oxygen 2.23 mg/L
 pH 8.39
 Turbidity 0.92 NTU

Flow (in gpm) 0.72 gpm
 Specific Conductance 139.0 μ S/cm

COLLECTED BY (PRINT): A. Vigil

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**EVENT ID:** 11508**EVENT NAME:** Pajarito (TA-54) & Chromium October
Monthly MY2018 Q1**SAMPLE ID:** CAPA-18-147574**WORK ORDER:**

RELINQUISHED BY (Printed Name) Tanya VanderVier (Signature) <i>Tanya VanderVier</i>	Date/Time 10-23-17 1500	RECEIVED BY (Printed Name) S. Sherwood (Signature) <i>S. Sherwood</i>	Date/Time 10/23/17 1500
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-18-147604

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	10-23-17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1419		MEDIA:		
PRS ID:	NA		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-20 S1		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

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

SAMPLE COMMENTS:

10-23-17

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): A. Vigil

RELINQUISHED BY (Printed Name) Tanya VanderVice (Signature) Tanya VanderVice	Date/Time 10-23-17 1500	RECEIVED BY (Printed Name) S. Sherwood (Signature) S. Sherwood	Date/Time 10/23/17 1530
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 10/05/2017

2018-558 TEST - Explosives		YES	NO
Samples collected from a WFO area?			X
Field Test for Explosives Results		YES	NO NA
Spot test shows presence of explosives residues. If YES - Do not ship.			X

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

TEST - Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity?				X
Sample Activity (dpm/100cm ²)	Shipment Activity (dpm*g/100cm ²)	Sampled Location	YES	NO NA
Alpha detectable	Alpha >160,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49		X
Alpha > 125	Alpha >1,250,000	other locations		
Beta > 1,500	Beta >15,000,000	any location		
The sample Alpha >16,000,000 dpm*g/100cm ² or Beta > 160,000,000 dpm*g/100cm ² . If YES - Do not ship.				
On the external surface of the sample container, alpha activity ≥ 24 dpm/cm ² , beta activity ≥ 240 dpm/cm ² , or surface activity ≥ 0.5 mR/hr. If YES - Do not ship.				
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on field screening measurements of alpha and beta activity.				

TEST - Location		YES	NO
Prior analytical measurements of radioactive isotopes are available?		X	
Sample Activity (pCi/g)	Shipment Activity (pCi)	YES	NO NA
<ul style="list-style-type: none"> Am-241 > 27 Cs-137 > 270 Pu-238 > 27 Pu-239/240 > 27 Th-228 > 27 U-234 > 270 U-238 > 270 H-3 > 27,000,000 	<ul style="list-style-type: none"> Am-241 > 270,000 Cs-137 > 270,000 Pu-238 > 270,000 Pu-239/240 > 270,000 Th-228 > 270,000 U-234 > 1,600,000,000 U-238 > unlimited H-3 > 27,000,000,000 		X
Am-241, Pu-238, Pu-239/240, or Th 228 > 27,000,000 pCi; or Cs-137 > 270,000,000 pCi or U-234 ≥ 160,000,000 pCi; or H-3 ≥ 1 Ci. If YES - Do not ship.			X
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on prior analytical measurements of radioactive isotopes.			X

TEST - AK		YES	NO	NA
The shippers documented knowledge of the sample positively identifies appropriate labeling.				X
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, and the sample is submitted to ARS or RP for hazard classification analysis.				X

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

These samples do not meet the criteria for classification in any hazard class according to regulation OSHA 29 CFR 1910.1200. The sample(s) contained in this shipment have been assigned a tentative proper DOT shipping name, hazard class, identification number, and packing group, based on the shipper's knowledge of the sample:

Hazard Assessment Completed By:	Date/Time
(Printed Name) Melissa M. [Signature]	10/24/17
(Signature) [Signature]	340

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) MATT ENGLERT	10-24-17
(Signature) [Signature]	1500

DATA VALIDATION REPORT

Chain Of Custody No. 2018-558

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
436149	EPA:120.1	1				
436149	EPA:150.1	1				
436149	EPA:160.1	1				
436149	EPA:170.0	2		1		
436149	EPA:245.2	2				
436149	EPA:300.0	1				
436149	EPA:310.1	1				
436149	EPA:335.4	1				
436149	EPA:350.1	1				
436149	EPA:351.2	1				
436149	EPA:353.2	1				
436149	EPA:365.4	1				
436149	EPA:900	1				
436149	EPA:901.1	1				
436149	EPA:905.0	1				
436149	HASL-300:AM-241	1				
436149	HASL-300:ISOPU	1				
436149	HASL-300:ISOU	1				
436149	SM:A2340B	1				
436149	SW-846:6010C	1				
436149	SW-846:6020	1				
436149	SW-846:6850	1				
436149	SW-846:8260B	1		1		
436149	SW-846:8270D	1				
436149	SW-846:9060	1				

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
436149	EPA:120.1	1714428	1714428	1										1				1			
436149	EPA:150.1	1714456	1714456	1										1				2			
436149	EPA:160.1	1713394	1713394	1					1					1				1			
436149	EPA:170.0	NA	NA	2		1															
436149	EPA:245.2	1717920	1717917	2					1	1				1				1			
436149	EPA:300.0	1715632	1715632	1					1					1				1			
436149	EPA:310.1	1714454	1714454	1						1				1				1			
436149	EPA:335.4	1712934	1712933	1					1	1				1				1			
436149	EPA:350.1	1714362	1714361	1					1	1				1				1			
436149	EPA:351.2	1714720	1714719	1					1	1				1				1			
436149	EPA:353.2	1713174	1713174	1					1					1				1			
436149	EPA:365.4	1713122	1713121	1					1	2				1				2			
436149	EPA:900	1716449	1716449	1					1	1	1			1				1			
436149	EPA:901.1	1713592	1713592	1					1					1				1			
436149	EPA:905.0	1714184	1714184	1					1	1				1				1			
436149	HASL-300:AM-241	1713388	1713388	1					1					1				1			
436149	HASL-300:ISOPU	1718157	1718157	1					1					1				1			
436149	HASL-300:ISOU	1713390	1713390	1					1					1				1			
436149	SM:A2340B	1720959	1720959	1																	
436149	SW-846:6010C	1712922	1712921	1					1	1				1				1			
436149	SW-846:6020	1712981	1712980	1					1	1				1				1			
436149	SW-846:6850	1713226	1713223	1					1	1	1			1							
436149	SW-846:8260B	1714932	1714932	1		1			2					4							
436149	SW-846:8270D	1713403	1713402	1					1	1	1			1							
436149	SW-846:9060	1711615	1711615	1					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-18-147548	436149001	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-18-147558	1203908703	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203908702	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147548	436149001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147549	1203908781	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAPA-18-147569	1203908841	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203908780	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147548	436149001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAPA-18-147573	1203905963	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203905962	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203905961	MB	1	0	0	0
EPA:170.0	VOC	CAPA-18-147548	436149001	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147574	436149002	REG	1	0	0	0
EPA:170.0	VOC	CAPA-18-147604	436149003	FTB	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147548	436149001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147569	1203917284	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAPA-18-147569	1203917286	MS	0	0	1	0
EPA:245.2	INORGANIC	CAPA-18-147574	436149002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203917283	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203917282	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-18-147648	1203911578	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAPA-18-147548	436149001	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-18-147548	436149001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147549	1203908768	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPA-18-147549	1203908770	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203908765	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAPA-18-147574	1203904784	DUP	1	0	0	0
EPA:335.4	INORGANIC	CAPA-18-147574	1203904786	MS	0	0	1	0
EPA:335.4	INORGANIC	CAPA-18-147574	436149002	REG	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203904783	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203904782	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147548	436149001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147558	1203908497	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-18-147558	1203908498	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203908496	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203908495	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147574	436149002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147589	1203909430	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-18-147589	1203909431	MS	0	0	1	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:351.2	GENERAL CHEMISTRY	LCS	1203909429	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203909428	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147548	436149001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAPA-18-147560	1203905379	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203905377	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203905376	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147548	436149001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147560	1203905251	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147560	1203905252	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147561	1203905253	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAPA-18-147561	1203905254	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203905250	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203905249	MB	1	0	0	0
EPA:900	RAD	CAPA-18-147574	436149002	REG	2	0	0	0
EPA:900	RAD	CAPA-18-147631	1203913665	DUP	2	0	0	0
EPA:900	RAD	CAPA-18-147631	1203913666	MS	0	0	2	0
EPA:900	RAD	CAPA-18-147631	1203913667	MSD	0	0	2	0
EPA:900	RAD	LCS	1203913668	LCS	0	0	2	0
EPA:900	RAD	MB	1203913664	MB	2	0	0	0
EPA:901.1	RAD	CAPA-18-147574	1203906423	DUP	5	0	0	0
EPA:901.1	RAD	CAPA-18-147574	436149002	REG	5	0	0	0
EPA:901.1	RAD	LCS	1203906424	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203906422	MB	5	0	0	0
EPA:905.0	RAD	CAPA-18-147574	1203907995	DUP	1	0	0	0
EPA:905.0	RAD	CAPA-18-147574	1203907996	MS	0	0	1	0
EPA:905.0	RAD	CAPA-18-147574	436149002	REG	1	0	0	0
EPA:905.0	RAD	LCS	1203907997	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203907994	MB	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147574	436149002	REG	1	0	0	0
HASL-300:AM-241	RAD	CAPA-18-147586	1203905947	DUP	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203905948	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203905946	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147574	1203917958	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAPA-18-147574	436149002	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203917959	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203917957	MB	2	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147574	436149002	REG	3	0	0	0
HASL-300:ISOU	RAD	CAPA-18-147586	1203905953	DUP	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203905954	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203905952	MB	3	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SM:A2340B	INORGANIC	CAPA-18-147548	436149001	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147548	436149001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147569	1203904772	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAPA-18-147569	1203904773	MS	0	0	17	0
SW-846:6010C	INORGANIC	LCS	1203904771	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203904770	MB	17	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147548	436149001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147569	1203904883	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAPA-18-147569	1203904884	MS	0	0	11	0
SW-846:6020	INORGANIC	LCS	1203904882	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203904881	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147548	436149001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147560	1203905526	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAPA-18-147560	1203905527	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203905525	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203905524	MB	1	0	0	0
SW-846:8260B	VOC	CAPA-18-147574	436149002	REG	80	3	0	0
SW-846:8260B	VOC	CAPA-18-147604	436149003	FTB	80	3	0	0
SW-846:8260B	VOC	LCS	1203909913	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203909914	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203910785	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203910786	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203909912	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203910784	MB	80	3	0	0
SW-846:8270D	SVOC	CAPA-18-147574	436149002	REG	80	6	0	0
SW-846:8270D	SVOC	CAPA-18-147580	1203905984	MS	0	6	76	0
SW-846:8270D	SVOC	CAPA-18-147580	1203905986	MSD	0	6	76	0
SW-846:8270D	SVOC	LCS	1203905983	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203905982	MB	80	6	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147574	436149002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-18-147598	1203905562	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203905560	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203905559	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

DATA VALIDATION REPORT

No.

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203905249	METHOD BLANK	EPA:365.4	W	Total Phosphate as Phosphorus	0.0361	J	mg/L	0.050
CAPA-18-147604	436149003	TRIP BLANK	EPA:170.0	W	Temperature	4		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-18-147548	1203905249	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.0361	mg/L	0.0928		0.050	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

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

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

DATA VALIDATION REPORT

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.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-20 S1	2018-558	CAPA-18-147548	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus		U	I4	N	0.0928	mg/L	0.0928	mg/L			W	10/23/2017		1713122	VAL	Y
R-20 S1	2018-558	CAPA-18-147574	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	2.44	pCi/L	2.44	pCi/L	3.18	1.27	W	10/23/2017		1713592	VAL	Y
R-20 S1	2018-558	CAPA-18-147574	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	1.51	pCi/L	1.51	pCi/L	5.20	1.17	W	10/23/2017		1713592	VAL	Y
R-20 S1	2018-558	CAPA-18-147574	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.762	pCi/L	0.762	pCi/L	2.82	0.769	W	10/23/2017		1716449	VAL	Y
R-20 S1	2018-558	CAPA-18-147574	REG	INIT	VOC	SW-846:8260B	Methylene Chloride	U	U	V4	N	1.08	ug/L	1.08	ug/L			W	10/23/2017		1714932	VAL	Y
R-20 S1	2018-558	CAPA-18-147574	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	2.1	pCi/L	2.1	pCi/L	8.15	2.08	W	10/23/2017		1713592	VAL	Y
R-20 S1	2018-558	CAPA-18-147574	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.00392	pCi/L	0.00392	pCi/L	0.0679	0.0152	W	10/23/2017		1718157	VAL	Y
R-20 S1	2018-558	CAPA-18-147574	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	-0.0117	pCi/L	-0.0117	pCi/L	0.088	0.0188	W	10/23/2017		1718157	VAL	Y
R-20 S1	2018-558	CAPA-18-147574	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	3.77	pCi/L	3.77	pCi/L	72.1	20.6	W	10/23/2017		1713592	VAL	Y
R-20 S1	2018-558	CAPA-18-147574	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-0.439	pCi/L	-0.439	pCi/L	4.48	1.19	W	10/23/2017		1713592	VAL	Y
R-20 S1	2018-558	CAPA-18-147574	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.105	pCi/L	-0.105	pCi/L	0.430	0.104	W	10/23/2017		1714184	VAL	Y

DATA VALIDATION REPORT

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-20 S1	2018-558	CAPA-18-147574	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0163	pCi/L	0.0163	pCi/L	0.0595	0.0118	W	10/23/2017		1713390	VAL	Y

Reason Code

Description

I4

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

J_LAB

The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL

NQ

The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualify. The analyte is detected in the sample.

R5

Analyte is not detected because the amount reported is less than the MDC.

U_LAB

The analytical laboratory qualified the analyte as not detected.

V4

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

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147548	R-20 S1	REG	EPA:120.1	0	1
CAPA-18-147548	R-20 S1	REG	EPA:150.1	0	1
CAPA-18-147548	R-20 S1	REG	EPA:160.1	0	1
CAPA-18-147548	R-20 S1	REG	EPA:170.0	0	1
CAPA-18-147548	R-20 S1	REG	EPA:245.2	0	1
CAPA-18-147548	R-20 S1	REG	EPA:300.0	0	4
CAPA-18-147548	R-20 S1	REG	EPA:310.1	0	2
CAPA-18-147548	R-20 S1	REG	EPA:350.1	0	1
CAPA-18-147548	R-20 S1	REG	EPA:353.2	0	1
CAPA-18-147548	R-20 S1	REG	EPA:365.4	0	1
CAPA-18-147548	R-20 S1	REG	SM:A2340B	0	1
CAPA-18-147548	R-20 S1	REG	SW-846:6010C	0	17
CAPA-18-147548	R-20 S1	REG	SW-846:6020	0	11
CAPA-18-147548	R-20 S1	REG	SW-846:6850	0	1
CAPA-18-147574	R-20 S1	REG	EPA:170.0	0	1
CAPA-18-147574	R-20 S1	REG	EPA:245.2	0	1
CAPA-18-147574	R-20 S1	REG	EPA:335.4	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-18-147574	R-20 S1	REG	EPA:351.2	0	1
CAPA-18-147574	R-20 S1	REG	EPA:900	0	2
CAPA-18-147574	R-20 S1	REG	EPA:901.1	0	5
CAPA-18-147574	R-20 S1	REG	EPA:905.0	0	1
CAPA-18-147574	R-20 S1	REG	HASL-300:AM-241	0	1
CAPA-18-147574	R-20 S1	REG	HASL-300:ISOPU	0	2
CAPA-18-147574	R-20 S1	REG	HASL-300:ISOU	0	3
CAPA-18-147574	R-20 S1	REG	SW-846:8260B	0	80
CAPA-18-147574	R-20 S1	REG	SW-846:8270D	0	80
CAPA-18-147574	R-20 S1	REG	SW-846:9060	0	1
CAPA-18-147604	R-20 S1	FTB	EPA:170.0	0	1
CAPA-18-147604	R-20 S1	FTB	SW-846:8260B	0	80

November 17, 2017

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

Re: LANL- WQH Water Samples
Work Order: 436149
SDG: 2018-558

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on October 25, 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: 2018-558
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 436149
SDG: 2018-558

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 436149
SDG # : 2018-558**

November 17, 2017

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on October 25, 2017 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperatures were checked, documented, and within specifications. Shipping container temperature was within specification (0 - 6C). There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
436149001	CAPA-18-147548
436149002	CAPA-18-147574
436149003	CAPA-18-147604

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: GC/MS Semivolatile, GC/MS Volatile, General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry.

I certify that this data report is in compliance with the terms and conditions of the subcontract and task order, both technically and for completeness, for other than the conditions detailed in the attached case narrative.


Katrina Hiott for
Valerie Davis
Project Manager

List of current GEL Certifications as of 17 November 2017

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-24
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Chain of Custody and Supporting Documentation

2018-558		TEST - Explosives		YES	NO
Samples collected from a WFO area?					X
Field Test for Explosives Results				YES	NO NA
Spot test shows presence of explosives residues. If YES - Do not ship.					X

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

TEST - Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity?				X
Sample Activity (dpm/100cm ²)	Shipment Activity (dpm*g/100cm ²)	Sampled Location	YES	NO NA
Alpha detectable	Alpha >160,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49		X
Alpha > 125	Alpha >1,250,000	other locations		
Beta > 1,500	Beta >15,000,000	any location		
The sample Alpha >16,000,000 dpm*g/100cm ² or Beta > 160,000,000 dpm*g/100cm ² . If YES - Do not ship.				
On the external surface of the sample container, alpha activity ≥ 24 dpm/cm ² , beta activity ≥ 240 dpm/cm ² , or surface activity ≥ 0.5 mR/hr. If YES - Do not ship.				
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on field screening measurements of alpha and beta activity.				

TEST - Location		YES	NO
Prior analytical measurements of radioactive isotopes are available?		X	
Sample Activity (pCi/g)	Shipment Activity (pCi)	YES	NO NA
<ul style="list-style-type: none"> Am-241 > 27 Cs-137 > 270 Pu-238 > 27 Pu-239/240 > 27 Th-228 > 27 U-234 > 270 U-238 > 270 H-3 > 27,000,000 	<ul style="list-style-type: none"> Am-241 > 270,000 Cs-137 > 270,000 Pu-238 > 270,000 Pu-239/240 > 270,000 Th-228 > 270,000 U-234 > 1,600,000,000 U-238 > unlimited H-3 > 27,000,000,000 		X
Am-241, Pu-238, Pu-239/240, or Th 228 > 27,000,000 pCi; or Cs-137 > 270,000,000 pCi or U-234 ≥ 160,000,000 pCi; or H-3 ≥ 1 Ci. If YES - Do not ship.			X
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, based on prior analytical measurements of radioactive isotopes.			X

TEST - AK		YES	NO	NA
The shippers documented knowledge of the sample positively identifies appropriate labeling.				X
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910, and the sample is submitted to ARS or RP for hazard classification analysis.				X

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

These samples do not meet the criteria for classification in any hazard class according to regulation OSHA 29 CFR 1910.1200. The sample(s) contained in this shipment have been assigned a tentative proper DOT shipping name, hazard class, identification number, and packing group, based on the shipper's knowledge of the sample:

Hazard Assessment Completed By:	Date/Time
(Printed Name) Melissa M. [Signature]	10/24/17
(Signature) [Signature]	3:00

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) MATT ENGLERT	10-24-17
(Signature) [Signature]	15:00

SAMPLE RECEIPT & REVIEW FORM

Client: <u>ESHC</u>		SDG/AR/COC/Work Order: <u>430149</u>	
Received By: <u>ZKW</u>		Date Received: <u>10/25/17</u>	
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other	
		<u>5908 1783 0427-4C</u> <u>5908 1783 0438-4C</u> <u>5908 1783 0416-18C (rechem)</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0 CPM</u> / mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	<input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. <input checked="" type="checkbox"/> PCB's <input type="checkbox"/> Flammable <input type="checkbox"/> Foreign Soil <input type="checkbox"/> RCRA <input type="checkbox"/> Asbestos <input type="checkbox"/> Beryllium <input type="checkbox"/> Other:	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet Ice <input checked="" type="checkbox"/> Ice Packs Dry ice <input checked="" type="checkbox"/> None Other: *all temperatures are recorded in Celsius TEMP: <u>9.2°C</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR3-16</u> Secondary Temperature Device Serial # (If Applicable):
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#:
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No ___ N/A ___ Sample ID's and containers affected:
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials

KHoff

Date

10/25/17

Page

1

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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 24OCT17
ACTWGT: 30.0 LB MAN
CAD: 0014176/CAFE2916

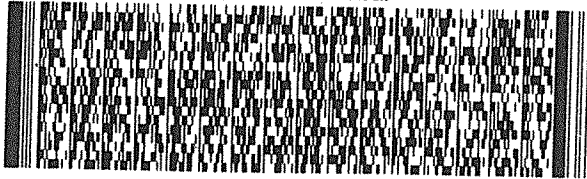
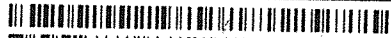
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRGW04BAGWSO



FedEx
Express



1 of 2

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MASTER

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WED - 25 OCT 10:30A
PRIORITY OVERNIGHT

29407
SC-US CHS



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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 24OCT17
ACTWGT: 37.0 LB M
CAD: 0014176/CAFE

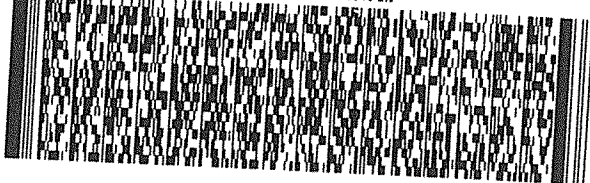
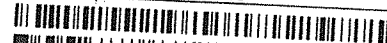
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GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: WE6L11551000



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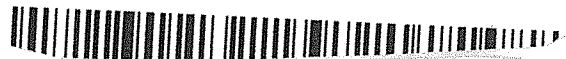
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PRIORITY OVERN

TRK#
0201

5908 1783 0438

X7 RBWA

29
SC-US



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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 24OCT17
ACTWGT: 48.0 LB M
CAD: 0014176/CAFE

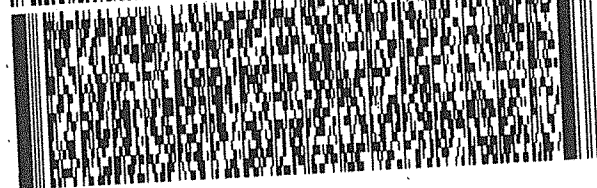
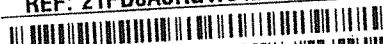
BILL SENDER

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GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRGW04BAGWSO



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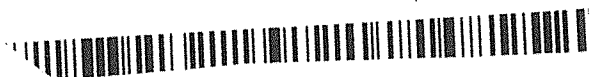
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Data Review Qualifier Flag Definition Sheet

Data Review Qualifier Definitions

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

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

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

Volatile Analysis

Case Narrative

**GC/MS Volatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-558
Work Order #: 436149**

Method/Analysis Information

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

Analytical Method: SW-846:8260B

Analytical Batch Number: 1714932

Sample Analysis

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

Sample ID	Client ID
436149002	CAPA-18-147574
436149003	CAPA-18-147604
1203909912	Method Blank (MB)
1203909913	Laboratory Control Sample (LCS)
1203909914	Laboratory Control Sample (LCS)
1203909915	436322007(CAPA-18-147578) Post Spike (PS)
1203909916	436322007(CAPA-18-147578) Post Spike (PS)
1203909917	436322007(CAPA-18-147578) Post Spike Duplicate (PSD)
1203909918	436322007(CAPA-18-147578) Post Spike Duplicate (PSD)
1203910784	Method Blank (MB)
1203910785	Laboratory Control Sample (LCS)
1203910786	Laboratory Control Sample (LCS)

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

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

SOP Reference

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

Calibration Information

A complete list of the initial calibration data files with the correct dates and times of analysis are shown in the Calibration History report located in the Standard Data section of the data package. The surrogate compounds were calibrated using a minimum five-point calibration curve. The surrogates were added by the auto sampler at a concentration of 50 ug/L or 20 ug/L for low level analyses. GEL Laboratories LLC will not have surrogate recoveries reported for Dibromofluoromethane. This is due to increased regulations for this analyte and an

industry shortage.

Initial Calibration

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

Continuing Calibration Verification Requirements

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

Quality Control (QC) Information

Blank (MB) Statement

The blanks analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

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

Matrix Spike/Matrix Spike Duplicate Recovery Statement

The spike and/or spike duplicate (See Below) recoveries were not all within the acceptance limits.

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

Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

The internal standard responses in all client and quality control samples met the required acceptance criteria.

Technical Information

Holding Time Specifications

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

Sample Preservation and Integrity

All samples met the sample preservation and integrity requirements.

Sample Dilutions/Methanol Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-analyses were not required for samples in this SDG.

Miscellaneous Information

Manual Integrations

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

TIC Comment

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

Additional Comments

Additional comments were not required for this SDG.

Residual Chlorine

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

Electronic Package Comment

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

System Configuration

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

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-558 GEL Work Order: 436149

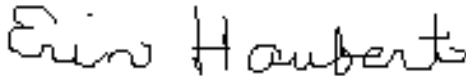
The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Erin Haubert

Date: 16 NOV 2017

Title: Data Validator

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-558

Lab Sample ID: 436149002

Date Collected: 10/23/2017 14:19

Date Received: 10/25/2017 08:50

Matrix: W

Client ID: CAPA-18-147574

Batch ID: 1714932

Run Date: 11/01/2017 19:13

Prep Date: 11/01/2017 19:13

Data File: 110117V9\9Q319.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-558

Lab Sample ID: 436149002

Date Collected: 10/23/2017 14:19

Date Received: 10/25/2017 08:50

Matrix: W

Client ID: CAPA-18-147574

Batch ID: 1714932

Run Date: 11/01/2017 19:13

Prep Date: 11/01/2017 19:13

Data File: 110117V9\9Q319.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride	J	1.08	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: 2018-558
Lab Sample ID: 436149002

Date Collected: 10/23/2017 14:19
Date Received: 10/25/2017 08:50

Matrix: W

Client ID: CAPA-18-147574

Client: ARSL004

Project: ESHL00114

Batch ID: 1714932

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 11/01/2017 19:13

Inst: VOA9.I

Dilution: 1

Prep Date: 11/01/2017 19:13

Analyst: RXY1

Purge Vol: 5 mL

Data File: 110117V9\9Q319.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.9	50.0	ug/L 108	(71%-134%)
Bromofluorobenzene	51.0	50.0	ug/L 102	(70%-131%)
Toluene-d8	51.1	50.0	ug/L 102	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	12.291	5.28	ug/L	0	J
	unknown siloxane	14.651	11.5	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-558

Lab Sample ID: 436149003

Date Collected: 10/23/2017 14:19

Date Received: 10/25/2017 08:50

Matrix: W

Client ID: CAPA-18-147604

Batch ID: 1714932

Run Date: 11/01/2017 15:59

Prep Date: 11/01/2017 15:59

Data File: 110117V9\9Q312.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-558

Lab Sample ID: 436149003

Date Collected: 10/23/2017 14:19

Date Received: 10/25/2017 08:50

Matrix: W

Client ID: CAPA-18-147604

Batch ID: 1714932

Run Date: 11/01/2017 15:59

Prep Date: 11/01/2017 15:59

Data File: 110117V9\9Q312.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-558

Lab Sample ID: 436149003

Date Collected: 10/23/2017 14:19

Date Received: 10/25/2017 08:50

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAPA-18-147604

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1714932

Inst: VOA9.I

Dilution: 1

Run Date: 11/01/2017 15:59

Analyst: RXY1

Purge Vol: 5 mL

Prep Date: 11/01/2017 15:59

Column: DB-624

Data File: 110117V9\9Q312.D

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.1	50.0	ug/L 102	(71%-134%)
Bromofluorobenzene	48.0	50.0	ug/L 96	(70%-131%)
Toluene-d8	50.5	50.0	ug/L 101	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	14.651	6.53	ug/L	0	J

Quality Control Summary

Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-558**Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203909913	LCS for batch 1714932	97	101	98
1203909914	LCS for batch 1714932	96	100	96
1203909912	MB for batch 1714932	99	99	101
436149003	CAPA-18-147604	102	101	96
436149002	CAPA-18-147574	108	102	102
1203910785	LCS for batch 1714932	101	106	100
1203910786	LCS for batch 1714932	107	105	98
1203910784	MB for batch 1714932	109	108	101
1203909915	CAPA-18-147578PS	119	109	104
1203909917	CAPA-18-147578PSD	118	104	103
1203909916	CAPA-18-147578PS	110	108	98
1203909918	CAPA-18-147578PSD	112	107	96

Surrogate**Acceptance Limits**

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

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203909913

Instrument: VOA9.I

Analysis Date: 11/01/2017 12:44

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203909913

Instrument: VOA9.I

Analysis Date: 11/01/2017 12:44

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203909913

Instrument: VOA9.I

Analysis Date: 11/01/2017 12:44

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203909913

Instrument: VOA9.I

Analysis Date: 11/01/2017 12:44

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203909914

Instrument: VOA9.I

Analysis Date: 11/01/2017 13:11

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-558

Client ID: CAPA-18-147578PS

Lab Sample ID 1203909915

Instrument: VOA4.I

Analyst: VXY1

Purge Vol: 5 mL

Sample Type: Post Spike

Matrix: W

Analysis Date: 11/07/2017 13:02

Dilution: 1

Batch ID: 1714932

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

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-558

Sample Type: Post Spike

Client ID: CAPA-18-147578PS

Matrix: W

Lab Sample ID 1203909915

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:02

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 8

SDG Number: 2018-558

Sample Type: Post Spike

Client ID: CAPA-18-147578PS

Matrix: W

Lab Sample ID 1203909915

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:02

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-558

Sample Type: Post Spike

Client ID: CAPA-18-147578PS

Matrix: W

Lab Sample ID 1203909915

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:02

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147578PSD

Matrix: W

Lab Sample ID 1203909917

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:31

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147578PSD

Matrix: W

Lab Sample ID 1203909917

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:31

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147578PSD

Matrix: W

Lab Sample ID 1203909917

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:31

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-558

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147578PSD

Matrix: W

Lab Sample ID 1203909917

Instrument: VOA4.I

Analysis Date: 11/07/2017 13:31

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-558

Sample Type: Post Spike

Client ID: CAPA-18-147578PS

Matrix: W

Lab Sample ID 1203909916

Instrument: VOA4.I

Analysis Date: 11/07/2017 14:01

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-558

Sample Type: Post Spike Duplicate

Client ID: CAPA-18-147578PSD

Matrix: W

Lab Sample ID 1203909918

Instrument: VOA4.I

Analysis Date: 11/07/2017 14:30

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203910785

Instrument: VOA4.I

Analysis Date: 11/07/2017 09:38

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203910785

Instrument: VOA4.I

Analysis Date: 11/07/2017 09:38

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203910785

Instrument: VOA4.I

Analysis Date: 11/07/2017 09:38

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203910785

Instrument: VOA4.I

Analysis Date: 11/07/2017 09:38

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1714932

Matrix: WATER

Lab Sample ID 1203910786

Instrument: VOA4.I

Analysis Date: 11/07/2017 10:36

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1714932

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

Method Blank Summary

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SDG Number:	2018-558	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1714932	Instrument ID:	VOA9.I	Data File:	110117V9\9Q307B1.D
Lab Sample ID:	1203909912	Prep Date:	11/01/2017 13:39	Analyzed:	11/01/17 13:39
Column:	DB-624				

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

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 1714932	1203909913	110117V9\9Q305L1.D	11/01/17	1244
02 LCS for batch 1714932	1203909914	110117V9\9Q306L1.D	11/01/17	1311
03 CAPA-18-147604	436149003	110117V9\9Q312.D	11/01/17	1559
04 CAPA-18-147574	436149002	110117V9\9Q319.D	11/01/17	1913

Method Blank Summary

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SDG Number:	2018-558	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1714932	Instrument ID:	VOA4.I	Data File:	110717V4\4H206B.D
Lab Sample ID:	1203910784	Prep Date:	11/07/2017 11:05	Analyzed:	11/07/17 11:05
Column:	DB-624				

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

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

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558

Lab Sample ID: 1203909912

Client Sample: QC for batch 1714932

Client ID: MB for batch 1714932

Batch ID: 1714932

Run Date: 11/01/2017 13:39

Prep Date: 11/01/2017 13:39

Data File: 110117V9\9Q307B1.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558
Lab Sample ID: 1203909912
Client Sample: QC for batch 1714932
Client ID: MB for batch 1714932
Batch ID: 1714932
Run Date: 11/01/2017 13:39
Prep Date: 11/01/2017 13:39
Data File: 110117V9\9Q307B1.D

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

Column: DB-624

Matrix: WATER

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

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

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558

Lab Sample ID: 1203909912

Client Sample: QC for batch 1714932

Client ID: MB for batch 1714932

Batch ID: 1714932

Run Date: 11/01/2017 13:39

Prep Date: 11/01/2017 13:39

Data File: 110117V9\9Q307B1.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

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

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558
Lab Sample ID: 1203909913
Client Sample: QC for batch 1714932
Client ID: LCS for batch 1714932
Batch ID: 1714932
Run Date: 11/01/2017 12:44
Prep Date: 11/01/2017 12:44
Data File: 110117V9\9Q305L1.D

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

Column: DB-624

Matrix: WATER

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

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

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558
Lab Sample ID: 1203909913
Client Sample: QC for batch 1714932
Client ID: LCS for batch 1714932
Batch ID: 1714932
Run Date: 11/01/2017 12:44
Prep Date: 11/01/2017 12:44
Data File: 110117V9\9Q305L1.D

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

Column: DB-624

Matrix: WATER

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

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

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number:	2018-558	Matrix:	WATER
Lab Sample ID:	1203909913		
Client Sample:	QC for batch 1714932	Client:	ARSL004
Client ID:	LCS for batch 1714932	Method:	SW-846:8260B
Batch ID:	1714932	Inst:	VOA9.I
Run Date:	11/01/2017 12:44	Analyst:	RXY1
Prep Date:	11/01/2017 12:44	Purge Vol:	5 mL
Data File:	110117V9\9Q305L1.D	Column:	DB-624

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

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

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558
Lab Sample ID: 1203909914
Client Sample: QC for batch 1714932
Client ID: LCS for batch 1714932
Batch ID: 1714932
Run Date: 11/01/2017 13:11
Prep Date: 11/01/2017 13:11
Data File: 110117V9\9Q306L1.D

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

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		43.1	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		250	ug/L	1.50	5.00
107-13-1	Acrylonitrile		230	ug/L	1.50	5.00
107-05-1	Allyl chloride		213	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558
Lab Sample ID: 1203909914
Client Sample: QC for batch 1714932
Client ID: LCS for batch 1714932
Batch ID: 1714932
Run Date: 11/01/2017 13:11
Prep Date: 11/01/2017 13:11
Data File: 110117V9\9Q306L1.D

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

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		223	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2160	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		221	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		232	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		227	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		216	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-558
Lab Sample ID: 1203909914
Client Sample: QC for batch 1714932
Client ID: LCS for batch 1714932
Batch ID: 1714932
Run Date: 11/01/2017 13:11
Prep Date: 11/01/2017 13:11
Data File: 110117V9\9Q306L1.D

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

Column: DB-624

Matrix: WATER

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

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	48.1	50.0	ug/L	96	(71%-134%)
Bromofluorobenzene	48.0	50.0	ug/L	96	(70%-131%)
Toluene-d8	50.2	50.0	ug/L	100	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558
Lab Sample ID: 1203909915
Client Sample: QC for batch 1714932
Client ID: CAPA-18-147578PS
Batch ID: 1714932
Run Date: 11/07/2017 13:02
Prep Date: 11/07/2017 13:02
Data File: 110717V4\4H210.D

Date Collected: 10/24/2017 12:56
Date Received: 10/26/2017 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOA4.I
Analyst: VXY1

Column: DB-624

Matrix: W

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

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-558	Date Collected: 10/24/2017 12:56	Matrix: W
Lab Sample ID: 1203909915	Date Received: 10/26/2017 08:55	
Client Sample: QC for batch 1714932	Client: ARSL004	Project: QC
Client ID: CAPA-18-147578PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714932	Inst: VOA4.I	Dilution: 1
Run Date: 11/07/2017 13:02	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 11/07/2017 13:02		
Data File: 110717V4\4H210.D	Column: DB-624	

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-558	Date Collected:	10/24/2017 12:56	Matrix:	W
Lab Sample ID:	1203909915	Date Received:	10/26/2017 08:55		
Client Sample:	QC for batch 1714932	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147578PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714932	Inst:	VOA4.I	Dilution:	1
Run Date:	11/07/2017 13:02	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	11/07/2017 13:02				
Data File:	110717V4\4H210.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		45.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		46.2	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		54.3	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		52.4	ug/L	0.300	1.00

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

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558
Lab Sample ID: 1203909916
Client Sample: QC for batch 1714932
Client ID: CAPA-18-147578PS
Batch ID: 1714932
Run Date: 11/07/2017 14:01
Prep Date: 11/07/2017 14:01
Data File: 110717V4\4H212.D

Date Collected: 10/24/2017 12:56
Date Received: 10/26/2017 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOA4.I
Analyst: VXY1

Column: DB-624

Matrix: W

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		44.5	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		263	ug/L	1.50	5.00
107-13-1	Acrylonitrile		270	ug/L	1.50	5.00
107-05-1	Allyl chloride		261	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-558	Date Collected: 10/24/2017 12:56	Matrix: W
Lab Sample ID: 1203909916	Date Received: 10/26/2017 08:55	
Client Sample: QC for batch 1714932	Client: ARSL004	Project: QC
Client ID: CAPA-18-147578PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714932	Inst: VOA4.I	Dilution: 1
Run Date: 11/07/2017 14:01	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 11/07/2017 14:01		
Data File: 110717V4\4H212.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		214	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2650	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		262	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		200	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		252	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		208	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

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Sample Summary**

SDG Number:	2018-558	Date Collected:	10/24/2017 12:56	Matrix:	W
Lab Sample ID:	1203909916	Date Received:	10/26/2017 08:55		
Client Sample:	QC for batch 1714932	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147578PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714932	Inst:	VOA4.I	Dilution:	1
Run Date:	11/07/2017 14:01	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	11/07/2017 14:01				
Data File:	110717V4\4H212.D	Column:	DB-624		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	55.0	50.0	ug/L	110	(71%-134%)
Bromofluorobenzene	48.9	50.0	ug/L	98	(70%-131%)
Toluene-d8	54.2	50.0	ug/L	108	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558
Lab Sample ID: 1203909917
Client Sample: QC for batch 1714932
Client ID: CAPA-18-147578PSD
Batch ID: 1714932
Run Date: 11/07/2017 13:31
Prep Date: 11/07/2017 13:31
Data File: 110717V4\4H211.D

Date Collected: 10/24/2017 12:56
Date Received: 10/26/2017 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOA4.I
Analyst: VXY1

Column: DB-624

Matrix: W

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

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

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Sample Summary

SDG Number: 2018-558	Date Collected: 10/24/2017 12:56	Matrix: W
Lab Sample ID: 1203909917	Date Received: 10/26/2017 08:55	
Client Sample: QC for batch 1714932	Client: ARSL004	Project: QC
Client ID: CAPA-18-147578PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714932	Inst: VOA4.I	Dilution: 1
Run Date: 11/07/2017 13:31	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 11/07/2017 13:31		
Data File: 110717V4\4H211.D	Column: DB-624	

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	2018-558	Date Collected:	10/24/2017 12:56	Matrix:	W
Lab Sample ID:	1203909917	Date Received:	10/26/2017 08:55		
Client Sample:	QC for batch 1714932	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147578PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714932	Inst:	VOA4.I	Dilution:	1
Run Date:	11/07/2017 13:31	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	11/07/2017 13:31				
Data File:	110717V4\4H211.D	Column:	DB-624		

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

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

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558
Lab Sample ID: 1203909918
Client Sample: QC for batch 1714932
Client ID: CAPA-18-147578PSD
Batch ID: 1714932
Run Date: 11/07/2017 14:30
Prep Date: 11/07/2017 14:30
Data File: 110717V4\4H213.D

Date Collected: 10/24/2017 12:56
Date Received: 10/26/2017 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOA4.I
Analyst: VXY1

Column: DB-624

Matrix: W

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		46.7	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		299	ug/L	1.50	5.00
107-13-1	Acrylonitrile		304	ug/L	1.50	5.00
107-05-1	Allyl chloride		282	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-558	Date Collected: 10/24/2017 12:56	Matrix: W
Lab Sample ID: 1203909918	Date Received: 10/26/2017 08:55	
Client Sample: QC for batch 1714932	Client: ARSL004	Project: QC
Client ID: CAPA-18-147578PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1714932	Inst: VOA4.I	Dilution: 1
Run Date: 11/07/2017 14:30	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 11/07/2017 14:30		
Data File: 110717V4\4H213.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		224	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2830	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		291	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		218	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		278	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		228	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

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SDG Number:	2018-558	Date Collected:	10/24/2017 12:56	Matrix:	W
Lab Sample ID:	1203909918	Date Received:	10/26/2017 08:55		
Client Sample:	QC for batch 1714932	Client:	ARSL004	Project:	QC
Client ID:	CAPA-18-147578PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1714932	Inst:	VOA4.I	Dilution:	1
Run Date:	11/07/2017 14:30	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	11/07/2017 14:30				
Data File:	110717V4\4H213.D	Column:	DB-624		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	55.8	50.0	ug/L	112	(71%-134%)
Bromofluorobenzene	48.2	50.0	ug/L	96	(70%-131%)
Toluene-d8	53.4	50.0	ug/L	107	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558

Lab Sample ID: 1203910784

Client Sample: QC for batch 1714932

Client ID: MB for batch 1714932

Batch ID: 1714932

Run Date: 11/07/2017 11:05

Prep Date: 11/07/2017 11:05

Data File: 110717V4\4H206B.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: VXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

Volatile
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Sample Summary

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SDG Number: 2018-558
Lab Sample ID: 1203910784
Client Sample: QC for batch 1714932
Client ID: MB for batch 1714932
Batch ID: 1714932
Run Date: 11/07/2017 11:05
Prep Date: 11/07/2017 11:05
Data File: 110717V4\4H206B.D

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

Column: DB-624

Matrix: WATER

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

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

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number: 2018-558	Matrix: WATER
Lab Sample ID: 1203910784	
Client Sample: QC for batch 1714932	Client: ARSL004
Client ID: MB for batch 1714932	Method: SW-846:8260B
Batch ID: 1714932	Project: QC
Run Date: 11/07/2017 11:05	SOP Ref: GL-OA-E-038
Prep Date: 11/07/2017 11:05	Dilution: 1
Data File: 110717V4\4H206B.D	Purge Vol: 5 mL
	Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	54.6	50.0	ug/L 109	(71%-134%)
Bromofluorobenzene	50.7	50.0	ug/L 101	(70%-131%)
Toluene-d8	53.8	50.0	ug/L 108	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558

Lab Sample ID: 1203910785

Client Sample: QC for batch 1714932

Client ID: LCS for batch 1714932

Batch ID: 1714932

Run Date: 11/07/2017 09:38

Prep Date: 11/07/2017 09:38

Data File: 110717V4\4H203L.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: VXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-558
Lab Sample ID: 1203910785
Client Sample: QC for batch 1714932
Client ID: LCS for batch 1714932
Batch ID: 1714932
Run Date: 11/07/2017 09:38
Prep Date: 11/07/2017 09:38
Data File: 110717V4\4H203L.D

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

Column: DB-624

Matrix: WATER

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

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-558
Lab Sample ID: 1203910785
Client Sample: QC for batch 1714932
Client ID: LCS for batch 1714932
Batch ID: 1714932
Run Date: 11/07/2017 09:38
Prep Date: 11/07/2017 09:38
Data File: 110717V4\4H203L.D

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

Column: DB-624

Matrix: WATER

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

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

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

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-558

Lab Sample ID: 1203910786

Client Sample: QC for batch 1714932

Client ID: LCS for batch 1714932

Batch ID: 1714932

Run Date: 11/07/2017 10:36

Prep Date: 11/07/2017 10:36

Data File: 110717V4\4H205LD

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: VXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-558

Lab Sample ID: 1203910786

Client Sample: QC for batch 1714932

Client ID: LCS for batch 1714932

Batch ID: 1714932

Run Date: 11/07/2017 10:36

Prep Date: 11/07/2017 10:36

Data File: 110717V4\4H205L.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA4.I

Analyst: VXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		220	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2720	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		272	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		215	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		273	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		228	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-558
Lab Sample ID: 1203910786
Client Sample: QC for batch 1714932
Client ID: LCS for batch 1714932
Batch ID: 1714932
Run Date: 11/07/2017 10:36
Prep Date: 11/07/2017 10:36
Data File: 110717V4\4H205L.D

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

Column: DB-624

Matrix: WATER

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.5	50.0	ug/L 107	(71%-134%)
Bromofluorobenzene	48.9	50.0	ug/L 98	(70%-131%)
Toluene-d8	52.4	50.0	ug/L 105	(74%-124%)

Semi-Volatile Analysis

Case Narrative

**GC/MS Semivolatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-558
Work Order #: 436149**

Method/Analysis Information

Procedure:	Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry
Analytical Method:	SW846 3510C/8270D
Prep Method:	SW846 3510C
Analytical Batch Number:	1713403
Prep Batch Number:	1713402

Sample Analysis

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

Sample ID	Client ID
436149002	CAPA-18-147574
1203905982	Method Blank (MB)
1203905983	Laboratory Control Sample (LCS)
1203905984	436315003(CAPA-18-147580) Matrix Spike (MS)
1203905986	436315003(CAPA-18-147580) Matrix Spike Duplicate (MSD)

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

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-009 REV# 39.

Raw data reports are processed and reviewed by the analyst using the data analysis software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package. The various calibration mixes may not be calibrated using all of the calibration levels. In addition, not all of the mixes are calibrated using the same levels.

Diphenylamine has now superseded N-Nitroso-diphenylamine on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Methodologies referenced N-Nitroso-diphenylamine. However, as stated in EPA Methodology, "N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine." Studies of these two compounds at GEL, both independent of each other and together, showed that they not only co-elute, but also have similar mass spectra. N-Nitroso-diphenylamine and Diphenylamine will be reported as Diphenylamine on all reports and forms.

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG) in this batch. A second source initial calibration verification (ICV) was included in the standard section directly behind the initial calibration.

CCV Requirements

All Calibration Verification Standards (CCV) did not meet the acceptance criteria as outlined in Method 8270D for sample 436149002 (CAPA-18-147574) and the associated QC. However, the method allows for a designated number of outliers dependent on the requested analyte list. This SDG satisfied the 8270D outlier acceptance criteria. If required, a CRDL was analyzed after the CCVs to demonstrate that there is adequate sensitivity to detect the failed compounds at the applicable lower quantitation limit.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG in this batch met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

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

Spike Recovery Statement

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

MS/MSD Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information:

Holding Time Specifications

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

Preparation/Analytical Method Verification

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

Sample Dilutions

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

Sample Re-extraction/Re-analysis

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

Miscellaneous Information:**Manual Integrations**

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

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

TIC Comment

Tentatively identified compounds (TIC) were requested for sample 436149002 (CAPA-18-147574) in this SDG in this batch.

Additional Comments

Additional comments were not required for the SDG associated samples in this batch.

Electronic Package Comment

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

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

System Configuration

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description
MSD5.I	Agilent 6890/5973 GC/MS w/ 7683 Autosampler	HP6890/HP5973	DB-5MS	25m x 0.2mm, 0.33um (5% Phenylmethylpolysiloxane)

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-558 GEL Work Order: 436149

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: 13 NOV 2017

Title: Data Validator

Sample Data Summary

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

Page 1 of 3

SDG Number: 2018-558
Lab Sample ID: 436149002

Date Collected: 10/23/2017 14:19
Date Received: 10/25/2017 08:50

Matrix: W

Client ID: CAPA-18-147574

Client: ARSL004

Project: ESHL00114

Batch ID: 1713403

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Run Date: 10/30/2017 21:47

Inst: MSD5.I

Dilution: 1

Prep Date: 10/30/2017 05:33

Analyst: JMB3

Inj. Vol: 1 uL

Data File: s103017.B\s5j3025.D

Aliquot: 960 mL

Final Volume: 1 mL

Column: DB-5ms

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

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

SDG Number: 2018-558

Lab Sample ID: 436149002

Date Collected: 10/23/2017 14:19

Date Received: 10/25/2017 08:50

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1713403

Inst: MSD5.I

Dilution: 1

Run Date: 10/30/2017 21:47

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 10/30/2017 05:33

Aliquot: 960 mL

Final Volume: 1 mL

Data File: s103017.B\s5j3025.D

Column: DB-5ms

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

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

Page 3 of 3

SDG Number: 2018-558
Lab Sample ID: 436149002

Date Collected: 10/23/2017 14:19
Date Received: 10/25/2017 08:50

Matrix: W

Client ID: CAPA-18-147574

Client: ARSL004

Project: ESHL00114

Batch ID: 1713403

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Run Date: 10/30/2017 21:47

Inst: MSD5.I

Dilution: 1

Prep Date: 10/30/2017 05:33

Analyst: JMB3

Inj. Vol: 1 uL

Data File: s103017.B\s5j3025.D

Aliquot: 960 mL

Final Volume: 1 mL

Column: DB-5ms

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	82.0	104	ug/L 79	(32%-124%)
2-Fluorobiphenyl	37.4	52.1	ug/L 72	(32%-112%)
2-Fluorophenol	38.3	104	ug/L 37	(15%-88%)
Nitrobenzene-d5	36.6	52.1	ug/L 70	(36%-115%)
Phenol-d5	26.9	104	ug/L 26	(15%-91%)
p-Terphenyl-d14	44.4	52.1	ug/L 85	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000080-05-7	Phenol, 4,4'-(1-methylethylidene)b	13.416	18.1	ug/L	98	NJ
	unknown	17.268	4.95	ug/L	0	J

Quality Control Summary

Semi-Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-558**Matrix Type: LIQUID**

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203905982	MB for batch 1713402	40	29	78	72	76	89
1203905983	LCS for batch 1713402	46	31	82	76	96	87
436149002	CAPA-18-147574	37	26	70	72	79	85
1203905984	CAPA-18-147580MS	57	44	79	79	94	84
1203905986	CAPA-18-147580MSD	56	45	81	82	95	90

Surrogate**Acceptance Limits**

2FP	= 2-Fluorophenol	(15%-88%)
PHL	= Phenol-d5	(15%-91%)
NBZ	= Nitrobenzene-d5	(36%-115%)
FBP	= 2-Fluorobiphenyl	(32%-112%)
TBP	= 2,4,6-Tribromophenol	(32%-124%)
TPH	= p-Terphenyl-d14	(36%-121%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1713402

Matrix: WATER

Lab Sample ID 1203905983

Instrument: MSD5.I

Analysis Date: 10/30/2017 16:42

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1713402

Inj. Vol: 1 uL

Batch ID: 1713403

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
62-75-9	LCS N-Methyl-N-nitrosomethylam	50.0	0.0	23.8	48	30-88
110-86-1	LCS Pyridine	50.0	0.0	27.4	55	27-89
62-53-3	LCS Aniline	50.0	0.0	42.2	84	49-112
108-95-2	LCS Phenol	50.0	0.0	17.0	34	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	42.9	86	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	39.4	79	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	32.3	65	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	32.5	65	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	34.0	68	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)et	50.0	0.0	32.9	66	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	38.6	77	44-102
95-48-7	LCS o-Cresol	50.0	0.0	35.4	71	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	35.8	72	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	38.8	78	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	30.1	60	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	43.2	86	53-115
78-59-1	LCS Isophorone	50.0	0.0	44.4	89	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	44.2	88	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	37.3	75	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	46.4	93	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	44.8	90	53-109
65-85-0	LCS Benzoic acid	100	0.0	31.6	32	21-74

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1713402

Matrix: WATER

Lab Sample ID 1203905983

Instrument: MSD5.I

Analysis Date: 10/30/2017 16:42

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1713402

Inj. Vol: 1 uL

Batch ID: 1713403

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	LCS 4-Chloroaniline	50.0	0.0	55.1	110	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	32.5	65	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	43.4	87	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	39.4	79	42-103
91-20-3	LCS Naphthalene	50.0	0.0	41.9	84	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	39.6	79	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	20.5	41	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	45.1	90	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	45.6	91	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	35.9	72	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	38.8	78	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	55.9	112	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	49.0	98	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	51.2	102	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	51.0	102	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	42.7	85	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	43.0	86	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	33.5	67	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	42.5	85	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	47.7	95	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	47.2	94	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	16.4	33	15-137

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1713402

Matrix: WATER

Lab Sample ID 1203905983

Instrument: MSD5.I

Analysis Date: 10/30/2017 16:42

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1713402

Inj. Vol: 1 uL

Batch ID: 1713403

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

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1713402

Matrix: WATER

Lab Sample ID 1203905983

Instrument: MSD5.I

Analysis Date: 10/30/2017 16:42

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1713402

Inj. Vol: 1 uL

Batch ID: 1713403

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
193-39-5	LCS Indeno(1,2,3-cd)pyrene	50.0	0.0	55.1	110	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	53.9	108	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	53.3	107	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	30.1	60	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	45.4	91	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	38.2	76	44-102
1912-24-9	LCS Atrazine	50.0	0.0	51.4	103	60-131
92-87-5	LCS Benzidine	100	0.0	91.0	91	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	54.5	109	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	35.8	72	39-99

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-558

Sample Type: Matrix Spike

Client ID: CAPA-18-147580MS

Matrix: W

Lab Sample ID 1203905984

Instrument: MSD5.I

Analysis Date: 10/31/2017 05:50

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1713402

Inj. Vol: 1 uL

Batch ID: 1713403

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
62-75-9	MS N-Methyl-N-nitrosomethylam	106	0.00 U	63.4	60	25-106
110-86-1	MS Pyridine	106	0.00 U	60.4	57	24-93
62-53-3	MS Aniline	106	0.00 U	83.2	78	37-113
108-95-2	MS Phenol	106	0.00 U	51.6	48	23-82
111-44-4	MS bis(2-Chloroethyl) ether	106	0.00 U	89.0	84	39-114
95-57-8	MS 2-Chlorophenol	106	0.00 U	89.2	84	37-108
541-73-1	MS 1,3-Dichlorobenzene	106	0.00 U	68.7	65	27-97
106-46-7	MS 1,4-Dichlorobenzene	106	0.00 U	70.6	66	28-97
95-50-1	MS 1,2-Dichlorobenzene	106	0.00 U	72.8	68	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)et	106	0.00 U	70.9	67	32-127
100-51-6	MS Benzyl alcohol	106	0.00 U	88.2	83	37-116
95-48-7	MS o-Cresol	106	0.00 U	83.3	78	34-109
65794-96-9	MS m,p-Cresols	106	0.00 U	90.8	85	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	106	0.00 U	84.9	80	42-118
67-72-1	MS Hexachloroethane	106	0.00 U	63.5	60	29-94
98-95-3	MS Nitrobenzene	106	0.00 U	93.2	88	38-123
78-59-1	MS Isophorone	106	0.00 U	93.0	87	43-120
88-75-5	MS 2-Nitrophenol	106	0.00 U	95.6	90	39-115
105-67-9	MS 2,4-Dimethylphenol	106	0.00 U	82.4	77	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	106	0.00 U	96.9	91	42-118
120-83-2	MS 2,4-Dichlorophenol	106	0.00 U	96.6	91	40-111
65-85-0	MS Benzoic acid	213	0.00 U	99.1	47	17-95

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Matrix Spike

Client ID: CAPA-18-147580MS

Matrix: W

Lab Sample ID 1203905984

Instrument: MSD5.I

Analysis Date: 10/31/2017 05:50

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1713402

Inj. Vol: 1 uL

Batch ID: 1713403

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

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Matrix Spike

Client ID: CAPA-18-147580MS

Matrix: W

Lab Sample ID 1203905984

Instrument: MSD5.I

Analysis Date: 10/31/2017 05:50

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1713402

Inj. Vol: 1 uL

Batch ID: 1713403

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

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Matrix Spike

Client ID: CAPA-18-147580MS

Matrix: W

Lab Sample ID 1203905984

Instrument: MSD5.I

Analysis Date: 10/31/2017 05:50

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1713402

Inj. Vol: 1 uL

Batch ID: 1713403

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

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Matrix Spike Duplicate

Client ID: CAPA-18-147580MSD

Matrix: W

Lab Sample ID 1203905986

Instrument: MSD5.I

Analysis Date: 10/31/2017 06:20

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1713402

Inj. Vol: 1 uL

Batch ID: 1713403

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L		Recovery %	Acceptance Limits	RPD %	Acceptance Limits
62-75-9	MSD N-Methyl-N-nitrosomethylam	106	0.00	U	60.4		57	25-106	5	0-30
110-86-1	MSD Pyridine	106	0.00	U	57.7		54	24-93	5	0-30
62-53-3	MSD Aniline	106	0.00	U	84.4		79	37-113	1	0-30
108-95-2	MSD Phenol	106	0.00	U	48.0		45	23-82	7	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	106	0.00	U	90.3		85	39-114	1	0-30
95-57-8	MSD 2-Chlorophenol	106	0.00	U	86.9		82	37-108	3	0-30
541-73-1	MSD 1,3-Dichlorobenzene	106	0.00	U	74.2		70	27-97	8	0-30
106-46-7	MSD 1,4-Dichlorobenzene	106	0.00	U	72.6		68	28-97	3	0-30
95-50-1	MSD 1,2-Dichlorobenzene	106	0.00	U	77.4		73	28-99	6	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)et	106	0.00	U	70.2		66	32-127	1	0-30
100-51-6	MSD Benzyl alcohol	106	0.00	U	86.9		82	37-116	1	0-30
95-48-7	MSD o-Cresol	106	0.00	U	81.2		76	34-109	3	0-30
65794-96-9	MSD m,p-Cresols	106	0.00	U	84.9		80	36-120	7	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	106	0.00	U	82.9		78	42-118	2	0-30
67-72-1	MSD Hexachloroethane	106	0.00	U	69.4		65	29-94	9	0-30
98-95-3	MSD Nitrobenzene	106	0.00	U	85.5		80	38-123	9	0-30
78-59-1	MSD Isophorone	106	0.00	U	85.6		80	43-120	8	0-30
88-75-5	MSD 2-Nitrophenol	106	0.00	U	91.1		86	39-115	5	0-30
105-67-9	MSD 2,4-Dimethylphenol	106	0.00	U	78.5		74	39-107	5	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	106	0.00	U	92.1		87	42-118	5	0-30
120-83-2	MSD 2,4-Dichlorophenol	106	0.00	U	92.6		87	40-111	4	0-30
65-85-0	MSD Benzoic acid	213	0.00	U	97.3		46	17-95	2	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Matrix Spike Duplicate

Client ID: CAPA-18-147580MSD

Matrix: W

Lab Sample ID 1203905986

Instrument: MSD5.I

Analysis Date: 10/31/2017 06:20

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1713402

Inj. Vol: 1 uL

Batch ID: 1713403

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

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-558

Sample Type: Matrix Spike Duplicate

Client ID: CAPA-18-147580MSD

Matrix: W

Lab Sample ID 1203905986

Instrument: MSD5.I

Analysis Date: 10/31/2017 06:20

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1713402

Inj. Vol: 1 uL

Batch ID: 1713403

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

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 8 of 8

SDG Number: 2018-558

Sample Type: Matrix Spike Duplicate

Client ID: CAPA-18-147580MSD

Matrix: W

Lab Sample ID 1203905986

Instrument: MSD5.I

Analysis Date: 10/31/2017 06:20

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1713402

Inj. Vol: 1 uL

Batch ID: 1713403

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
193-39-5	MSD Indeno(1,2,3-cd)pyrene	106	0.00 U	116	109	27-121	3	0-30
53-70-3	MSD Dibenzo(a,h)anthracene	106	0.00 U	113	106	30-125	3	0-30
191-24-2	MSD Benzo(ghi)perylene	106	0.00 U	113	106	24-126	0	0-30
123-91-1	MSD 1,4-Dioxane	106	0.00 U	74.2	70	24-110	2	0-30
930-55-2	MSD N-Nitrosopyrrolidine	106	0.00 U	95.6	90	47-119	4	0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	106	0.00 U	84.9	80	32-101	6	0-30
1912-24-9	MSD Atrazine	106	0.00 U	108	102	42-129	2	0-30
92-87-5	MSD Benzidine	213	0.00 U	152	72	15-130	12	0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	106	0.00 U	125	118	34-124	1	0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	106	0.00 U	79.7	75	26-102	6	0-30

Method Blank Summary

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SDG Number:	2018-558	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1713402	Instrument ID:	MSD5.I	Data File:	s103017.B\s5j3014.D
Lab Sample ID:	1203905982	Prep Date:	10/30/2017 05:33	Analyzed:	10/30/17 16:12
Column:	DB-5ms				

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

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 1713402	1203905983	s103017.B\s5j3015.D	10/30/17	1642
02 CAPA-18-147574	436149002	s103017.B\s5j3025.D	10/30/17	2147
03 CAPA-18-147580MS	1203905984	s103017.B\s5j3036.D	10/31/17	0550
04 CAPA-18-147580MSD	1203905986	s103017.B\s5j3037.D	10/31/17	0620

Quality Control Data

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

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SDG Number: 2018-558		Matrix: WATER
Lab Sample ID: 1203905982		
Client Sample: QC for batch 1713402	Client: ARSL004	Project: QC
Client ID: MB for batch 1713402	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1713403	Inst: MSD5.I	Dilution: 1
Run Date: 10/30/2017 16:12	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 10/30/2017 05:33	Aliquot: 1000 mL	Final Volume: 1 mL
Data File: s103017.B\s5j3014.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.00	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene	U	3.00	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
122-66-7	Azobenzene	U	3.00	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
123-91-1	1,4-Dioxane	U	3.00	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene	U	0.300	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.00	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol	U	3.00	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol	U	3.00	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol	U	3.00	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol	U	3.00	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol	U	5.00	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene	U	3.00	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene	U	3.00	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene	U	0.410	ug/L	0.410	1.00
95-57-8	2-Chlorophenol	U	3.00	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.00	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene	U	0.300	ug/L	0.300	1.00
88-75-5	2-Nitrophenol	U	3.00	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine	U	3.00	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether	U	3.00	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol	U	3.00	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.30	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether	U	3.00	ug/L	3.00	10.0
100-02-7	4-Nitrophenol	U	3.00	ug/L	3.00	10.0
83-32-9	Acenaphthene	U	0.300	ug/L	0.300	1.00
208-96-8	Acenaphthylene	U	0.300	ug/L	0.300	1.00
62-53-3	Aniline	U	4.20	ug/L	4.20	10.0
120-12-7	Anthracene	U	0.300	ug/L	0.300	1.00
1912-24-9	Atrazine	U	3.00	ug/L	3.00	10.0
92-87-5	Benzidine	U	3.90	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene	U	0.300	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene	U	0.300	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene	U	0.300	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene	U	0.300	ug/L	0.300	1.00

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

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SDG Number: 2018-558

Lab Sample ID: 1203905982

Client Sample: QC for batch 1713402

Client ID: MB for batch 1713402

Batch ID: 1713403

Run Date: 10/30/2017 16:12

Prep Date: 10/30/2017 05:33

Data File: s103017.B\s5j3014.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD5.I

Analyst: JMB3

Aliquot: 1000 mL

Column: DB-5ms

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

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

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

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SDG Number: 2018-558
Lab Sample ID: 1203905982
Client Sample: QC for batch 1713402
Client ID: MB for batch 1713402
Batch ID: 1713403
Run Date: 10/30/2017 16:12
Prep Date: 10/30/2017 05:33
Data File: s103017.B\s5j3014.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 1000 mL
Column: DB-5ms

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

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

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

Tentatively Identified Compound Summary

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

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

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SDG Number: 2018-558

Lab Sample ID: 1203905983

Client Sample: QC for batch 1713402

Client ID: LCS for batch 1713402

Batch ID: 1713403

Run Date: 10/30/2017 16:42

Prep Date: 10/30/2017 05:33

Data File: s103017.B\s5j3015.D

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD5.I
Analyst: JMB3
Aliquot: 1000 mL
Column: DB-5ms

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

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-558

Lab Sample ID: 1203905983

Client Sample: QC for batch 1713402

Client ID: LCS for batch 1713402

Batch ID: 1713403

Run Date: 10/30/2017 16:42

Prep Date: 10/30/2017 05:33

Data File: s103017.B\s5j3015.D

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD5.I

Analyst: JMB3

Aliquot: 1000 mL

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		44.3	ug/L	0.300	1.00
65-85-0	Benzoic acid		31.6	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		38.6	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		37.5	ug/L	3.00	10.0
218-01-9	Chrysene		47.0	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		43.5	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		38.5	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		53.9	ug/L	0.300	1.00
132-64-9	Dibenzofuran		42.5	ug/L	3.00	10.0
84-66-2	Diethylphthalate		47.2	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		49.0	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		40.4	ug/L	3.00	10.0
206-44-0	Fluoranthene		47.2	ug/L	0.300	1.00
86-73-7	Fluorene		42.1	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		45.7	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		32.5	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		20.5	ug/L	3.00	10.0
67-72-1	Hexachloroethane		30.1	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		55.1	ug/L	0.300	1.00
78-59-1	Isophorone		44.4	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		23.8	ug/L	3.00	10.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.00	ug/L	3.00	10.0
55-18-5	N-Nitrosodiethylamine	U	3.00	ug/L	3.00	10.0
621-64-7	N-Nitrosodi--n-propylamine		38.8	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		45.4	ug/L	3.00	10.0
91-20-3	Naphthalene		41.9	ug/L	0.300	1.00
98-95-3	Nitrobenzene		43.2	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		49.2	ug/L	3.00	10.0
85-01-8	Phenanthrene		45.1	ug/L	0.300	1.00
108-95-2	Phenol		17.0	ug/L	3.00	10.0
129-00-0	Pyrene		40.0	ug/L	0.300	1.00
110-86-1	Pyridine		27.4	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		32.9	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		46.4	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		42.9	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		34.4	ug/L	3.00	10.0

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

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SDG Number: 2018-558	Matrix: WATER
Lab Sample ID: 1203905983	
Client Sample: QC for batch 1713402	Client: ARSL004
Client ID: LCS for batch 1713402	Method: SW846 3510C/8270D
Batch ID: 1713403	Inst: MSD5.I
Run Date: 10/30/2017 16:42	Analyst: JMB3
Prep Date: 10/30/2017 05:33	Aliquot: 1000 mL
Data File: s103017.B\s5j3015.D	Column: DB-5ms
	Project: QC
	SOP Ref: GL-OA-E-009
	Dilution: 1
	Inj. Vol: 1 uL
	Final Volume: 1 mL

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

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

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

SDG Number: 2018-558	Date Collected: 10/24/2017 11:42	Matrix: W
Lab Sample ID: 1203905984	Date Received: 10/26/2017 08:55	
Client Sample: QC for batch 1713402	Client: ARSL004	Project: QC
Client ID: CAPA-18-147580MS	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1713403	Inst: MSD5.I	Dilution: 1
Run Date: 10/31/2017 05:50	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 10/30/2017 05:33	Aliquot: 470 mL	Final Volume: 1 mL
Data File: s103017.B\s5j3036.D	Column: DB-5ms	

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

**Semi-Volatile
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Sample Summary**

SDG Number: 2018-558	Date Collected: 10/24/2017 11:42	Matrix: W
Lab Sample ID: 1203905984	Date Received: 10/26/2017 08:55	
Client Sample: QC for batch 1713402	Client: ARSL004	Project: QC
Client ID: CAPA-18-147580MS	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1713403	Inst: MSD5.I	Dilution: 1
Run Date: 10/31/2017 05:50	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 10/30/2017 05:33	Aliquot: 470 mL	Final Volume: 1 mL
Data File: s103017.B\s5j3036.D	Column: DB-5ms	

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

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-558	Date Collected: 10/24/2017 11:42	Matrix: W
Lab Sample ID: 1203905984	Date Received: 10/26/2017 08:55	
Client Sample: QC for batch 1713402	Client: ARSL004	Project: QC
Client ID: CAPA-18-147580MS	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1713403	Inst: MSD5.I	Dilution: 1
Run Date: 10/31/2017 05:50	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 10/30/2017 05:33	Aliquot: 470 mL	Final Volume: 1 mL
Data File: s103017.B\s5j3036.D	Column: DB-5ms	

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

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

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

SDG Number: 2018-558	Date Collected: 10/24/2017 11:42	Matrix: W
Lab Sample ID: 1203905986	Date Received: 10/26/2017 08:55	
Client Sample: QC for batch 1713402	Client: ARSL004	Project: QC
Client ID: CAPA-18-147580MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1713403	Inst: MSD5.I	Dilution: 1
Run Date: 10/31/2017 06:20	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 10/30/2017 05:33	Aliquot: 470 mL	Final Volume: 1 mL
Data File: s103017.B\s5j3037.D	Column: DB-5ms	

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

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

SDG Number: 2018-558	Date Collected: 10/24/2017 11:42	Matrix: W
Lab Sample ID: 1203905986	Date Received: 10/26/2017 08:55	
Client Sample: QC for batch 1713402	Client: ARSL004	Project: QC
Client ID: CAPA-18-147580MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1713403	Inst: MSD5.I	Dilution: 1
Run Date: 10/31/2017 06:20	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 10/30/2017 05:33	Aliquot: 470 mL	Final Volume: 1 mL
Data File: s103017.B\s5j3037.D	Column: DB-5ms	

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

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

Page 3 of 3

SDG Number: 2018-558	Date Collected: 10/24/2017 11:42	Matrix: W
Lab Sample ID: 1203905986	Date Received: 10/26/2017 08:55	
Client Sample: QC for batch 1713402	Client: ARSL004	Project: QC
Client ID: CAPA-18-147580MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1713403	Inst: MSD5.I	Dilution: 1
Run Date: 10/31/2017 06:20	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 10/30/2017 05:33	Aliquot: 470 mL	Final Volume: 1 mL
Data File: s103017.B\s5j3037.D	Column: DB-5ms	

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

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

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-558
Work Order #: 436149**

Method/Analysis Information

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

Analytical Method: SW-846:6850

Prep Method: SW-846:6850

Analytical Batch Number: 1713226

Prep Batch Number: 1713223

Sample Analysis

Sample ID	Client ID
436149001	436149001 (CAPA-18-147548)
1203905528	Interference Check Sample (ICS)
1203905524	Method Blank (MB)
1203905525	Laboratory Control Sample (LCS)
1203905526	435630001(CAPA-18-147560) Matrix Spike (MS)
1203905527	435630001(CAPA-18-147560) Matrix Spike Duplicate (MSD)

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

Preparation/Analytical Method Verification

SOP Reference

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

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this SDG. Due to software constraints, all Initial

Calibration Blanks must be designated as IPB001.

ICV Requirements

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

CCB Requirements

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

CCV Requirements

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

Low Level Standard (CRI) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Interference Check Sample (ICS)

The ICS spike recoveries met the acceptance criteria.

QC Sample Designation

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

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

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

Internal Standard Area Acceptance

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

Retention Time

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information**Manual Integrations**

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

Method Comments

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

Additional Comments

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

Perchlorate Isotope Ratio

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

System Configuration

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

Electronic Packaging Comment

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

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

Chromatographic Columns

The LC-MS/MS Perchlorate analysis was performed on a Quattro 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: 2018-558 GEL Work Order: 436149

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 06 NOV 2017

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147548Date Received: 25-OCT-17GEL Job No (SDG): 2018-558GEL Sample ID: 436149001Date Filtered: 26-OCT-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.188	ug/L	J	1	26-OCT-17 23:26	per1026044a
	Perchlorate Isotope Ratio			3.08			1	26-OCT-17 23:26	per1026044a
14797-73-0	Perchlorate-101	.05	.2	0.184	ug/L	J	1	26-OCT-17 23:26	per1026044a
	Perchlorate-O(18)			0.474	ug/L		1	26-OCT-17 23:26	per1026044a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

*Concentration =

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

Quality Control Summary

Perchlorate Laboratory Control Sample

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No. (SDG): 2018-558

Extract Batch Code: 1713223

Date Filtered: 26-OCT-17

Matrix: WATER

Sample ID: 1203905525

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

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

Perchlorate Spike/Spike Duplicate Summary

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No (SDG): 2018-558

Extract Batch Code: 1713223

Date Extracted: 26-OCT-17

GEL MS/PS ID: 1203905526

Client ID: CAPA-18-147560

GEL MSD/PSD ID: 1203905527

QC Type: MS

Compound^	Spike Added	Sample Conc	Units	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Recovery Limit
Perchlorate	0.200	0.340	ug/L	0.532	96	.506	83	5	30	75 - 125
Perchlorate Isotope Ratio	0	2.93		3.04		2.86		6		-
Perchlorate-101	0.200	0.350	ug/L	0.528	89	.535	93	1	30	75 - 125
Perchlorate-O(18)	0	0.491	ug/L	0.509		.471		8		-

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

Quality Control Data

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 26-OCT-17GEL Job No (SDG): 2018-558GEL Sample ID: 1203905524Date Filtered: 26-OCT-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.050	ug/L	U	1	26-OCT-17 18:23	per1026015a
	Perchlorate Isotope Ratio						1	26-OCT-17 18:23	per1026015a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	26-OCT-17 18:23	per1026015a
	Perchlorate-O(18)			0.504	ug/L		1	26-OCT-17 18:23	per1026015a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 26-OCT-17GEL Job No (SDG): 2018-558GEL Sample ID: 1203905525Date Filtered: 26-OCT-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.203	ug/L		1	26-OCT-17 18:33	per1026016a
	Perchlorate Isotope Ratio			2.94			1	26-OCT-17 18:33	per1026016a
14797-73-0	Perchlorate-101	.05	.2	0.209	ug/L		1	26-OCT-17 18:33	per1026016a
	Perchlorate-O(18)			0.523	ug/L		1	26-OCT-17 18:33	per1026016a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2018-558GEL Sample ID: 1203905528Date Filtered: 26-OCT-17Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.241	ug/L		1	26-OCT-17 18:43	per1026017a
	Perchlorate Isotope Ratio			3.22			1	26-OCT-17 18:43	per1026017a
14797-73-0	Perchlorate-101	.05	.2	0.226	ug/L		1	26-OCT-17 18:43	per1026017a
	Perchlorate-O(18)			0.524	ug/L		1	26-OCT-17 18:43	per1026017a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147560MSDate Received: 20-OCT-17GEL Job No (SDG): 2018-558GEL Sample ID: 1203905526Date Filtered: 26-OCT-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.532	ug/L		1	26-OCT-17 19:04	per1026019a
	Perchlorate Isotope Ratio			3.04			1	26-OCT-17 19:04	per1026019a
14797-73-0	Perchlorate-101	.05	.2	0.528	ug/L		1	26-OCT-17 19:04	per1026019a
	Perchlorate-O(18)			0.509	ug/L		1	26-OCT-17 19:04	per1026019a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1713223Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAPA-18-147560MSDDate Received: 20-OCT-17GEL Job No (SDG): 2018-558GEL Sample ID: 1203905527Date Filtered: 26-OCT-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.506	ug/L		1	26-OCT-17 19:15	per1026020a
	Perchlorate Isotope Ratio			2.86			1	26-OCT-17 19:15	per1026020a
14797-73-0	Perchlorate-101	.05	.2	0.535	ug/L		1	26-OCT-17 19:15	per1026020a
	Perchlorate-O(18)			0.471	ug/L		1	26-OCT-17 19:15	per1026020a

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

*Concentration =

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

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-558
Work Order #: 436149

Sample ID	Client ID
436149001	CAPA-18-147548
436149002	CAPA-18-147574
1203904770	Method Blank (MB) ICP
1203904771	Laboratory Control Sample (LCS)
1203904774	436156001(CAPA-18-147569L) Serial Dilution (SD)
1203904772	436156001(CAPA-18-147569D) Sample Duplicate (DUP)
1203904773	436156001(CAPA-18-147569S) Matrix Spike (MS)
1203904881	Method Blank (MB) ICP-MS
1203904882	Laboratory Control Sample (LCS)
1203904885	436156001(CAPA-18-147569L) Serial Dilution (SD)
1203904883	436156001(CAPA-18-147569D) Sample Duplicate (DUP)
1203904884	436156001(CAPA-18-147569S) Matrix Spike (MS)
1203917282	Method Blank (MB) CVAA
1203917283	Laboratory Control Sample (LCS)
1203917288	436156001(CAPA-18-147569L) Serial Dilution (SD)
1203917284	436156001(CAPA-18-147569D) Sample Duplicate (DUP)
1203917286	436156001(CAPA-18-147569S) Matrix Spike (MS)

Sample Analysis

Samples 436149001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1712922, 1712981, 1717920 and 1720959
Prep Batch :	1712921, 1712980 and 1717917
Standard Operating Procedures:	GL-MA-E-013 REV# 30, GL-MA-E-006 REV# 14, GL-MA-E-014 REV# 32, GL-MA-E-010 REV# 36 and GL-GC-E-107 REV# 10
Analytical Method:	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
Prep Method :	SW846 3005A and EPA 245.1/245.2 Prep

Preparation/Analytical Method Verification

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

System Configuration

The Hardness as CaCO₃ is calculated from Calcium and Magnesium results.

The Metals analysis-ICP was performed on a PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

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

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

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

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

ICSA/ICSAB Statement

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

Continuing Calibration Blanks (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 436156001 (CAPA-18-147569)-ICP, ICP-MS and CVAA.

Matrix Spike (MS/MSD) Recovery Statement

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes.

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate

value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. The relative percent differences (RPD) between the sample and its duplicate (DUP) were within acceptable limits for all applicable analytes.

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Additional Comments

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

$$\text{Hardness} = 2.497 (\text{Ca}) + 4.118 (\text{Mg})$$

Please refer to the Total Ca and Total Mg data to validate results appearing on the Hardness Summary sheet. Both results are in the Inorganic/metals section of the package. There is no Batch QC for calculated results, and thus no QC Summary for the Hardness by Calculation Batch. The MDLs and PQLs are calculated using the higher of the two calculated values of Ca or Mg.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-558 GEL Work Order: 436149

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature:



Name: Nik-Cole Elmore

Date: 21 NOV 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-558**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 436149001**BASIS:** As Received**DATE COLLECTED** 23-OCT-17**CLIENT ID:** CAPA-18-147548**LEVEL:** Low**DATE RECEIVED** 25-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	11/13/17 10:59	111317W1-6	1717920

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-558

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 436149001

BASIS: As Received

DATE COLLECTED 23-OCT-17

CLIENT ID: CAPA-18-147548

LEVEL: Low

DATE RECEIVED 25-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	11/20/17 17:40	112017-2	1712922
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	11/01/17 21:03	171101-3	1712981
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	11/01/17 21:03	171101-3	1712981
7440-39-3	Barium	112	ug/L		1	5	5	1	P	JWJ	11/20/17 17:40	112017-2	1712922
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	JWJ	11/20/17 17:40	112017-2	1712922
7440-42-8	Boron	16.5	ug/L	J	15	50	50	1	P	JWJ	11/20/17 17:40	112017-2	1712922
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/01/17 21:03	171101-3	1712981
7440-70-2	Calcium	12400	ug/L		50	200	200	1	P	JWJ	10/30/17 19:00	103017-1	1712922
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	11/01/17 21:03	171101-3	1712981
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	JWJ	11/20/17 17:40	112017-2	1712922
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	JWJ	11/20/17 17:40	112017-2	1712922
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	JWJ	11/20/17 17:40	112017-2	1712922
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	11/01/17 21:03	171101-3	1712981
7439-95-4	Magnesium	2080	ug/L		110	300	300	1	P	JWJ	11/20/17 17:40	112017-2	1712922
7439-96-5	Manganese	17.4	ug/L		2	10	10	1	P	JWJ	11/20/17 17:40	112017-2	1712922
7439-98-7	Molybdenum	1.22	ug/L		0.2	0.5	0.5	1	MS	BAJ	11/02/17 13:54	171102-5	1712981
7440-02-0	Nickel	2	ug/L		0.6	2	2	1	MS	BAJ	11/01/17 21:03	171101-3	1712981
7440-09-7	Potassium	2500	ug/L		50	150	150	1	P	JWJ	10/30/17 19:00	103017-1	1712922
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	11/01/17 21:03	171101-3	1712981
7631-86-9	Silica	64600	ug/L		53	213	213	1	P	JWJ	11/20/17 17:40	112017-2	1712922
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	11/01/17 21:03	171101-3	1712981
7440-23-5	Sodium	11500	ug/L		100	300	300	1	P	JWJ	11/20/17 17:40	112017-2	1712922
7440-24-6	Strontium	140	ug/L		1	5	5	1	P	JWJ	11/20/17 17:40	112017-2	1712922
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	11/01/17 21:03	171101-3	1712981
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	JWJ	11/20/17 17:40	112017-2	1712922
7440-61-1	Uranium	0.809	ug/L		0.067	0.2	0.2	1	MS	BAJ	11/02/17 03:00	171101-4	1712981
7440-62-2	Vanadium	4.39	ug/L	J	1	5	5	1	P	JWJ	11/20/17 17:40	112017-2	1712922
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	JWJ	11/20/17 17:40	112017-2	1712922

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-558**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 436149001**BASIS:** As Received**DATE COLLECTED** 23-OCT-17**CLIENT ID:** CAPA-18-147548**LEVEL:** Low**DATE RECEIVED** 25-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	39.6	mg/L		0.453	1.24	1.24	1		JJ2	11/21/17 08:58		1720959

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1712922	1712921	SW846 3005A	50	mL	50	mL	10/26/17	SXW1
1712981	1712980	SW846 3005A	50	mL	50	mL	10/26/17	SXW1
1717920	1717917	EPA 245.1/245.2 Prep	20	mL	20	mL	11/10/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-558**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 436149002**BASIS:** As Received**DATE COLLECTED** 23-OCT-17**CLIENT ID:** CAPA-18-147574**LEVEL:** Low**DATE RECEIVED** 25-OCT-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	11/13/17 11:00	111317W1-6	1717920

Prep Information:

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

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2018-558
Contract: ESHL00114
Matrix: W

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Acceptance Window</u>	<u>Conc Qual</u>	<u>M*</u>	<u>MDL</u>	<u>RDL</u>
1203904770	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Calcium	50	ug/L	+/-200	U	P	50	200
	Copper	3	ug/L	+/-10	U	P	3	10
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Potassium	50	ug/L	+/-150	U	P	50	150
	Sodium	100	ug/L	+/-300	U	P	100	300
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Strontium	1	ug/L	+/-5	U	P	1	5
	Silica	53	ug/L	+/-213	U	P	53	213
	Manganese	2	ug/L	+/-10	U	P	2	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Cobalt	1	ug/L	+/-5	U	P	1	5
1203904881	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	2	ug/L	+/-5	U	MS	2	5
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203917282	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2

***Analytical Methods:**

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

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-558

Client ID: CAPA-18-147569S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 436156001

Spike ID: 1203904773

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Aluminum	ug/L	75-125	5110		68	U	5000	102		P
Barium	ug/L	75-125	515		12.9		500	100		P
Beryllium	ug/L	75-125	507		1	U	500	101		P
Boron	ug/L	75-125	517		15	U	500	101		P
Calcium	ug/L	75-125	16700		11500		5000	104		P
Cobalt	ug/L	75-125	511		1	U	500	102		P
Copper	ug/L	75-125	511		3	U	500	102		P
Iron	ug/L	75-125	5110		30	U	5000	102		P
Magnesium	ug/L	75-125	8150		2910		5000	105		P
Manganese	ug/L	75-125	505		2	U	500	101		P
Potassium	ug/L	75-125	6510		1550		5000	99.2		P
Silica	ug/L		80600		71300		10700	86.7	N/A	P
Sodium	ug/L	75-125	13800		9310		5000	89.5		P
Strontium	ug/L	75-125	536		50.4		500	97.1		P
Tin	ug/L	75-125	510		2.5	U	500	102		P
Vanadium	ug/L	75-125	513		4.59	J	500	102		P
Zinc	ug/L	75-125	490		3.3	U	500	97.9		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-558

Client ID: CAPA-18-147569S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 436156001

Spike ID: 1203904884

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Antimony	ug/L	75-125	54.6		1	U	50	108		MS
Arsenic	ug/L	75-125	53.6		2	U	50	104		MS
Cadmium	ug/L	75-125	53.9		0.3	U	50	108		MS
Chromium	ug/L	75-125	56.6		3	U	50	107		MS
Lead	ug/L	75-125	50.9		0.5	U	50	102		MS
Molybdenum	ug/L	75-125	56.9		1.02		50	112		MS
Nickel	ug/L	75-125	51.9		0.6	U	50	103		MS
Selenium	ug/L	75-125	53		2	U	50	105		MS
Silver	ug/L	75-125	52.9		0.3	U	50	106		MS
Thallium	ug/L	75-125	49.1		0.6	U	50	98.2		MS
Uranium	ug/L	75-125	49.1		0.241		50	97.6		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-558

Client ID: CAPA-18-147569S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 436156001

Spike ID: 1203917286

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

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 2018-558

Lab Code: GEL

Contract: ESHL00114

Client ID: CAPA-18-147569D

Matrix: WATER

Level: Low

Sample ID: 436156001

Duplicate ID: 1203904772

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	12.9		12.2		5.93		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	11500		11000		5.01		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%	2910		2840		2.5		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1550		1480		4.33		P
Silica	ug/L	+/-20%	71300		67700		5.12		P
Sodium	ug/L	+/-20%	9310		8830		5.3		P
Strontium	ug/L	+/-20%	50.4		48		4.91		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	4.59 J		4.31 J		6.45		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2018-558

Lab Code: GEL

Contract: ESHL00114

Client ID: CAPA-18-147569D

Matrix: WATER

Level: Low

Sample ID: 436156001

Duplicate ID: 1203904883

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		3.03 J		200		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.02		0.997		1.89		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	0.241		0.251		4.07		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
–6–
Duplicate Sample Summary

SDG No.: 2018–558**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAPA–18–147569D**Matrix:** WATER**Level:** Low**Sample ID:** 436156001**Duplicate ID:** 1203917284**Percent Solids for Dup:** N/A

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

***Analytical Methods:**

AV EPA 245.1/245.2

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2018-558

Contract: ESHL00114

Aqueous LCS Source:OS2I

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203904771								
	Aluminum	ug/L	5000	5130		103	80-120	P
	Barium	ug/L	500	504		101	80-120	P
	Beryllium	ug/L	500	500		99.9	80-120	P
	Boron	ug/L	500	501		100	80-120	P
	Calcium	ug/L	5000	5060		101	80-120	P
	Cobalt	ug/L	500	510		102	80-120	P
	Copper	ug/L	500	502		100	80-120	P
	Iron	ug/L	5000	5140		103	80-120	P
	Magnesium	ug/L	5000	5230		105	80-120	P
	Manganese	ug/L	500	507		101	80-120	P
	Potassium	ug/L	5000	4740		94.8	80-120	P
	Silica	ug/L	10700	10300		96.5	80-120	P
	Sodium	ug/L	5000	4600		92	80-120	P
	Strontium	ug/L	500	484		96.8	80-120	P
	Tin	ug/L	500	507		101	80-120	P
	Vanadium	ug/L	500	497		99.3	80-120	P
	Zinc	ug/L	500	488		97.6	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-558

Contract: ESHL00114

Aqueous LCS Source: Inorganic Ventures

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203904882								
	Antimony	ug/L	50	51.3		103	80-120	MS
	Arsenic	ug/L	50	53		106	80-120	MS
	Cadmium	ug/L	50	52.1		104	80-120	MS
	Chromium	ug/L	50	52.9		106	80-120	MS
	Lead	ug/L	50	51.2		102	80-120	MS
	Molybdenum	ug/L	50	49.9		99.8	80-120	MS
	Nickel	ug/L	50	50.5		101	80-120	MS
	Selenium	ug/L	50	53.3		107	80-120	MS
	Silver	ug/L	50	52.1		104	80-120	MS
	Thallium	ug/L	50	48.8		97.6	80-120	MS
	Uranium	ug/L	50	47.6		95.3	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2018-558

Contract: ESHL00114

Aqueous LCS Source: GEL

Solid LCS Source:

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

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2018-558

Client ID: CAPA-18-147569L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 436156001

Serial Dilution ID: 1203904774

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	12.9		14.3	J	10.706			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	11500		11300		1.574		10	P
Cobalt	1	U	5	U				P
Copper	3	U	114					P
Iron	30	U	150	U				P
Magnesium	2910		2990		2.711			P
Manganese	2	U	10	U				P
Potassium	1550		1580		1.924			P
Silica	71300		70600		.924		10	P
Sodium	9310		9220		.97		10	P
Strontium	50.4		49.9		.989		10	P
Tin	2.5	U	12.5	U				P
Vanadium	4.59	J	5	U	.801			P
Zinc	3.3	U	30.8	J				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2018-558

Client ID: CAPA-18-147569L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 436156001

Serial Dilution ID: 1203904885

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	2	U	10	U				MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.02		1	U	16.831			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	.241		.335	U	32.78			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2018-558 **Client ID:** CAPA-18-147569L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 436156001 **Serial Dilution ID:** 1203917288

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Mercury	.067	U	.335	U				AV

*Analytical Methods:

AV EPA 245.1/245.2

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-558
Work Order #: 436149**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1711615

Method: SW 9060 Total Organic Carbon

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW-846:9060:

Sample ID	Client ID
436149002	CAPA-18-147574
1203905559	Method Blank (MB)
1203905560	Laboratory Control Sample (LCS)
1203905562	436027004(CAPA-18-147598) Sample Duplicate (DUP)
1203905564	436027004(CAPA-18-147598) Post Spike (PS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-093 REV# 15.

Preparation/Analytical Method Verification

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

Calibration Information

The Carbon analysis was performed on a O-I Analytical 1030W Carbon Analyzer.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

acceptance limits.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 436027004 (CAPA-18-147598) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will

always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product:	Cyanide and Total		
Analytical Batch:	1712934	Method:	WSP-CN(T)
Prep Batch :	1712933	Method:	EPA 335.4

Sample Analysis

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

Sample ID	Client ID
436149002	CAPA-18-147574
1203904782	Method Blank (MB)
1203904783	Laboratory Control Sample (LCS)
1203904784	436149002(CAPA-18-147574) Sample Duplicate (DUP)
1203904786	436149002(CAPA-18-147574) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 20.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 436149002 (CAPA-18-147574) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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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
436149001	CAPA-18-147548
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) and 436149001 (CAPA-18-147548) were manually integrated to correctly position the baseline as set in the calibration standards.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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scanned and inserted into the electronic package.

Method/Analysis Information

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

Sample Analysis

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

Sample ID	Client ID
436149001	CAPA-18-147548
1203908495	Method Blank (MB)
1203908496	Laboratory Control Sample (LCS)
1203908497	436027001(CAPA-18-147558) Sample Duplicate (DUP)
1203908498	436027001(CAPA-18-147558) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

acceptance limits.

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages

electronically. The following change from traditional packages should be noted:

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

Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1714720	Method:	TKN
Prep Batch :	1714719	Method:	EPA 351.2 Prep

Sample Analysis

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

Sample ID	Client ID
436149002	CAPA-18-147574
1203909428	Method Blank (MB)
1203909429	Laboratory Control Sample (LCS)
1203909430	435631005(CAPA-18-147589) Sample Duplicate (DUP)
1203909431	435631005(CAPA-18-147589) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

acceptance limits.

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

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

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1713174

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
436149001	CAPA-18-147548
1203905376	Method Blank (MB)
1203905377	Laboratory Control Sample (LCS)
1203905379	435630001(CAPA-18-147560) Sample Duplicate (DUP)
1203905383	435630001(CAPA-18-147560) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The following samples 1203905379 (CAPA-18-147560DUP) and 1203905383 (CAPA-18-147560PS) in this sample group were diluted due to matrix interference. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

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

Sample Analysis

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

Sample ID	Client ID
436149001	CAPA-18-147548
1203905249	Method Blank (MB)
1203905250	Laboratory Control Sample (LCS)
1203905251	435630001(CAPA-18-147560) Sample Duplicate (DUP)
1203905253	435630004(CAPA-18-147561) Sample Duplicate (DUP)
1203905252	435630001(CAPA-18-147560) Matrix Spike (MS)
1203905254	435630004(CAPA-18-147561) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-103 REV# 10.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 435630001 (CAPA-18-147560) and 435630004 (CAPA-18-147561) were selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1713394

Method: TDS

Sample Analysis

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

Sample ID	Client ID
436149001	CAPA-18-147548
1203905961	Method Blank (MB)
1203905962	Laboratory Control Sample (LCS)
1203905963	436027007(CAPA-18-147573) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-001 REV# 15.

Preparation/Analytical Method Verification

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

Calibration Information

The Solids analysis was performed on a Sartorius Balance BAL216. Solids lab

Initial Calibration

All initial calibration requirements have been met for this SDG.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Consecutive Weight Checks

All consecutive weight checks were met.

Quality Control (QC) Designation

Sample 436027007 (CAPA-18-147573) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1714428

Method: EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
436149001	CAPA-18-147548
1203908702	Laboratory Control Sample (LCS)
1203908703	436027001(CAPA-18-147558) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: pH

Analytical Batch: 1714456 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
436149001	CAPA-18-147548
1203908780	Laboratory Control Sample (LCS)
1203908781	435718001(CAPA-18-147549) Sample Duplicate (DUP)
1203908841	436156001(CAPA-18-147569) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 435718001 (CAPA-18-147549) and 436156001 (CAPA-18-147569) were selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

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

Sample	Analyte	Value
1203908781 (CAPA-18-147549DUP)	pH	Received 21-OCT-17, out of holding 19-OCT-17
1203908841 (CAPA-18-147569DUP)	pH	Received 25-OCT-17, out of holding 23-OCT-17
436149001 (CAPA-18-147548)	pH	Received 25-OCT-17, out of holding 23-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: 1714454 **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
436149001	CAPA-18-147548
1203908765	Laboratory Control Sample (LCS)
1203908768	435718001(CAPA-18-147549) Sample Duplicate (DUP)
1203908770	435718001(CAPA-18-147549) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 13.

Preparation/Analytical Method Verification

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

Calibration Information

The Titration and Ion analysis was performed on a Electronic bottle-top buret.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 435718001 (CAPA-18-147549) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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.

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Qualifier Definition Report for

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

Client SDG: 2018-558 GEL Work Order: 436149

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Review/Validation

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

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

Signature:



Name: Kristen Mizzell

Date: 16 NOV 2017

Title: Team Leader

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: November 16, 2017

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

Los Alamos, New Mexico 87545
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client SDG: 2018-558

Client Sample ID: CAPA-18-147548
Sample ID: 436149001
Matrix: W
Collect Date: 23-OCT-17 14:19
Receive Date: 25-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	1855	1715632	1
Chloride		2.19	0.067	0.200	mg/L		1					
Fluoride		0.165	0.033	0.100	mg/L		1					
Sulfate		1.87	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.057	0.017	0.050	mg/L	1.00	1	KLP1	11/01/17	1342	1714362	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.200	0.017	0.050	mg/L		1	KLP1	10/26/17	1349	1713174	3
PO4 "As Received"												
Phosphorus, Total as P		0.0928	0.020	0.050	mg/L	1.00	1	KLP1	10/26/17	1427	1713122	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		124	3.40	14.3	mg/L			KLP1	10/27/17	1111	1713394	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		68.3	1.45	4.00	mg/L			RXB5	11/02/17	1744	1714454	6
Carbonate alkalinity (CaCO3)	J	3.99	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		165	1.00	1.00	umhos/cm		1	VH1	11/08/17	1029	1714428	7
PH "As Received"												
pH at Temp 14.4C	H	8.56	0.010	0.100	SU		1	RXB5	11/02/17	1742	1714456	8

The following Prep Methods were performed:

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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: November 16, 2017

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

Los Alamos, New Mexico 87545
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client SDG: 2018-558

Client Sample ID: CAPA-18-147548
Sample ID: 436149001

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
The following Analytical Methods were performed:												
Method	Description		Analyst Comments									
1	EPA:300.0											
2	EPA:350.1											
3	EPA:353.2											
4	EPA 365.4 1974											
5	EPA:160.1											
6	EPA:310.1											
7	EPA:120.1											
8	EPA 150.1 1982											

Notes:

Column headers are defined as follows:

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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: November 16, 2017

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

Los Alamos, New Mexico 87545

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

Client SDG: 2018-558

Client Sample ID: CAPA-18-147574
Sample ID: 436149002
Matrix: W
Collect Date: 23-OCT-17 14:19
Receive Date: 25-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.552	0.330	1.00	mg/L		1	TSM	11/02/17	0716	1711615	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	0759	1712934	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	J	0.0585	0.033	0.100	mg/L	1.00	1	KLP1	11/02/17	0914	1714720	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	11/02/17	0706	1712933
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	11/01/17	1600	1714719

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

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

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: November 16, 2017

Page 1 of 6

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

Contact: Ms. Nita Patel

Workorder: 436149

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1711615										
QC1203905562	436027004	DUP									
Total Organic Carbon Average	J	0.426	J	0.368	mg/L	14.6	^	(+/-1.00)	TSM	11/02/17	04:31
QC1203905560	LCS										
Total Organic Carbon Average	10.0			10.3	mg/L			(80%-120%)		11/01/17	13:28
QC1203905559	MB										
Total Organic Carbon Average			U	ND	mg/L					11/01/17	13:16
QC1203905564	436027004	PS									
Total Organic Carbon Average	10.0	J	0.426	11.2	mg/L			(75%-125%)		11/02/17	05:18
Flow Injection Analysis											
Batch	1712934										
QC1203904784	436149002	DUP									
Cyanide, Total	U	ND	U	ND	ug/L	N/A			AXH3	11/02/17	08:00
QC1203904783	LCS										
Cyanide, Total	50.0			47.1	ug/L			(90%-110%)		11/02/17	07:58
QC1203904782	MB										
Cyanide, Total			U	ND	ug/L					11/02/17	07:57
QC1203904786	436149002	MS									
Cyanide, Total	100	U	ND	102	ug/L			(90%-110%)		11/02/17	08:01
Ion Chromatography											
Batch	1715632										
QC1203911578	436689005	DUP									
Bromide	U	ND	U	ND	mg/L	N/A			MAR1	11/03/17	23:44

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QC Summary

Workorder: 436149

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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%)			

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QC Summary

Workorder: 436149

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

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QC Summary

Workorder: 436149

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

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QC Summary

Workorder: 436149

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

- Notes:**
- < Result is less than value reported
 - > Result is greater than value reported
 - B The target analyte was detected in the associated blank.
 - E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
 - H Analytical holding time was exceeded

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QC Summary

Workorder: 436149

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

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

Radiological Analysis

Case Narrative

**Radiochemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-558
Work Order #: 436149**

Method/Analysis Information

Product: Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Batch Number: 1713388

Sample ID	Client ID
436149002	CAPA-18-147574
1203905946	Method Blank (MB)
1203905948	Laboratory Control Sample (LCS)
1203905947	435630002(CAPA-18-147586) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:

Calibration Information

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

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

Aliquots for samples 1203905946 (MB) and 1203905948 (LCS) were changed to 1.0, and the MDCs (and Lc if requested) for all samples are calculated using a blank population per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

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

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

Sample 436149002 (CAPA-18-147574) was recounted due to high carrier/tracer yield. The recount is reported.
Sample 1203905946 (MB) was recounted due to a peak shift. The recount is reported.

Miscellaneous Information:**Manual Integration**

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: IsoU

Analytical Method: HASL-300:ISOU

Analytical Batch Number: 1713390

Sample ID	Client ID
436149002	CAPA-18-147574
1203905952	Method Blank (MB)
1203905954	Laboratory Control Sample (LCS)
1203905953	435630002(CAPA-18-147586) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:

Calibration Information

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

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

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

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

Blank Decision Level

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

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

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

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

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Sample result 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: 1718157

Sample ID	Client ID
436149002	CAPA-18-147574
1203917957	Method Blank (MB)
1203917959	Laboratory Control Sample (LCS)
1203917958	436149002(CAPA-18-147574) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-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 1203917957 (MB) and 1203917959 (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: 436149002 (CAPA-18-147574). The QC was from ARSL work order 436149.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the matrix of the samples. The samples were counted the maximum count time in order to achieve the lowest possible MDAs.

Sample	Analyte	Value
1203917958 (CAPA-18-147574DUP)	Plutonium-238	Result -0.0499 < MDA 0.108 > RDL 0.05 pCi/L
	Plutonium-239/240	Result -0.0748 < MDA 0.14 > RDL 0.05 pCi/L
436149002 (CAPA-18-147574)	Plutonium-238	Result 0.00392 < MDA 0.0679 > RDL 0.05 pCi/L
	Plutonium-239/240	Result -0.0117 < MDA 0.088 > 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

Sample result are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

Samples were reprepared due to low carrier/tracer yield. The re-analysis is being reported.

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: 1713592

Sample ID	Client ID
436149002	CAPA-18-147574
1203906422	Method Blank (MB)
1203906424	Laboratory Control Sample (LCS)
1203906423	436149002(CAPA-18-147574) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:

Calibration Information

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

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

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

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

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

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: GFPC, Sr90, liquid

Analytical Method: EPA:905.0

Analytical Batch Number: 1714184

Sample ID	Client ID
436149002	CAPA-18-147574
1203907994	Method Blank (MB)
1203907997	Laboratory Control Sample (LCS)
1203907995	436149002(CAPA-18-147574) Sample Duplicate (DUP)
1203907996	436149002(CAPA-18-147574) Matrix Spike (MS)

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

SOP Reference

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

Calibration Information:**Calibration Information**

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

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:**Blank Information**

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

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

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

Matrix Spike (MS) Recovery

The MS spike recoveries met acceptance limits.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Sample result are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

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

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

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

Additional Comments

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

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

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

Sample ID	Client ID
436149002	CAPA-18-147574
1203913664	Method Blank (MB)
1203913668	Laboratory Control Sample (LCS)
1203913665	437078009(CAPA-18-147631) Sample Duplicate (DUP)
1203913666	437078009(CAPA-18-147631) Matrix Spike (MS)
1203913667	437078009(CAPA-18-147631) Matrix Spike Duplicate (MSD)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001 REV# 19.

Calibration Information:**Calibration Information**

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

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:**Blank Information**

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

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

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

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

Blank Decision Level

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

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

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

Matrix Spike (MS) Recovery

The MS spike recoveries met acceptance limits.

Duplication Criteria between MS and MSD

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

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Gross Alpha/Beta Preparation Information

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

Recounts

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

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

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

Additional Comments

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

Qualifier Information

Manual qualifiers were not required.

Certification Statement

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

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Qualifier Definition Report for

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

Client SDG: 2018-558 GEL Work Order: 436149

The Qualifiers in this report are defined as follows:

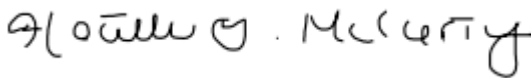
- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Review/Validation

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

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

Signature:



Name: Heather McCarty

Date: 17 NOV 2017

Title: Analyst II

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Report Date: November 17, 2017

Client Sample ID: CAPA-18-147574
Sample ID: 436149002
Matrix: W
Collect Date: 23-OCT-17
Receive Date: 25-OCT-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241		0.0378	+/-0.00963	0.0331	0.014	+/-0.00977	0.050	pCi/L			JXR5	11/07/17	1400	1713388	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	0.00392	+/-0.0152	0.0679	0.0286	+/-0.0152	0.050	pCi/L			JXR5	11/15/17	1408	1718157	2
Plutonium-239/240	U	-0.0117	+/-0.0188	0.088	0.0387	+/-0.0188	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.534	+/-0.0385	0.0559	0.0244	+/-0.0465	1.00	pCi/L			JXR5	11/05/17	1533	1713390	3
Uranium-235/236	U	0.0163	+/-0.0118	0.0595	0.0253	+/-0.0118	1.00	pCi/L							
Uranium-238		0.285	+/-0.0292	0.0541	0.0235	+/-0.0324	0.500	pCi/L							
Rad Gamma Spec Analysis															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	2.44	+/-1.27	3.18	1.32	+/-1.28	8.00	pCi/L			BSW1	11/12/17	0854	1713592	4
Cobalt-60	U	1.51	+/-1.17	5.20	2.20	+/-1.22	8.00	pCi/L							
Neptunium-237	U	2.10	+/-2.08	8.15	3.72	+/-2.14		pCi/L							
Potassium-40	U	3.77	+/-20.6	72.1	32.1	+/-20.6		pCi/L							
Sodium-22	U	-0.439	+/-1.19	4.48	1.85	+/-1.19		pCi/L							
Rad Gas Flow Proportional Counting															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	-0.105	+/-0.104	0.430	0.187	+/-0.104	0.500	pCi/L			LXB3	11/11/17	1542	1714184	5
<i>WSP-GrossA/B "As Received"</i>															
Beta		4.06	+/-0.957	2.82	1.31	+/-1.02	3.00	pCi/L			AXH4	11/15/17	1143	1716449	6
Alpha	U	0.762	+/-0.769	2.82	1.05	+/-0.772	3.00	pCi/L			AXH4	11/15/17	1648	1716449	7

The following Analytical Methods were performed

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

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer	Alphaspec Am241 Liquid "As Received"	1713388	90.9	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1718157	97.3	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1713390	82.9	(50%-105%)

GEL LABORATORIES LLC

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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAPA-18-147574

Sample ID: 436149002

Project: ESHL00114

Client ID: ARSL004

Report Date: November 17, 2017

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test								Batch ID	Recovery%	Acceptable Limits				
Strontium Carrier		GFPC, Sr90, liquid "As Received"							1714184	86.6	(50%-105%)				

Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: November 17, 2017
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Client : Los Alamos National Laboratory
TA-00, SM1237, Rm104C

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 436149

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1713388										
QC1203905947	435630002	DUP									
Americium-241	U	-0.00202	U	0.00497	pCi/L	0.261		(0-1)	JXR5	11/05/17	12:18
	Uncert:	+/-0.00729		+/-0.00608							
	TPU:	+/-0.00729		+/-0.00609							
**Americium-243 Tracer	2.62	2.15		2.50	pCi/L		95.2	(50%-105%)			
	Uncert:	+/-0.0731		+/-0.0808							
	TPU:	+/-0.136		+/-0.144							
QC1203905948	LCS										
Americium-241	1.97			1.80	pCi/L		91.7	(80%-120%)	JXR5	11/05/17	12:18
	Uncert:			+/-0.0588							
	TPU:			+/-0.100							
**Americium-243 Tracer	2.10			1.92	pCi/L		91.4	(50%-105%)			
	Uncert:			+/-0.0629							
	TPU:			+/-0.114							
QC1203905946	MB										
Americium-241			U	0.00284	pCi/L				JXR5	11/06/17	17:11
	Uncert:			+/-0.00634							
	TPU:			+/-0.00635							
**Americium-243 Tracer	2.10			1.41	pCi/L		67.2	(50%-105%)			
	Uncert:			+/-0.0769							
	TPU:			+/-0.130							
Batch	1713390										
QC1203905953	435630002	DUP									
Uranium-234		0.500		0.567	pCi/L	0.351		(0-1)	JXR5	11/06/17	09:16
	Uncert:	+/-0.0377		+/-0.0414							
	TPU:	+/-0.045		+/-0.0503							
Uranium-235/236	U	0.0367	U	0.0623	pCi/L	0.413		(0-1)			
	Uncert:	+/-0.0138		+/-0.0168							
	TPU:	+/-0.0139		+/-0.0171							
Uranium-238		0.265		0.264	pCi/L	0.005		(0-1)			
	Uncert:	+/-0.0275		+/-0.0295							
	TPU:	+/-0.0305		+/-0.0324							
**Uranium-232 Tracer	2.62	1.79		1.89	pCi/L		72.1	(50%-105%)			
	Uncert:	+/-0.0851		+/-0.0894							
	TPU:	+/-0.155		+/-0.160							
QC1203905954	LCS										
Uranium-234				2.34	pCi/L				JXR5	11/06/17	09:16
	Uncert:			+/-0.0715							
	TPU:			+/-0.136							
Uranium-235/236				0.163	pCi/L						
	Uncert:			+/-0.0215							
	TPU:			+/-0.0229							

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1713390										
Uranium-238	2.70			2.64	pCi/L		97.9	(80%-120%)			
	Uncert:			+/-0.0759							
	TPU:			+/-0.151							
**Uranium-232 Tracer	2.10			1.69	pCi/L		80.9	(50%-105%)			
	Uncert:			+/-0.0678							
	TPU:			+/-0.124							
QC1203905952 MB											
Uranium-234			U	0.0352	pCi/L				JXR5	11/05/17	15:33
	Uncert:			+/-0.0123							
	TPU:			+/-0.0125							
Uranium-235/236			U	0.0124	pCi/L						
	Uncert:			+/-0.00762							
	TPU:			+/-0.00764							
Uranium-238			U	0.00252	pCi/L						
	Uncert:			+/-0.00665							
	TPU:			+/-0.00666							
**Uranium-232 Tracer	2.10			1.51	pCi/L		71.8	(50%-105%)			
	Uncert:			+/-0.0729							
	TPU:			+/-0.129							
Batch	1718157										
QC1203917958 436149002 DUP											
Plutonium-238		U	0.00392	U	-0.0499	pCi/L	0.732	(0-1)	JXR5	11/15/17	14:08
	Uncert:		+/-0.0152		+/-0.0216						
	TPU:		+/-0.0152		+/-0.0216						
Plutonium-239/240		U	-0.0117	U	-0.0748	pCi/L	0.697	(0-1)			
	Uncert:		+/-0.0188		+/-0.0265						
	TPU:		+/-0.0188		+/-0.0265						
**Plutonium-242 Tracer	4.93	4.80		2.93	pCi/L		59.5	(50%-105%)			
	Uncert:		+/-0.141		+/-0.179						
	TPU:		+/-0.295		+/-0.333						
QC1203917959 LCS											
Plutonium-238				U	-0.0075	pCi/L		(80%-120%)	JXR5	11/15/17	14:08
	Uncert:			+/-0.00593							
	TPU:			+/-0.00593							
Plutonium-239/240	1.98			2.14	pCi/L		108	(80%-120%)			
	Uncert:			+/-0.0637							
	TPU:			+/-0.132							
**Plutonium-242 Tracer	1.97			1.40	pCi/L		71.2	(50%-105%)			
	Uncert:			+/-0.0614							
	TPU:			+/-0.123							
QC1203917957 MB											
Plutonium-238				U	-0.00155	pCi/L			JXR5	11/15/17	14:08
	Uncert:			+/-0.00466							
	TPU:			+/-0.00466							
Plutonium-239/240			U	-0.0124	pCi/L						
	Uncert:			+/-0.00491							

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Rad Alpha Spec											
Batch	1718157										
**Plutonium-242 Tracer		TPU:		+/-0.00491							
	1.97			1.77	pCi/L		89.6	(50%-105%)			
		Uncert:		+/-0.0555							
		TPU:		+/-0.117							
Rad Gamma Spec											
Batch	1713592										
QC1203906423	436149002	DUP									
Cesium-137		U	2.44	U	-1.28	pCi/L	0.651		(0-1)	BSW1	11/14/1706:19
		Uncert:	+/-1.27		+/-1.55						
		TPU:	+/-1.28		+/-1.57						
Cobalt-60		U	1.51	U	-2.02	pCi/L	0.627		(0-1)		
		Uncert:	+/-1.17		+/-1.52						
		TPU:	+/-1.22		+/-1.60						
Neptunium-237		U	2.10	U	-3.74	pCi/L	0.605		(0-1)		
		Uncert:	+/-2.08		+/-2.54						
		TPU:	+/-2.14		+/-2.69						
Potassium-40		U	3.77	U	-53.9	pCi/L	0.648		(0-1)		
		Uncert:	+/-20.6		+/-20.3						
		TPU:	+/-20.6		+/-23.9						
Sodium-22		U	-0.439	U	-2.32	pCi/L	0.298		(0-1)		
		Uncert:	+/-1.19		+/-1.88						
		TPU:	+/-1.19		+/-1.96						
QC1203906424	LCS										
Americium-241	34300				37300	pCi/L	109	(80%-120%)	BSW1	11/12/1711:39	
		Uncert:			+/-795						
		TPU:			+/-2210						
Cesium-137	13000				13700	pCi/L	105	(80%-120%)			
		Uncert:			+/-177						
		TPU:			+/-587						
Cobalt-60	11300				11300	pCi/L	100	(80%-120%)			
		Uncert:			+/-183						
		TPU:			+/-547						
Neptunium-237				U	-70.9	pCi/L					
		Uncert:			+/-56.2						
		TPU:			+/-58.6						
Potassium-40				U	-50.6	pCi/L					
		Uncert:			+/-124						
		TPU:			+/-124						
Sodium-22				U	30.2	pCi/L					
		Uncert:			+/-18.6						
		TPU:			+/-19.9						
QC1203906422	MB										
Cesium-137				U	-2.2	pCi/L			BSW1	11/14/1706:18	
		Uncert:			+/-1.21						
		TPU:			+/-1.31						
Cobalt-60				U	0.387	pCi/L					

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gamma Spec											
Batch	1713592										
Neptunium-237	Uncert:			+/-1.16							
	TPU:			+/-1.16							
			U	0.751	pCi/L						
Potassium-40	Uncert:			+/-2.18							
	TPU:			+/-2.19							
			U	-18	pCi/L						
Sodium-22	Uncert:			+/-15.0							
	TPU:			+/-15.6							
			U	-0.202	pCi/L						
	Uncert:			+/-0.761							
	TPU:			+/-0.762							
Rad Gas Flow											
Batch	1714184										
QC1203907995	436149002	DUP									
Strontium-90	U	-0.105	U	0.0561	pCi/L	0.355		(0-1)	LXB3	11/11/17	15:43
**Strontium Carrier	Uncert:	+/-0.104		+/-0.123							
	TPU:	+/-0.104		+/-0.123							
	7.85	6.80		7.80	mg		99.4	(50%-105%)			
QC1203907997	LCS										
Strontium-90	23.7			26.9	pCi/L		113	(80%-120%)	LXB3	11/13/17	08:20
**Strontium Carrier	Uncert:			+/-0.700							
	TPU:			+/-2.41							
	7.85			4.80	mg		61.1	(50%-105%)			
QC1203907994	MB										
Strontium-90			U	-0.0173	pCi/L				LXB3	11/11/17	15:43
**Strontium Carrier	Uncert:			+/-0.0672							
	TPU:			+/-0.0672							
	7.85			6.70	mg		85.4	(50%-105%)			
QC1203907996	436149002	MS									
Strontium-90	237	U	-0.105	181	pCi/L		76.3	(75%-125%)	LXB3	11/11/17	15:43
**Strontium Carrier	Uncert:			+/-4.90							
	TPU:			+/-15.4							
	7.85			8.10	mg		103	(50%-105%)			
Batch	1716449										
QC1203913665	437078009	DUP									
Alpha		2.35	U	1.11	pCi/L	0.36		(0-1)	AXH4	11/15/17	16:48
Beta	Uncert:	+/-0.879		+/-0.802							
	TPU:	+/-0.901		+/-0.808							
	U	2.54		4.00	pCi/L	0.363		(0-1)		11/15/17	11:42
QC1203913668	Uncert:			+/-0.980							
	TPU:			+/-1.04							
Alpha	12.1			11.6	pCi/L		95.6	(80%-120%)	AXH4	11/15/17	16:50
	Uncert:			+/-0.557							
	TPU:			+/-1.12							

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Parname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1716449										
Beta	47.4			49.7	pCi/L		105	(80%-120%)			
	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							
	TPU:	+/-0.982		+/-152							

Notes:

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

The Qualifiers in this report are defined as follows:

- ** Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- M REMF Result > MDC/CL and < RDL
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.

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Parmname	NOM	Sample Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
R	Sample results are rejected									
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.									
UI	Gamma Spectroscopy--Uncertain identification									
UJ	Gamma Spectroscopy--Uncertain identification									
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.									
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.									
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.									
h	Preparation or preservation holding time was exceeded									

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

** Indicates analyte is a surrogate/tracer compound.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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