

The order of this data package is as follows:

1. Chain-of-Custody/Lab Request
2. Copies of COCs
3. Validation Report
4. Laboratory analysis

Comments:

[illegible]

R-29

Shipping Classification Determination Checklist

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Sampling Plan ID/Name: 11694

COC: 2018-2089

TEST - Explosives				YES	NO
Samples collected from a WFO area? (TAs -8, 9, 11, 16, 37, 14, 15, 36, 22, 39, 40, and 49)				<input checked="" type="checkbox"/>	
Field Test for Explosives Results				YES	NO
HE SPOT test result positive. If YES - Do not transport.				<input checked="" type="checkbox"/>	
TEST - Chemical Preservation				YES	NO
Samples are chemically preserved?				<input checked="" type="checkbox"/>	
Field Team Member Statement				YES	NO
Chemical preservation exceeds limits given 40 CFR 136, Table II - Required Containers, Preservation Techniques and Holding Times (footnote 3). If YES - Do not ship.				<input checked="" type="checkbox"/>	
TEST - Field Screen				YES	NO
The sample has field screening measurements of alpha and beta activity?					<input checked="" type="checkbox"/>
Sample Activity (dpm/100cm ²)	Shipment Activity (dpm*g/100cm ²)	Sampled Location		YES	NO
Alpha detectable	AND Alpha ≥ 160,000	AT TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49			<input checked="" type="checkbox"/>
Alpha ≥ 125	AND Alpha ≥ 1,250,000	AT other locations			<input checked="" type="checkbox"/>
Beta ≥ 1,500	AND Beta ≥ 15,000,000	AT any location			<input checked="" type="checkbox"/>
The sample Alpha ≥ 16,000,000 dpm*g/100cm ² or Beta ≥ 160,000,000 dpm*g/100cm ² . If YES - Do not ship.					<input checked="" type="checkbox"/>
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.					<input checked="" type="checkbox"/>
The sample is tentatively identified as DOT hazard Class 7 (Radioactive). The shipment is labeled <i>Radioactive Material, Excepted Package - Limited Quantity Material - UN2910</i> , based on field screening measurements of alpha and beta activity.					<input checked="" type="checkbox"/>
TEST - Location				YES	NO
Prior analytical measurements of radioactive isotopes are available?				<input checked="" type="checkbox"/>	
Sample Activity (pCi/g)	Shipment Activity (pCi)			YES	NO
Am-241 ≥ 27 pCi/g	AND Am-241 ≥ 270,000 pCi Total				<input checked="" type="checkbox"/>
Cs-137 ≥ 270 pCi/g	AND Cs-137 ≥ 270,000 pCi Total				<input checked="" type="checkbox"/>
Pu-238 ≥ 27 pCi/g	AND Pu-238 ≥ 270,000 pCi Total				<input checked="" type="checkbox"/>
Pu-239/240 ≥ 27 pCi/g	AND Pu-239/240 ≥ 270,000 pCi Total				<input checked="" type="checkbox"/>
Th-228 ≥ 27 pCi/g	AND Th-228 ≥ 270,000 pCi Total				<input checked="" type="checkbox"/>
U-234 ≥ 270 pCi/g	AND U-234 ≥ 1,600,000,000 pCi Total				<input checked="" type="checkbox"/>
U-238 ≥ 270 pCi/g	AND U-238 ≥ unlimited				<input checked="" type="checkbox"/>
H-3 ≥ 27,000,000 pCi/g	AND H-3 ≥ 27,000,000,000 pCi Total				<input checked="" type="checkbox"/>
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.					<input checked="" type="checkbox"/>
The sample is tentatively identified as DOT hazard Class 7 (Radioactive). The shipment is labeled <i>Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910</i> , based on prior analytical measurements of radioactive isotopes.					<input checked="" type="checkbox"/>
TEST - AK				YES	NO
The shippers documented knowledge of the sample positively identifies appropriate labeling.					<input checked="" type="checkbox"/>
Documented Field Team Member Statement				YES	NO
The sample is tentatively identified as DOT hazard Class 7 (Radioactive). The shipment is labeled <i>Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910</i> , and the sample is submitted to ARS or RP for hazard classification analysis.					<input checked="" type="checkbox"/>
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		Date/Time		Hazard Assessment Reviewed	
(Printed Name) Tanya Vander Vis		3-6-18		(Printed Name) Elizabethina Kagan	
(Signature) Tanya Vander Vis		1320		(Signature) [Signature]	
				3-6-18	
				1320	

DATA VALIDATION REPORT

Chain Of Custody No. 2018-2089

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
445476	EPA:120.1	1	1			
445476	EPA:150.1	1	1			
445476	EPA:160.1	1	1			
445476	EPA:170.0	2	2	1		
445476	EPA:245.2	2	2			
445476	EPA:300.0	1	1			
445476	EPA:310.1	1	1			
445476	EPA:335.4	1	1			
445476	EPA:350.1	1	1			
445476	EPA:351.2	1	1			
445476	EPA:353.2	1	1			
445476	EPA:365.4	1	1			
445476	EPA:900	1	1			
445476	EPA:901.1	1	1			
445476	EPA:905.0	1	1			
445476	HASL-300:AM-241	1	1			
445476	HASL-300:ISOPU	1	1			
445476	HASL-300:ISOU	1	1			
445476	SM:A2340B	1	1			
445476	SW-846:6010C	1	1			
445476	SW-846:6020	1	1			
445476	SW-846:6850	1	1			
445476	SW-846:8260B	1	1	1		
445476	SW-846:8270D	1	1			
445476	SW-846:8330B	1	1			
445476	SW-846:9060	1	1			

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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
445476	EPA:120.1	1746355	1746355	1	1									1				1			
445476	EPA:150.1	1745501	1745501	1	1									1				1			
445476	EPA:160.1	1746577	1746577	1	1				1					1				1			
445476	EPA:170.0	NA	NA	2	2	1															
445476	EPA:245.2	1745780	1745779	2	2				1	1				1				1			
445476	EPA:300.0	1745475	1745475	1	1				1					1				1			
445476	EPA:310.1	1745500	1745500	1	1					1				1				1			
445476	EPA:335.4	1745736	1745735	1	1				1	1				1				1			
445476	EPA:350.1	1744739	1744738	1	1				1	2				1				2			
445476	EPA:351.2	1744737	1744736	1	1				1	2				1				2			
445476	EPA:353.2	1745313	1745313	1	1				1					1				2			
445476	EPA:365.4	1744746	1744745	1	1				1	2				1				2			
445476	EPA:900	1746730	1746730	1	1				1	1	1			1				1			
445476	EPA:901.1	1745746	1745746	1	1				1					1				1			
445476	EPA:905.0	1746698	1746698	1	1				1	1				1				1			
445476	HASL-300:AM-241	1745470	1745470	1	1				1					1				1			
445476	HASL-300:ISOPU	1745471	1745471	1	1				1					1				1			
445476	HASL-300:ISOU	1745472	1745472	1	1				1					1				1			
445476	SM:A2340B	1752213	1752213	1	1																
445476	SW-846:6010C	1745495	1745494	1	1				1	1				1				1			
445476	SW-846:6020	1745486	1745485	1	1				1	1				1				1			
445476	SW-846:6850	1746747	1746744	1	1				1	1	1			1							
445476	SW-846:8260B	1746875	1746875	1	1	1			2					4							
445476	SW-846:8270D	1745680	1745679	1	1				1	1	1			1							
445476	SW-846:8330B	1746310	1746309	1	1				1	1	1			1							
445476	SW-846:9060	1745644	1745644	1	1				1					1				1			

2. Distribution Of Analytes In EDD.

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DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAAN-18-151443	1203987915	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAAN-18-151443	445476001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAAN-18-151450	445476005	FD	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203987912	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAAN-18-151443	445476001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAAN-18-151450	445476005	FD	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-18-151410	1203986137	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203986136	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAAN-18-151443	445476001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAAN-18-151450	445476005	FD	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CTUA-17-151330	1203988407	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203988404	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203988403	MB	1	0	0	0
EPA:170.0	VOC	CAAN-18-151443	445476001	REG	1	0	0	0
EPA:170.0	VOC	CAAN-18-151444	445476002	REG	1	0	0	0
EPA:170.0	VOC	CAAN-18-151448	445476004	FTB	1	0	0	0
EPA:170.0	VOC	CAAN-18-151450	445476005	FD	1	0	0	0
EPA:170.0	VOC	CAAN-18-151451	445476007	FD	1	0	0	0
EPA:245.2	INORGANIC	CAAN-18-151443	445476001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAAN-18-151444	445476002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAAN-18-151450	445476005	FD	1	0	0	0
EPA:245.2	INORGANIC	CAAN-18-151451	445476006	FD	1	0	0	0
EPA:245.2	INORGANIC	CTUA-17-151330	1203986779	DUP	1	0	0	0
EPA:245.2	INORGANIC	CTUA-17-151330	1203986780	MS	0	0	1	0
EPA:245.2	INORGANIC	LCS	1203986778	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203986777	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAAN-18-151443	445476001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAAN-18-151450	445476005	FD	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CTUA-17-151330	1203986085	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203986084	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203986083	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAAN-18-151443	445476001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAAN-18-151450	445476005	FD	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-18-151410	1203986132	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-18-151410	1203986134	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203986131	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAAN-18-151444	1203986679	DUP	1	0	0	0
EPA:335.4	INORGANIC	CAAN-18-151444	1203986681	MS	0	0	1	0
EPA:335.4	INORGANIC	CAAN-18-151444	445476002	REG	1	0	0	0

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Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:335.4	INORGANIC	CAAN-18-151451	445476006	FD	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203986677	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203986676	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAAN-18-151443	1203986324	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAAN-18-151443	1203986325	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAAN-18-151443	445476001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAAN-18-151450	445476005	FD	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203984481	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203984480	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	NP001-18-151827	1203986322	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	NP001-18-151827	1203986323	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAAN-18-151444	445476002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAAN-18-151451	445476006	FD	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-12	1203984478	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-12	1203984479	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203984477	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203984476	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	NP001-18-151827	1203986260	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	NP001-18-151827	1203986262	MS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	CAAN-18-151443	1203986197	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAAN-18-151443	445476001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAAN-18-151450	445476005	FD	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203985745	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203985744	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	NP001-18-151827	1203986196	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAAN-18-151443	1203986265	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAAN-18-151443	1203986266	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAAN-18-151443	445476001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAAN-18-151450	445476005	FD	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203984496	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203984495	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	NP048-18-151677	1203987049	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	NP048-18-151677	1203987050	MS	0	0	1	0
EPA:900	RAD	CAAN-18-151444	445476002	REG	2	0	0	0
EPA:900	RAD	CAAN-18-151451	445476006	FD	2	0	0	0
EPA:900	RAD	CAAN-18-151479	1203988748	DUP	2	0	0	0
EPA:900	RAD	CAAN-18-151479	1203988749	MS	0	0	2	0
EPA:900	RAD	CAAN-18-151479	1203988750	MSD	0	0	2	0
EPA:900	RAD	LCS	1203988751	LCS	0	0	2	0

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Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:900	RAD	MB	1203988747	MB	2	0	0	0
EPA:901.1	RAD	CAAN-18-151444	1203986696	DUP	5	0	0	0
EPA:901.1	RAD	CAAN-18-151444	445476002	REG	5	0	0	0
EPA:901.1	RAD	CAAN-18-151451	445476006	FD	5	0	0	0
EPA:901.1	RAD	LCS	1203986697	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203986695	MB	5	0	0	0
EPA:905.0	RAD	CAAN-18-151444	445476002	REG	1	0	0	0
EPA:905.0	RAD	CAAN-18-151451	445476006	FD	1	0	0	0
EPA:905.0	RAD	CAAN-18-151491	1203988670	DUP	1	0	0	0
EPA:905.0	RAD	CAAN-18-151491	1203988671	MS	0	0	1	0
EPA:905.0	RAD	LCS	1203988672	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203988669	MB	1	0	0	0
HASL-300:AM-241	RAD	CAAN-18-151444	1203986069	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAAN-18-151444	445476002	REG	1	0	0	0
HASL-300:AM-241	RAD	CAAN-18-151451	445476006	FD	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203986070	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203986068	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAAN-18-151444	1203986072	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAAN-18-151444	445476002	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAAN-18-151451	445476006	FD	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203986073	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203986071	MB	2	0	0	0
HASL-300:ISOU	RAD	CAAN-18-151444	1203986075	DUP	3	0	0	0
HASL-300:ISOU	RAD	CAAN-18-151444	445476002	REG	3	0	0	0
HASL-300:ISOU	RAD	CAAN-18-151451	445476006	FD	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203986076	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203986074	MB	3	0	0	0
SM:A2340B	INORGANIC	CAAN-18-151443	445476001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAAN-18-151450	445476005	FD	1	0	0	0
SW-846:6010C	INORGANIC	CAAN-18-151443	1203986123	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAAN-18-151443	1203986124	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAAN-18-151443	445476001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAAN-18-151450	445476005	FD	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203986122	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203986121	MB	17	0	0	0
SW-846:6020	INORGANIC	CAAN-18-151443	1203986106	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAAN-18-151443	1203986107	MS	0	0	11	0
SW-846:6020	INORGANIC	CAAN-18-151443	445476001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAAN-18-151450	445476005	FD	11	0	0	0

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DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6020	INORGANIC	LCS	1203986105	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203986104	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAAN-18-151443	445476001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAAN-18-151450	445476005	FD	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CTUA-17-151330	1203988799	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CTUA-17-151330	1203988800	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203988798	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203988797	MB	1	0	0	0
SW-846:8260B	VOC	CAAN-18-151444	445476002	REG	80	3	0	0
SW-846:8260B	VOC	CAAN-18-151448	445476004	FTB	80	3	0	0
SW-846:8260B	VOC	CAAN-18-151451	445476006	FD	80	3	0	0
SW-846:8260B	VOC	LCS	1203990221	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203990222	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203993952	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203993953	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203990220	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203993951	MB	80	3	0	0
SW-846:8270D	SVOC	CAAN-18-151444	1203986543	MS	0	6	76	0
SW-846:8270D	SVOC	CAAN-18-151444	1203986544	MSD	0	6	76	0
SW-846:8270D	SVOC	CAAN-18-151444	445476002	REG	80	6	0	0
SW-846:8270D	SVOC	CAAN-18-151451	445476006	FD	80	6	0	0
SW-846:8270D	SVOC	LCS	1203986542	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203986541	MB	80	6	0	0
SW-846:8330B	LCMS/MS HIGH	CAAN-18-151444	1203987816	MS	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	CAAN-18-151444	1203987817	MSD	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	CAAN-18-151444	445476003	REG	20	1	0	0
SW-846:8330B	LCMS/MS HIGH	CAAN-18-151451	445476007	FD	20	1	0	0
SW-846:8330B	LCMS/MS HIGH	LCS	1203987815	LCS	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	MB	1203987814	MB	20	1	0	0
SW-846:9060	GENERAL CHEMISTRY	CAAN-18-151444	1203986469	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAAN-18-151444	445476002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAAN-18-151451	445476006	FD	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203986468	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203986467	MB	1	0	0	0

3. Are any analytes missing?

No.

Only results shown in Section 13 'Display Flagged Data' are current as of this report generation. All other sections are valid for the date the COC data was inserted into EIM, and may have changed due to data updates in the intervening time.

DATA VALIDATION REPORT

4. Were any holding times exceeded?

Field Sample ID	Lab Sample ID	Analytical Method	Sample Date	Extraction Date	Analysis Date	Extraction Hold Time	Max Extract Hold Time	Reject Above	Exceeds Limit	Analysis Hold Time	Max Analysis Hold Time	Reject Above	Exceeds Limit
CAAN-18-151444	445476002	SW-846:8260B	03-06-2018		03-20-2018	NA				14	14	15	X
CAAN-18-151448	445476004	SW-846:8260B	03-06-2018		03-20-2018	NA				14	14	15	X
CAAN-18-151451	445476006	SW-846:8260B	03-06-2018		03-20-2018	NA				14	14	15	X

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	1203984480	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0284	J	mg/L	0.050
MB	1203986121	METHOD BLANK	SW-846:6010C	W	Sodium	120	J	ug/L	300
MB	1203986121	METHOD BLANK	SW-846:6010C	W	Strontium	-1.03	UJ	ug/L	5.00
CAAN-18-151448	445476004	TRIP BLANK	EPA:170.0	W	Temperature	2		Deg C	

Field Sample ID	Blank Lab	Blank Type	Analytical Method	Parameter Name	Blank Lab Result	Blank Lab Units	Lab Result	Lab Qualifier	Lab Detection Limit	Detect Flag	Detect to Nondetect Factor	Detect to Estimated Factor	Use Factors
CAAN-18-151443	1203984480	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0284	mg/L	0.206		0.050	Y	5	100	Y
CAAN-18-151450	1203984480	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0284	mg/L	0.048	J	0.050	Y	5	100	Y
CAAN-18-151443	1203986121	METHOD BLANK	SW-846:6010C	Sodium	120	ug/L	11000		300	Y	5	100	Y
CAAN-18-151450	1203986121	METHOD BLANK	SW-846:6010C	Sodium	120	ug/L	10100		300	Y	5	100	Y

Only results shown in Section 13 'Display Flagged Data' are current as of this report generation. All other sections are valid for the date the COC data was inserted into EIM, and may have changed due to data updates in the intervening time.

DATA VALIDATION REPORT

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
CAAN-18-151443	1203986121	METHOD BLANK	SW-846:6010C	Strontium	-1.03	ug/L	57.4		5.00	Y	5	100	Y
CAAN-18-151450	1203986121	METHOD BLANK	SW-846:6010C	Strontium	-1.03	ug/L	56.1		5.00	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
CAAN-18-151444	1203986543	1203986544	SW-846:8270D	Benzidine	1745679	03-09-2018	W	42	81	130	15	10	63	30

8. Any LCS/LCSD or BS/BSR 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?

Only results shown in Section 13 'Display Flagged Data' are current as of this report generation. All other sections are valid for the date the COC data was inserted into EIM, and may have changed due to data updates in the intervening time.

DATA VALIDATION REPORT

Field Sample ID	Lab Sample ID	LD Lab Sample ID	Analytical Method	Parameter Name	Sample Matrix	Lab Result	LD Lab Result	Lab Units	Detect Flag	LD Detect Flag	RPD	RPD Limit
CAAN-18-151444	445476002	1203986075	HASL-300:ISOU	Uranium-234	W	0.294	0.374	pCi/L	Y	Y	24	20
CAAN-18-151444	445476002	1203986075	HASL-300:ISOU	Uranium-238	W	0.193	0.146	pCi/L	Y	Y	27.4	20

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	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-29	2018-2089	CAAN-18-151443	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		J+	I4a	Y	0.206	mg/L	0.206	mg/L			W	03/06/2018		1744739	VAL	Y
R-29	2018-2089	CAAN-18-151443	REG	INIT	INORGANIC	SW-846:6010C	Sodium		J+	I4a	Y	11000	ug/L	11	mg/L			W	03/06/2018		1745495	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00588	pCi/L	0.00588	pCi/L	0.0275	0.00464	W	03/06/2018		1745470	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	-2	pCi/L	-2	pCi/L	4.86	1.48	W	03/06/2018		1745746	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	0.284	pCi/L	0.284	pCi/L	4.75	1.14	W	03/06/2018		1745746	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	-0.0876	pCi/L	-0.0876	pCi/L	1.82	0.280	W	03/06/2018		1746730	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	1.12	pCi/L	1.12	pCi/L	2.15	0.656	W	03/06/2018		1746730	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	1.55	pCi/L	1.55	pCi/L	8.99	2.34	W	03/06/2018		1745746	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	-0.00623	pCi/L	-0.00623	pCi/L	0.0441	0.00804	W	03/06/2018		1745471	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.00415	pCi/L	0.00415	pCi/L	0.0475	0.00831	W	03/06/2018		1745471	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	14.3	pCi/L	14.3	pCi/L	48.2	26.7	W	03/06/2018		1745746	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	0.833	pCi/L	0.833	pCi/L	4.89	1.25	W	03/06/2018		1745746	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.287	pCi/L	0.287	pCi/L	0.388	0.125	W	03/06/2018		1746698	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	HASL-300:ISOU	Uranium-234		J	R10	Y	0.294	pCi/L	0.294	pCi/L	0.0869	0.0284	W	03/06/2018		1745472	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0412	pCi/L	0.0412	pCi/L	0.0412	0.015	W	03/06/2018		1745472	VAL	Y
R-29	2018-2089	CAAN-18-151444	REG	INIT	RAD	HASL-300:ISOU	Uranium-238		J	R10	Y	0.193	pCi/L	0.193	pCi/L	0.0532	0.0227	W	03/06/2018		1745472	VAL	Y
R-29	2018-2089	CAAN-18-151450	FD	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J	U	I4	N	0.048	mg/L	0.048	mg/L			W	03/06/2018		1744739	VAL	Y
R-29	2018-2089	CAAN-18-151450	FD	INIT	INORGANIC	SW-846:6010C	Sodium		J+	I4a	Y	10100	ug/L	10.1	mg/L			W	03/06/2018		1745495	VAL	Y
R-29	2018-2089	CAAN-18-151451	FD	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00411	pCi/L	0.00411	pCi/L	0.0385	0.00769	W	03/06/2018		1745470	VAL	Y

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DATA VALIDATION REPORT

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Paramter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-29	2018-2089	CAAN-18-151451	FD	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	0.242	pCi/L	0.242	pCi/L	6.56	1.66	W	03/06/2018		1745746	VAL	Y
R-29	2018-2089	CAAN-18-151451	FD	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-2.83	pCi/L	-2.83	pCi/L	6.43	1.93	W	03/06/2018		1745746	VAL	Y
R-29	2018-2089	CAAN-18-151451	FD	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.76	pCi/L	0.76	pCi/L	2.09	0.599	W	03/06/2018		1746730	VAL	Y
R-29	2018-2089	CAAN-18-151451	FD	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	1.55	pCi/L	1.55	pCi/L	2.44	0.765	W	03/06/2018		1746730	VAL	Y
R-29	2018-2089	CAAN-18-151451	FD	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-0.478	pCi/L	-0.478	pCi/L	11.9	3.45	W	03/06/2018		1745746	VAL	Y
R-29	2018-2089	CAAN-18-151451	FD	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.0131	pCi/L	0.0131	pCi/L	0.0463	0.00618	W	03/06/2018		1745471	VAL	Y
R-29	2018-2089	CAAN-18-151451	FD	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.00218	pCi/L	0.00218	pCi/L	0.050	0.00578	W	03/06/2018		1745471	VAL	Y
R-29	2018-2089	CAAN-18-151451	FD	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	22.4	pCi/L	22.4	pCi/L	121	27.9	W	03/06/2018		1745746	VAL	Y
R-29	2018-2089	CAAN-18-151451	FD	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	2.41	pCi/L	2.41	pCi/L	9.98	2.25	W	03/06/2018		1745746	VAL	Y
R-29	2018-2089	CAAN-18-151451	FD	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.0232	pCi/L	-0.0232	pCi/L	0.432	0.111	W	03/06/2018		1746698	VAL	Y

Reason Code

Description

I4	the sample result is =<5x the concentration of related analyte in the method blank.
I4a	The affected analytes are considered estimated and biased high because this analyte was identified in the method blank but was >5x
J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualifiy the analyte as not detected and/or any other standard qualifire. The analyte is detected in the sample.
R10	Associated duplicate sample has DER or RER> the analytical laboratory's acceptance limits.
R5	Analyte is not detected because the amount reported is less than the MDC.
U_LAB	The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAAN-18-151443	R-29	REG	EPA:120.1	0	1
CAAN-18-151443	R-29	REG	EPA:150.1	0	1
CAAN-18-151443	R-29	REG	EPA:160.1	0	1
CAAN-18-151443	R-29	REG	EPA:170.0	0	1
CAAN-18-151443	R-29	REG	EPA:245.2	0	1

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DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAAN-18-151443	R-29	REG	EPA:300.0	0	4
CAAN-18-151443	R-29	REG	EPA:310.1	0	2
CAAN-18-151443	R-29	REG	EPA:350.1	0	1
CAAN-18-151443	R-29	REG	EPA:353.2	0	1
CAAN-18-151443	R-29	REG	EPA:365.4	0	1
CAAN-18-151443	R-29	REG	SM:A2340B	0	1
CAAN-18-151443	R-29	REG	SW-846:6010C	0	17
CAAN-18-151443	R-29	REG	SW-846:6020	0	11
CAAN-18-151443	R-29	REG	SW-846:6850	0	1
CAAN-18-151444	R-29	REG	EPA:170.0	0	1
CAAN-18-151444	R-29	REG	EPA:245.2	0	1
CAAN-18-151444	R-29	REG	EPA:335.4	0	1
CAAN-18-151444	R-29	REG	EPA:351.2	0	1
CAAN-18-151444	R-29	REG	EPA:900	0	2
CAAN-18-151444	R-29	REG	EPA:901.1	0	5
CAAN-18-151444	R-29	REG	EPA:905.0	0	1
CAAN-18-151444	R-29	REG	HASL-300:AM-241	0	1
CAAN-18-151444	R-29	REG	HASL-300:ISOPU	0	2
CAAN-18-151444	R-29	REG	HASL-300:ISOU	0	3
CAAN-18-151444	R-29	REG	SW-846:8260B	0	80
CAAN-18-151444	R-29	REG	SW-846:8270D	0	80
CAAN-18-151444	R-29	REG	SW-846:8330B	0	20
CAAN-18-151444	R-29	REG	SW-846:9060	0	1
CAAN-18-151448	R-29	FTB	EPA:170.0	0	1
CAAN-18-151448	R-29	FTB	SW-846:8260B	0	80
CAAN-18-151450	R-29	FD	EPA:120.1	0	1
CAAN-18-151450	R-29	FD	EPA:150.1	0	1
CAAN-18-151450	R-29	FD	EPA:160.1	0	1
CAAN-18-151450	R-29	FD	EPA:170.0	0	1
CAAN-18-151450	R-29	FD	EPA:245.2	0	1
CAAN-18-151450	R-29	FD	EPA:300.0	0	4
CAAN-18-151450	R-29	FD	EPA:310.1	0	2
CAAN-18-151450	R-29	FD	EPA:350.1	0	1
CAAN-18-151450	R-29	FD	EPA:353.2	0	1
CAAN-18-151450	R-29	FD	EPA:365.4	0	1
CAAN-18-151450	R-29	FD	SM:A2340B	0	1

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DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAAN-18-151450	R-29	FD	SW-846:6010C	0	17
CAAN-18-151450	R-29	FD	SW-846:6020	0	11
CAAN-18-151450	R-29	FD	SW-846:6850	0	1
CAAN-18-151451	R-29	FD	EPA:170.0	0	1
CAAN-18-151451	R-29	FD	EPA:245.2	0	1
CAAN-18-151451	R-29	FD	EPA:335.4	0	1
CAAN-18-151451	R-29	FD	EPA:351.2	0	1
CAAN-18-151451	R-29	FD	EPA:900	0	2
CAAN-18-151451	R-29	FD	EPA:901.1	0	5
CAAN-18-151451	R-29	FD	EPA:905.0	0	1
CAAN-18-151451	R-29	FD	HASL-300:AM-241	0	1
CAAN-18-151451	R-29	FD	HASL-300:ISOPU	0	2
CAAN-18-151451	R-29	FD	HASL-300:ISOU	0	3
CAAN-18-151451	R-29	FD	SW-846:8260B	0	80
CAAN-18-151451	R-29	FD	SW-846:8270D	0	80
CAAN-18-151451	R-29	FD	SW-846:8330B	0	20
CAAN-18-151451	R-29	FD	SW-846:9060	0	1

April 04, 2018

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

Re: LANL- WQH Water Samples
Work Order: 445476
SDG: 2018-2089

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on March 08, 2018, and analyzed for Explosives by LCMSMS, 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,

Brielle Luthman for
Valerie Davis
Project Manager

Chain of Custody: 2018-2089
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 445476
SDG: 2018-2089

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 445476
SDG # : 2018-2089**

April 04, 2018

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 March 08, 2018 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>
445476001	CAAN-18-151443
445476002	CAAN-18-151444
445476003	CAAN-18-151444
445476004	CAAN-18-151448
445476005	CAAN-18-151450
445476006	CAAN-18-151451
445476007	CAAN-18-151451

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: Explosives by LCMSMS, 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.

B Luthman
Brielle Luthman for
Valerie Davis
Project Manager

List of current GEL Certifications as of 04 April 2018

State	Certification
Alaska	17-018
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	LA180011
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 Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Chain of Custody and Supporting Documentation

Chain of Custody/Analysis Request



Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: <u>ESHL</u>		SDG/AR/COC/Work Order: <u>445476</u>		
Received By: <u>ZKW</u>		Date Received: <u>3/8/18</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 5896</u> <u>5908 1783 5885</u> <u>5908 1783 5900</u>		
Suspected Hazard Information	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	*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"/> Yes <input type="checkbox"/> No	Hazard Class Shipped: _____ UN#: _____		
COC/Samples marked or classified as radioactive?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <input checked="" type="checkbox"/> PM/mR/Hr Classified as: Rad 1 Rad 2 Rad 3		
Is package, COC, and/or Samples marked HAZ?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	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"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Wet Ice <input checked="" type="checkbox"/> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: <u>2°C</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" 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"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?			<input checked="" type="checkbox"/>	Sample ID's and Containers Affected: <u>Some WST samples rec'd unopened</u> If Preservation added, Lot#:
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>			If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No ___ N/A ___ Sample ID's and containers affected:
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?			<input checked="" type="checkbox"/>	Sample ID's affected: <u>We didn't receive the WSP-CR cont. for -151330</u>
12 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
Comments (Use Continuation Form if needed):				

PM (or PMA) review: Initials TMC Date 3/9/18 Page 1 of 1

GL-CHL-SR-001 Rev 5

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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 07MAR18
ACTWGT: 48.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

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: 07MAR18
ACTWGT: 47.0 LB MAN
CAD: 0014176/CAFE2916

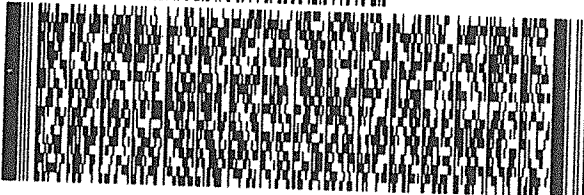
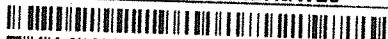
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWEO



FedEx
Express

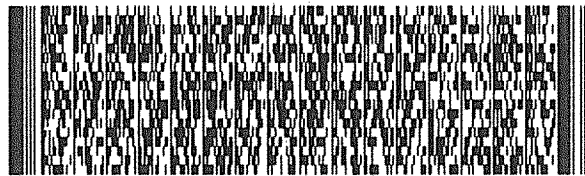


TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWEO



FedEx
Express



2 of 2
MPS# 5908 1783 5896
0263

Mstr# 5908 1783 5885

0201

THU - 08 MAR 10:30A
PRIORITY OVERNIGHT

X7 RBWA

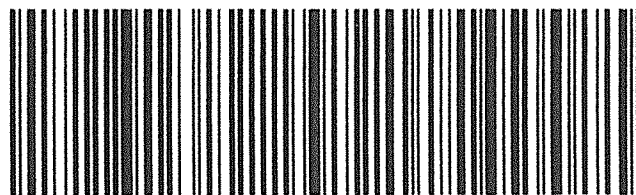
29407
SC-US CHS



1 of 2
TRK# 5908 1783 5885
0201
MASTER

X7 RBWA

29407
SC-US CHS



Do Not Lift Using This Tag

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

SHIP DATE: 07MAR18
ACTWGT: 50.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

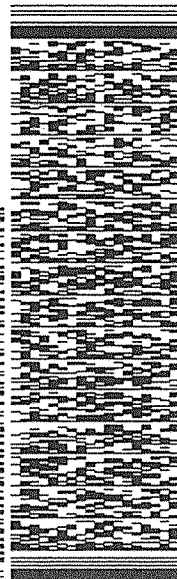
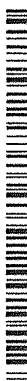
LOS ALAMOS, NM 87545
UNITED STATES US

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 8AG30AWEG11571000



FedEx
Express

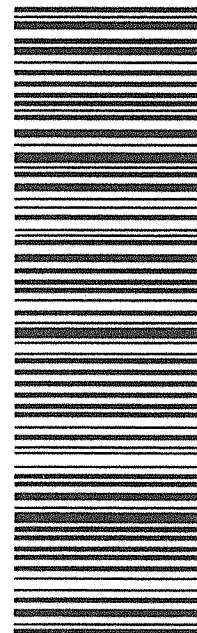


THU - 08 MAR 10:30A
PRIORITY OVERNIGHT

TRK# 5908 1783 5900
0201

X7 RBWA

29407
SC-US CHS



Data Review Qualifier Flag Definition Sheet

Data Review Qualifier Definitions

Qualifier	Explanation
-----------	-------------

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

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

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

Volatile Analysis

Case Narrative

**GC/MS Volatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-2089
Work Order #: 445476**

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

Analytical Method: SW-846:8260B

Analytical Procedure: GL-OA-E-038 REV# 26

Analytical Batch: 1746875

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445476002	CAAN-18-151444
445476004	CAAN-18-151448
445476006	CAAN-18-151451
1203989078	445591003(CAAN-18-151479) Post Spike (PS)
1203989079	445591003(CAAN-18-151479) Post Spike (PS)
1203989082	445591003(CAAN-18-151479) Post Spike Duplicate (PSD)
1203989083	445591003(CAAN-18-151479) Post Spike Duplicate (PSD)
1203990220	Method Blank (MB)
1203990221	Laboratory Control Sample (LCS)
1203990222	Laboratory Control Sample (LCS)
1203993951	Method Blank (MB)
1203993952	Laboratory Control Sample (LCS)
1203993953	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Blank (MB) Statement

Target analytes were detected in the blanks 1203990220 (MB) and 1203993951 (MB) below the reporting limit.

Miscellaneous Information

TIC Comment

Tentatively identified compounds (TIC) may be requested for samples 445476002 (CAAN-18-151444), 445476004 (CAAN-18-151448) and 445476006 (CAAN-18-151451) 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.

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: 2018-2089 GEL Work Order: 445476

The Qualifiers in this report are defined as follows:

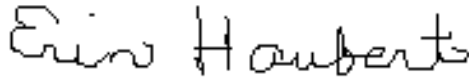
- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a surrogate compound
- B The target analyte was detected in the associated blank.
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- DL Indicates that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

Review/Validation

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

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

Signature:



Name: Erin Haubert

Date: 04 APR 2018

Title: Data Validator

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-2089

Lab Sample ID: 445476002

Date Collected: 03/06/2018 10:56

Date Received: 03/08/2018 08:50

Matrix: W

Client ID: CAAN-18-151444

Batch ID: 1746875

Run Date: 03/20/2018 15:55

Prep Date: 03/20/2018 15:55

Data File: 032018V6\6L214.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-2089

Lab Sample ID: 445476002

Date Collected: 03/06/2018 10:56

Date Received: 03/08/2018 08:50

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1746875

Inst: VOA6.I

Dilution: 1

Run Date: 03/20/2018 15:55

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 03/20/2018 15:55

Data File: 032018V6\6L214.D

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 3 of 3

SDG Number: 2018-2089

Lab Sample ID: 445476002

Date Collected: 03/06/2018 10:56

Date Received: 03/08/2018 08:50

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAAN-18-151444

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1746875

Inst: VOA6.I

Dilution: 1

Run Date: 03/20/2018 15:55

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 03/20/2018 15:55

Column: DB-624

Data File: 032018V6\6L214.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	52.4	50.0	ug/L 105	(71%-134%)
Bromofluorobenzene	51.6	50.0	ug/L 103	(70%-131%)
Toluene-d8	49.0	50.0	ug/L 98	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-2089

Lab Sample ID: 445476004

Date Collected: 03/06/2018 10:56

Date Received: 03/08/2018 08:50

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAAN-18-151448

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1746875

Inst: VOA6.I

Dilution: 1

Run Date: 03/20/2018 15:27

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 03/20/2018 15:27

Data File: 032018V6\6L213.D

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-2089

Lab Sample ID: 445476004

Date Collected: 03/06/2018 10:56

Date Received: 03/08/2018 08:50

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1746875

Inst: VOA6.I

Dilution: 1

Run Date: 03/20/2018 15:27

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 03/20/2018 15:27

Data File: 032018V6\6L213.D

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

Page 3 of 3

SDG Number: 2018-2089

Lab Sample ID: 445476004

Date Collected: 03/06/2018 10:56

Date Received: 03/08/2018 08:50

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1746875

Inst: VOA6.I

Dilution: 1

Run Date: 03/20/2018 15:27

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 03/20/2018 15:27

Data File: 032018V6\6L213.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	48.8	50.0	ug/L 98	(71%-134%)
Bromofluorobenzene	49.2	50.0	ug/L 98	(70%-131%)
Toluene-d8	46.3	50.0	ug/L 93	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	11.348	17.2	ug/L	0	J
	unknown siloxane	13.75	23.2	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-2089

Lab Sample ID: 445476006

Date Collected: 03/06/2018 10:56

Date Received: 03/08/2018 08:50

Matrix: W

Client ID: CAAN-18-151451

Batch ID: 1746875

Run Date: 03/20/2018 16:23

Prep Date: 03/20/2018 16:23

Data File: 032018V6\6L215.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-2089
Lab Sample ID: 445476006

Client ID: CAAN-18-151451
Batch ID: 1746875
Run Date: 03/20/2018 16:23
Prep Date: 03/20/2018 16:23
Data File: 032018V6\6L215.D

Date Collected: 03/06/2018 10:56
Date Received: 03/08/2018 08:50
Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: W

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

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

**Volatile
Certificate of Analysis
Sample Summary**

Page 3 of 3

SDG Number: 2018-2089

Lab Sample ID: 445476006

Date Collected: 03/06/2018 10:56

Date Received: 03/08/2018 08:50

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1746875

Inst: VOA6.I

Dilution: 1

Run Date: 03/20/2018 16:23

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 03/20/2018 16:23

Data File: 032018V6\6L215.D

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.7	50.0	ug/L 101	(71%-134%)
Bromofluorobenzene	50.6	50.0	ug/L 101	(70%-131%)
Toluene-d8	48.7	50.0	ug/L 97	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	11.348	8.33	ug/L	0	J
	unknown siloxane	13.75	16.3	ug/L	0	J

Quality Control Summary

Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-2089**Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203990221	LCS for batch 1746875	104	98	101
1203990222	LCS for batch 1746875	102	98	103
1203990220	MB for batch 1746875	101	95	100
445476004	CAAN-18-151448	98	93	98
445476002	CAAN-18-151444	105	98	103
445476006	CAAN-18-151451	101	97	101
1203993952	LCS for batch 1746875	105	103	106
1203993953	LCS for batch 1746875	102	97	100
1203993951	MB for batch 1746875	101	100	102
1203989078	CAAN-18-151479PS	102	98	102
1203989082	CAAN-18-151479PSD	108	104	106
1203989079	CAAN-18-151479PS	102	98	102
1203989083	CAAN-18-151479PSD	104	100	104

Surrogate**Acceptance Limits**

DCED4 = 1,2-Dichloroethane-d4

(71%-134%)

TOL = Toluene-d8

(74%-124%)

BFB = Bromofluorobenzene

(70%-131%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-2089

Sample Type: Post Spike

Client ID: CAAN-18-151479PS

Matrix: W

Lab Sample ID 1203989078

Instrument: VOA6.I

Analysis Date: 03/21/2018 17:08

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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	83.8	84	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1090	87	56-131
67-64-1	PS Acetone	250	0.00 U	122	49	25-155
74-88-4	PS Iodomethane	250	0.00 U	207	83	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	220	88	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	251	100	48-133
78-93-3	PS 2-Butanone	250	0.00 U	156	62	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	213	85	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	189	75	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	40.1	80	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	47.0	94	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	46.3	93	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	51.8	104	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	51.1	102	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	51.5	103	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	41.2	82	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	44.6	89	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	41.4	83	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	42.1	84	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	46.1	92	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	45.3	91	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	45.6	91	69-127

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-2089

Sample Type: Post Spike

Client ID: CAAN-18-151479PS

Matrix: W

Lab Sample ID 1203989078

Instrument: VOA6.I

Analysis Date: 03/21/2018 17:08

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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	44.5	89	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	43.5	87	71-130
67-66-3	PS Chloroform	50.0	0.00 U	43.9	88	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	44.2	88	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	43.0	86	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	45.0	90	69-130
71-43-2	PS Benzene	50.0	0.00 U	42.3	85	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	45.0	90	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	44.6	89	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	43.6	87	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	48.4	97	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	45.5	91	70-134
108-88-3	PS Toluene	50.0	0.00 U	41.4	83	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	47.0	94	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	43.9	88	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	42.7	85	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	42.0	84	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	41.5	83	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	45.1	90	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	41.7	83	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	42.7	85	61-130

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-2089

Sample Type: Post Spike

Client ID: CAAN-18-151479PS

Matrix: W

Lab Sample ID 1203989078

Instrument: VOA6.I

Analysis Date: 03/21/2018 17:08

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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	42.4	85	62-131
100-42-5	PS Styrene	50.0	0.00 U	45.0	90	59-135
75-25-2	PS Bromoform	50.0	0.00 U	51.4	103	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	43.2	86	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	44.9	90	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	43.7	87	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	41.8	84	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	43.1	86	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	43.9	88	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	42.4	85	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	42.3	85	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	43.7	87	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	43.8	88	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	43.9	88	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	44.3	89	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	41.6	83	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	41.2	82	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	44.3	89	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	38.0	76	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	42.3	85	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	42.9	86	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	40.6	81	52-135

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-2089

Sample Type: Post Spike

Client ID: CAAN-18-151479PS

Matrix: W

Lab Sample ID 1203989078

Instrument: VOA6.I

Analysis Date: 03/21/2018 17:08

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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	40.7	81	50-133
630-20-6	PS	1,1,1,2-Tetrachloroethane	50.0	0.00	U	47.2	94	71-133
95-50-1	PS	1,2-Dichlorobenzene	50.0	0.00	U	41.6	83	60-125
71-36-3	PS	n-Butyl alcohol	5000	0.00	U	4750	95	60-140

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-2089

Sample Type: Post Spike Duplicate

Client ID: CAAN-18-151479PSD

Matrix: W

Lab Sample ID 1203989082

Instrument: VOA6.I

Analysis Date: 03/21/2018 17:36

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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 91.2	91	59-132	9	0-20
75-05-8	PSD Acetonitrile	1250	0.00	U 1160	93	56-131	6	0-20
67-64-1	PSD Acetone	250	0.00	U 131	52	25-155	7	0-20
74-88-4	PSD Iodomethane	250	0.00	U 227	91	66-133	9	0-20
75-15-0	PSD Carbon disulfide	250	0.00	U 238	95	61-141	8	0-20
108-05-4	PSD Vinyl acetate	250	0.00	U 233	93	48-133	8	0-20
78-93-3	PSD 2-Butanone	250	0.00	U 167	67	25-143	7	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00	U 229	92	61-127	7	0-20
591-78-6	PSD 2-Hexanone	250	0.00	U 203	81	33-138	8	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00	U 36.0	72	33-164	11	0-20
74-87-3	PSD Chloromethane	50.0	0.00	U 41.6	83	53-139	12	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00	U 41.8	84	58-140	10	0-20
74-83-9	PSD Bromomethane	50.0	0.00	U 46.5	93	59-146	11	0-20
75-00-3	PSD Chloroethane	50.0	0.00	U 45.8	92	65-129	11	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00	U 45.7	91	65-141	12	0-20
60-29-7	PSD Ethyl ether	50.0	0.00	U 38.3	77	69-127	7	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00	U 48.8	98	59-130	9	0-20
75-09-2	PSD Methylene chloride	50.0	0.00	U 45.0	90	62-123	8	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00	U 46.5	93	69-132	10	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00	U 49.9	100	65-127	8	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00	U 49.0	98	67-127	8	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00	U 49.5	99	69-127	8	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-2089

Sample Type: Post Spike Duplicate

Client ID: CAAN-18-151479PSD

Matrix: W

Lab Sample ID 1203989082

Instrument: VOA6.I

Analysis Date: 03/21/2018 17:36

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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 49.2	98	66-137	10	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00	U 47.5	95	71-130	9	0-20
67-66-3	PSD Chloroform	50.0	0.00	U 47.7	95	71-129	8	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00	U 48.6	97	69-139	10	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00	U 46.8	94	67-130	9	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00	U 51.3	103	66-143	10	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00	U 48.5	97	69-130	8	0-20
71-43-2	PSD Benzene	50.0	0.00	U 46.0	92	66-125	8	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00	U 48.9	98	65-131	8	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00	U 48.1	96	67-127	8	0-20
74-95-3	PSD Dibromomethane	50.0	0.00	U 47.5	95	72-129	9	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00	U 52.5	105	70-138	8	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00	U 50.0	100	70-134	9	0-20
108-88-3	PSD Toluene	50.0	0.00	U 44.8	90	60-126	8	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00	U 51.6	103	69-135	9	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00	U 47.5	95	66-125	8	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00	U 45.4	91	67-124	6	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00	U 44.8	90	60-130	6	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00	U 44.8	90	68-143	8	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00	U 48.6	97	71-127	7	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00	U 45.5	91	64-124	9	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00	U 46.4	93	61-130	8	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-2089

Sample Type: Post Spike Duplicate

Client ID: CAAN-18-151479PSD

Matrix: W

Lab Sample ID 1203989082

Instrument: VOA6.I

Analysis Date: 03/21/2018 17:36

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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 46.2	92	62-131	9	0-20
100-42-5	PSD Styrene	50.0	0.00	U 49.2	98	59-135	9	0-20
75-25-2	PSD Bromoform	50.0	0.00	U 56.6	113	64-138	10	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00	U 47.0	94	55-133	8	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00	U 48.4	97	62-129	8	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00	U 47.0	94	70-124	7	0-20
108-86-1	PSD Bromobenzene	50.0	0.00	U 45.4	91	62-124	8	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00	U 46.7	93	50-133	8	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00	U 47.8	96	53-135	9	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00	U 46.4	93	56-128	9	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00	U 45.8	92	53-130	8	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00	U 47.5	95	55-135	8	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00	U 47.8	96	53-132	9	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00	U 48.0	96	50-138	9	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00	U 48.2	96	49-138	8	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00	U 45.0	90	56-126	8	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00	U 45.0	90	55-125	9	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00	U 47.9	96	43-142	8	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00	U 41.9	84	62-141	10	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00	U 46.7	93	40-147	10	0-20
91-20-3	PSD Naphthalene	50.0	0.00	U 48.4	97	62-134	12	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00	U 45.1	90	52-135	10	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-2089

Sample Type: Post Spike Duplicate

Client ID: CAAN-18-151479PSD

Matrix: W

Lab Sample ID 1203989082

Instrument: VOA6.I

Analysis Date: 03/21/2018 17:36

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

			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	45.3	91	50-133	11	0-20
630-20-6	PSD	1,1,1,2-Tetrachloroethane	50.0	0.00	U	51.5	103	71-133	9	0-20
95-50-1	PSD	1,2-Dichlorobenzene	50.0	0.00	U	45.5	91	60-125	9	0-20
71-36-3	PSD	n-Butyl alcohol	5000	0.00	U	5200	104	60-140	9	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-2089

Sample Type: Post Spike

Client ID: CAAN-18-151479PS

Matrix: W

Lab Sample ID 1203989079

Instrument: VOA6.I

Analysis Date: 03/21/2018 18:04

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
107-02-8	PS	Acrolein	250	0.00 U	268	107	49-141
76-13-1	PS	Trichlorotrifluoroethane	250	0.00 U	234	94	57-149
107-05-1	PS	Allyl chloride	250	0.00 U	242	97	54-128
107-13-1	PS	Acrylonitrile	250	0.00 U	232	93	59-129
107-12-0	PS	Propionitrile	250	0.00 U	221	88	58-131
126-98-7	PS	Methacrylonitrile	250	0.00 U	236	94	59-134
80-62-6	PS	Methyl methacrylate	250	0.00 U	227	91	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	2300	92	60-143
126-99-8	PS	2-Chloro-1,3-butadiene	50.0	0.00 U	50.0	100	63-146

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 2

SDG Number: 2018-2089

Sample Type: Post Spike Duplicate

Client ID: CAAN-18-151479PSD

Matrix: W

Lab Sample ID 1203989083

Instrument: VOA6.I

Analysis Date: 03/21/2018 18:32

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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	293	117	49-141	9	0-20
76-13-1	PSD Trichlorotrifluoroethane	250	0.00	U	248	99	57-149	6	0-20
107-05-1	PSD Allyl chloride	250	0.00	U	256	103	54-128	6	0-20
107-13-1	PSD Acrylonitrile	250	0.00	U	255	102	59-129	9	0-20
107-12-0	PSD Propionitrile	250	0.00	U	245	98	58-131	10	0-20
126-98-7	PSD Methacrylonitrile	250	0.00	U	258	103	59-134	9	0-20
80-62-6	PSD Methyl methacrylate	250	0.00	U	250	100	62-135	10	0-20
97-63-2	PSD Ethyl methacrylate	250	0.00	U	238	95	60-136	11	0-20
78-83-1	PSD Isobutyl alcohol	2500	0.00	U	2560	102	60-143	11	0-20
126-99-8	PSD 2-Chloro-1,3-butadiene	50.0	0.00	U	52.8	106	63-146	5	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746875

Matrix: WATER

Lab Sample ID 1203990221

Instrument: VOA6.I

Analysis Date: 03/20/2018 11:41

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	LCS m,p-Xylenes	100	0.0	88.0	88	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1260	101	61-125
67-64-1	LCS Acetone	250	0.0	203	81	48-157
74-88-4	LCS Iodomethane	250	0.0	225	90	72-128
75-15-0	LCS Carbon disulfide	250	0.0	241	96	69-138
108-05-4	LCS Vinyl acetate	250	0.0	278	111	67-125
78-93-3	LCS 2-Butanone	250	0.0	223	89	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	248	99	66-124
591-78-6	LCS 2-Hexanone	250	0.0	238	95	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	48.0	96	40-160
74-87-3	LCS Chloromethane	50.0	0.0	48.5	97	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	48.0	96	65-137
74-83-9	LCS Bromomethane	50.0	0.0	49.0	98	63-137
75-00-3	LCS Chloroethane	50.0	0.0	53.2	106	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	54.4	109	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	42.2	84	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	48.8	98	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	44.2	88	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	47.0	94	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	49.0	98	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	48.0	96	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	48.5	97	75-123

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746875

Matrix: WATER

Lab Sample ID 1203990221

Instrument: VOA6.I

Analysis Date: 03/20/2018 11:41

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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	50.4	101	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	46.3	93	76-125
67-66-3	LCS Chloroform	50.0	0.0	46.5	93	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	48.1	96	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	46.5	93	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	50.5	101	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	47.3	95	74-122
71-43-2	LCS Benzene	50.0	0.0	45.5	91	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	47.7	95	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	46.6	93	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	47.4	95	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	51.3	103	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	49.4	99	78-131
108-88-3	LCS Toluene	50.0	0.0	43.8	88	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	50.5	101	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	47.2	94	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	45.1	90	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	44.1	88	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	44.0	88	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	49.4	99	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	43.8	88	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	44.7	89	73-125

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746875

Matrix: WATER

Lab Sample ID 1203990221

Instrument: VOA6.I

Analysis Date: 03/20/2018 11:41

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS o-Xylene	50.0	0.0	44.1	88	74-126
100-42-5	LCS Styrene	50.0	0.0	47.3	95	72-130
75-25-2	LCS Bromoform	50.0	0.0	56.9	114	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	44.9	90	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	49.7	99	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	48.5	97	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	43.1	86	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	44.1	88	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	44.8	90	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	43.4	87	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	43.0	86	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	45.2	90	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	44.5	89	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	45.1	90	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	45.0	90	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	42.1	84	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	41.5	83	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	43.9	88	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	45.9	92	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	41.5	83	72-136
91-20-3	LCS Naphthalene	50.0	0.0	50.3	101	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	43.4	87	70-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746875

Matrix: WATER

Lab Sample ID 1203990221

Instrument: VOA6.I

Analysis Date: 03/20/2018 11:41

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	43.0	86	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	49.4	99	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	42.7	85	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5870	117	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746875

Matrix: WATER

Lab Sample ID 1203990222

Instrument: VOA6.I

Analysis Date: 03/20/2018 13:06

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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	301	121	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	247	99	61-148
107-05-1	LCS	Allyl chloride	250	0.0	248	99	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	257	103	65-122
107-12-0	LCS	Propionitrile	250	0.0	252	101	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	260	104	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	255	102	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	237	95	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2770	111	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	52.1	104	66-147

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746875

Matrix: WATER

Lab Sample ID 1203993952

Instrument: VOA6.I

Analysis Date: 03/21/2018 10:35

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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	87.3	87	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1110	89	61-125
67-64-1	LCS Acetone	250	0.0	323	129	48-157
74-88-4	LCS Iodomethane	250	0.0	217	87	72-128
75-15-0	LCS Carbon disulfide	250	0.0	229	92	69-138
108-05-4	LCS Vinyl acetate	250	0.0	252	101	67-125
78-93-3	LCS 2-Butanone	250	0.0	322	129	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	260	104	66-124
591-78-6	LCS 2-Hexanone	250	0.0	341	136	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	41.0	82	40-160
74-87-3	LCS Chloromethane	50.0	0.0	45.5	91	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	45.5	91	65-137
74-83-9	LCS Bromomethane	50.0	0.0	47.2	94	63-137
75-00-3	LCS Chloroethane	50.0	0.0	49.9	100	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	50.8	102	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	40.0	80	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	46.7	93	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	43.4	87	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	45.2	90	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	47.7	95	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	46.6	93	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	46.8	94	75-123

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746875

Matrix: WATER

Lab Sample ID 1203993952

Instrument: VOA6.I

Analysis Date: 03/21/2018 10:35

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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	48.8	98	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	45.8	92	76-125
67-66-3	LCS Chloroform	50.0	0.0	45.3	91	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	46.1	92	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	44.6	89	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	48.6	97	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	46.0	92	74-122
71-43-2	LCS Benzene	50.0	0.0	43.8	88	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	46.6	93	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	45.3	91	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	45.6	91	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	49.9	100	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	49.2	98	78-131
108-88-3	LCS Toluene	50.0	0.0	43.3	87	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	50.2	100	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	45.7	91	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	43.2	86	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	43.4	87	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	43.8	88	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	47.0	94	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	43.4	87	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	44.2	88	73-125

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746875

Matrix: WATER

Lab Sample ID 1203993952

Instrument: VOA6.I

Analysis Date: 03/21/2018 10:35

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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	43.8	88	74-126
100-42-5	LCS Styrene	50.0	0.0	47.0	94	72-130
75-25-2	LCS Bromoform	50.0	0.0	56.3	113	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	45.5	91	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	47.4	95	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	45.5	91	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	44.2	88	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	44.8	90	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	45.9	92	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	44.5	89	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	44.2	88	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	46.0	92	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	45.9	92	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	46.1	92	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	46.6	93	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	44.1	88	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	43.3	87	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	46.4	93	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	42.0	84	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	45.4	91	72-136
91-20-3	LCS Naphthalene	50.0	0.0	48.0	96	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	44.9	90	70-130

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746875

Matrix: WATER

Lab Sample ID 1203993952

Instrument: VOA6.I

Analysis Date: 03/21/2018 10:35

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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	45.4	91	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	49.4	99	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	44.3	89	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5090	102	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746875

Matrix: WATER

Lab Sample ID 1203993953

Instrument: VOA6.I

Analysis Date: 03/21/2018 11:32

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1746875

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	292	117	60-140
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	240	96	61-148
107-05-1	LCS Allyl chloride	250	0.0	240	96	59-125
107-13-1	LCS Acrylonitrile	250	0.0	252	101	65-122
107-12-0	LCS Propionitrile	250	0.0	245	98	64-124
126-98-7	LCS Methacrylonitrile	250	0.0	254	102	64-126
80-62-6	LCS Methyl methacrylate	250	0.0	251	100	69-127
97-63-2	LCS Ethyl methacrylate	250	0.0	232	93	66-130
78-83-1	LCS Isobutyl alcohol	2500	0.0	2660	106	65-135
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	50.1	100	66-147

Method Blank Summary

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SDG Number:	2018-2089	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1746875	Instrument ID:	VOA6.I	Data File:	032018V6\6L210B.D
Lab Sample ID:	1203990220	Prep Date:	03/20/2018 14:02	Analyzed:	03/20/18 14:02
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 1746875	1203990221	032018V6\6L205L.D	03/20/18	1141
02 LCS for batch 1746875	1203990222	032018V6\6L208L.D	03/20/18	1306
03 CAAN-18-151448	445476004	032018V6\6L213.D	03/20/18	1527
04 CAAN-18-151444	445476002	032018V6\6L214.D	03/20/18	1555
05 CAAN-18-151451	445476006	032018V6\6L215.D	03/20/18	1623

Method Blank Summary

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SDG Number:	2018-2089	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1746875	Instrument ID:	VOA6.I	Data File:	032118V6\6L307B.D
Lab Sample ID:	1203993951	Prep Date:	03/21/2018 12:28	Analyzed:	03/21/18 12:28
Column:	DB-624				

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

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
07 LCS for batch 1746875	1203993952	032118V6\6L303L.D	03/21/18	1035
08 LCS for batch 1746875	1203993953	032118V6\6L305L.D	03/21/18	1132
09 CAAN-18-151479PS	1203989078	032118V6\6L317.D	03/21/18	1708
10 CAAN-18-151479PSD	1203989082	032118V6\6L318.D	03/21/18	1736
11 CAAN-18-151479PS	1203989079	032118V6\6L319.D	03/21/18	1804
12 CAAN-18-151479PSD	1203989083	032118V6\6L320.D	03/21/18	1832

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-2089
Lab Sample ID: 1203989078
Client Sample: QC for batch 1746875
Client ID: CAAN-18-151479PS
Batch ID: 1746875
Run Date: 03/21/2018 17:08
Prep Date: 03/21/2018 17:08
Data File: 032118V6\6L317.D

Date Collected: 03/07/2018 08:38
Date Received: 03/09/2018 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

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		47.2	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		44.2	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		44.9	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		43.9	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		45.3	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		44.6	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		43.0	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		40.6	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		43.7	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		40.7	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		43.8	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		38.0	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		45.1	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		41.6	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		45.0	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		44.6	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		43.9	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		41.6	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		42.7	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		41.2	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		44.5	ug/L	0.300	1.00
78-93-3	2-Butanone		156	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		42.4	ug/L	0.300	1.00
591-78-6	2-Hexanone		189	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		42.3	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		44.3	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		213	ug/L	1.50	5.00
67-64-1	Acetone		122	ug/L	1.50	10.0
75-05-8	Acetonitrile		1090	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		42.3	ug/L	0.300	1.00
108-86-1	Bromobenzene		41.8	ug/L	0.300	1.00
74-97-5	Bromochloromethane		43.5	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		48.4	ug/L	0.300	1.00
75-25-2	Bromoform		51.4	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-2089	Date Collected: 03/07/2018 08:38	Matrix: W
Lab Sample ID: 1203989078	Date Received: 03/09/2018 08:55	
Client Sample: QC for batch 1746875	Client: ARSL004	Project: QC
Client ID: CAAN-18-151479PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1746875	Inst: VOA6.I	Dilution: 1
Run Date: 03/21/2018 17:08	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 03/21/2018 17:08		
Data File: 032118V6\6L317.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		51.8	ug/L	0.300	1.00
75-15-0	Carbon disulfide		220	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		46.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		41.7	ug/L	0.300	1.00
75-00-3	Chloroethane		51.1	ug/L	0.300	1.00
67-66-3	Chloroform		43.9	ug/L	0.300	1.00
74-87-3	Chloromethane		47.0	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		41.5	ug/L	0.300	1.00
74-95-3	Dibromomethane		43.6	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		40.1	ug/L	0.300	1.00
60-29-7	Ethyl ether		41.2	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		42.7	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	42.3	ug/L	0.300	1.00
74-88-4	Iodomethane		207	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		43.2	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		41.4	ug/L	1.00	10.0
91-20-3	Naphthalene		42.9	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		45.0	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		42.0	ug/L	0.300	1.00
108-88-3	Toluene		41.4	ug/L	0.300	1.00
79-01-6	Trichloroethylene		45.0	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		51.5	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		251	ug/L	1.50	5.00
75-01-4	Vinyl chloride		46.3	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		45.6	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		45.5	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		83.8	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4750	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		44.3	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		43.1	ug/L	0.300	1.00
95-47-6	o-Xylene		42.4	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		43.9	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

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SDG Number:	2018-2089	Date Collected:	03/07/2018 08:38	Matrix:	W
Lab Sample ID:	1203989078	Date Received:	03/09/2018 08:55		
Client Sample:	QC for batch 1746875	Client:	ARSL004	Project:	QC
Client ID:	CAAN-18-151479PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1746875	Inst:	VOA6.I	Dilution:	1
Run Date:	03/21/2018 17:08	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	03/21/2018 17:08				
Data File:	032118V6\6L317.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		42.1	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		43.7	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		46.1	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		47.0	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	50.9	50.0	ug/L	102	(70%-131%)
Toluene-d8	49.1	50.0	ug/L	98	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-2089
Lab Sample ID: 1203989079
Client Sample: QC for batch 1746875
Client ID: CAAN-18-151479PS
Batch ID: 1746875
Run Date: 03/21/2018 18:04
Prep Date: 03/21/2018 18:04
Data File: 032118V6\6L319.D

Date Collected: 03/07/2018 08:38
Date Received: 03/09/2018 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

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		50.0	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		268	ug/L	1.50	5.00
107-13-1	Acrylonitrile		232	ug/L	1.50	5.00
107-05-1	Allyl chloride		242	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: 2018-2089
Lab Sample ID: 1203989079
Client Sample: QC for batch 1746875
Client ID: CAAN-18-151479PS
Batch ID: 1746875
Run Date: 03/21/2018 18:04
Prep Date: 03/21/2018 18:04
Data File: 032118V6\6L319.D

Date Collected: 03/07/2018 08:38
Date Received: 03/09/2018 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: W

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		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		2300	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		236	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		227	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		221	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		234	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:	2018-2089	Date Collected:	03/07/2018 08:38	Matrix:	W
Lab Sample ID:	1203989079	Date Received:	03/09/2018 08:55		
Client Sample:	QC for batch 1746875	Client:	ARSL004	Project:	QC
Client ID:	CAAN-18-151479PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1746875	Inst:	VOA6.I	Dilution:	1
Run Date:	03/21/2018 18:04	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	03/21/2018 18:04				
Data File:	032118V6\6L319.D	Column:	DB-624		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.9	50.0	ug/L	102	(71%-134%)
Bromofluorobenzene	50.8	50.0	ug/L	102	(70%-131%)
Toluene-d8	48.8	50.0	ug/L	98	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-2089	Date Collected: 03/07/2018 08:38	Matrix: W
Lab Sample ID: 1203989082	Date Received: 03/09/2018 08:55	
Client Sample: QC for batch 1746875	Client: ARSL004	Project: QC
Client ID: CAAN-18-151479PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1746875	Inst: VOA6.I	Dilution: 1
Run Date: 03/21/2018 17:36	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 03/21/2018 17:36		
Data File: 032118V6\6L318.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		51.5	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		48.6	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		48.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		47.5	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		49.0	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		48.8	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		46.8	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		45.1	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		47.0	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		45.3	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		47.8	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		41.9	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		48.6	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		45.5	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		48.5	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		48.1	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		47.8	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		45.0	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		45.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		45.0	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		49.2	ug/L	0.300	1.00
78-93-3	2-Butanone		167	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		46.4	ug/L	0.300	1.00
591-78-6	2-Hexanone		203	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		45.8	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		48.2	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		229	ug/L	1.50	5.00
67-64-1	Acetone		131	ug/L	1.50	10.0
75-05-8	Acetonitrile		1160	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		46.0	ug/L	0.300	1.00
108-86-1	Bromobenzene		45.4	ug/L	0.300	1.00
74-97-5	Bromochloromethane		47.5	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		52.5	ug/L	0.300	1.00
75-25-2	Bromoform		56.6	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-2089	Date Collected: 03/07/2018 08:38	Matrix: W
Lab Sample ID: 1203989082	Date Received: 03/09/2018 08:55	
Client Sample: QC for batch 1746875	Client: ARSL004	Project: QC
Client ID: CAAN-18-151479PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1746875	Inst: VOA6.I	Dilution: 1
Run Date: 03/21/2018 17:36	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 03/21/2018 17:36		
Data File: 032118V6\6L318.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		46.5	ug/L	0.300	1.00
75-15-0	Carbon disulfide		238	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		51.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		45.5	ug/L	0.300	1.00
75-00-3	Chloroethane		45.8	ug/L	0.300	1.00
67-66-3	Chloroform		47.7	ug/L	0.300	1.00
74-87-3	Chloromethane		41.6	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		44.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		47.5	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		36.0	ug/L	0.300	1.00
60-29-7	Ethyl ether		38.3	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		46.4	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	46.7	ug/L	0.300	1.00
74-88-4	Iodomethane		227	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		47.0	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		45.0	ug/L	1.00	10.0
91-20-3	Naphthalene		48.4	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		49.2	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		44.8	ug/L	0.300	1.00
108-88-3	Toluene		44.8	ug/L	0.300	1.00
79-01-6	Trichloroethylene		48.9	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		45.7	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		233	ug/L	1.50	5.00
75-01-4	Vinyl chloride		41.8	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		49.5	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		50.0	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		91.2	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5200	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		47.9	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		46.7	ug/L	0.300	1.00
95-47-6	o-Xylene		46.2	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		48.0	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	2018-2089	Date Collected:	03/07/2018 08:38	Matrix:	W
Lab Sample ID:	1203989082	Date Received:	03/09/2018 08:55		
Client Sample:	QC for batch 1746875	Client:	ARSL004	Project:	QC
Client ID:	CAAN-18-151479PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1746875	Inst:	VOA6.I	Dilution:	1
Run Date:	03/21/2018 17:36	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	03/21/2018 17:36				
Data File:	032118V6\6L318.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		46.5	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		47.5	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		49.9	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		51.6	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	53.0	50.0	ug/L	106	(70%-131%)
Toluene-d8	51.8	50.0	ug/L	104	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-2089
Lab Sample ID: 1203989083
Client Sample: QC for batch 1746875
Client ID: CAAN-18-151479PSD
Batch ID: 1746875
Run Date: 03/21/2018 18:32
Prep Date: 03/21/2018 18:32
Data File: 032118V6\6L320.D

Date Collected: 03/07/2018 08:38
Date Received: 03/09/2018 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

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		52.8	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		293	ug/L	1.50	5.00
107-13-1	Acrylonitrile		255	ug/L	1.50	5.00
107-05-1	Allyl chloride		256	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: 2018-2089
Lab Sample ID: 1203989083
Client Sample: QC for batch 1746875
Client ID: CAAN-18-151479PSD
Batch ID: 1746875
Run Date: 03/21/2018 18:32
Prep Date: 03/21/2018 18:32
Data File: 032118V6\6L320.D

Date Collected: 03/07/2018 08:38
Date Received: 03/09/2018 08:55
Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: W

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		238	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		2560	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		258	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		250	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		245	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		248	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:	2018-2089	Date Collected:	03/07/2018 08:38	Matrix:	W
Lab Sample ID:	1203989083	Date Received:	03/09/2018 08:55		
Client Sample:	QC for batch 1746875	Client:	ARSL004	Project:	QC
Client ID:	CAAN-18-151479PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1746875	Inst:	VOA6.I	Dilution:	1
Run Date:	03/21/2018 18:32	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	03/21/2018 18:32				
Data File:	032118V6\6L320.D	Column:	DB-624		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.8	50.0	ug/L	104	(71%-134%)
Bromofluorobenzene	52.1	50.0	ug/L	104	(70%-131%)
Toluene-d8	50.2	50.0	ug/L	100	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-2089
Lab Sample ID: 1203990220
Client Sample: QC for batch 1746875
Client ID: MB for batch 1746875
Batch ID: 1746875
Run Date: 03/20/2018 14:02
Prep Date: 03/20/2018 14:02
Data File: 032018V6\6L210B.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: WATER

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

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

Volatile Certificate of Analysis Sample Summary

SDG Number: 2018-2089

Lab Sample ID: 1203990220

Client Sample: QC for batch 1746875

Client ID: MB for batch 1746875

Batch ID: 1746875

Run Date: 03/20/2018 14:02

Prep Date: 03/20/2018 14:02

Data File: 032018V6\6L210B.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	J	0.360	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: 2018-2089

Lab Sample ID: 1203990220

Client Sample: QC for batch 1746875

Client ID: MB for batch 1746875

Batch ID: 1746875

Run Date: 03/20/2018 14:02

Prep Date: 03/20/2018 14:02

Data File: 032018V6\6L210B.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.6	50.0	ug/L 101	(71%-134%)
Bromofluorobenzene	49.8	50.0	ug/L 100	(70%-131%)
Toluene-d8	47.7	50.0	ug/L 95	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-2089
Lab Sample ID: 1203990221
Client Sample: QC for batch 1746875
Client ID: LCS for batch 1746875
Batch ID: 1746875
Run Date: 03/20/2018 11:41
Prep Date: 03/20/2018 11:41
Data File: 032018V6\6L205L.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		49.4	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		48.1	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		49.7	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		47.2	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		48.0	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		48.8	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		46.5	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		43.4	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		48.5	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		43.0	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		44.5	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		45.9	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		49.4	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		42.7	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		47.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		46.6	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		44.8	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		42.1	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		45.1	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		41.5	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		50.4	ug/L	0.300	1.00
78-93-3	2-Butanone		223	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		43.4	ug/L	0.300	1.00
591-78-6	2-Hexanone		238	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		43.0	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		45.0	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		248	ug/L	1.50	5.00
67-64-1	Acetone		203	ug/L	1.50	10.0
75-05-8	Acetonitrile		1260	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		45.5	ug/L	0.300	1.00
108-86-1	Bromobenzene		43.1	ug/L	0.300	1.00
74-97-5	Bromochloromethane		46.3	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		51.3	ug/L	0.300	1.00
75-25-2	Bromoform		56.9	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-2089
Lab Sample ID: 1203990221
Client Sample: QC for batch 1746875
Client ID: LCS for batch 1746875
Batch ID: 1746875
Run Date: 03/20/2018 11:41
Prep Date: 03/20/2018 11:41
Data File: 032018V6\6L205L.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		49.0	ug/L	0.300	1.00
75-15-0	Carbon disulfide		241	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		50.5	ug/L	0.300	1.00
108-90-7	Chlorobenzene		43.8	ug/L	0.300	1.00
75-00-3	Chloroethane		53.2	ug/L	0.300	1.00
67-66-3	Chloroform		46.5	ug/L	0.300	1.00
74-87-3	Chloromethane		48.5	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		44.0	ug/L	0.300	1.00
74-95-3	Dibromomethane		47.4	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		48.0	ug/L	0.300	1.00
60-29-7	Ethyl ether		42.2	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		44.7	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	41.5	ug/L	0.300	1.00
74-88-4	Iodomethane		225	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		44.9	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		44.2	ug/L	1.00	10.0
91-20-3	Naphthalene		50.3	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		47.3	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		44.1	ug/L	0.300	1.00
108-88-3	Toluene		43.8	ug/L	0.300	1.00
79-01-6	Trichloroethylene		47.7	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		54.4	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		278	ug/L	1.50	5.00
75-01-4	Vinyl chloride		48.0	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		49.4	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		88.0	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5870	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		43.9	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		44.1	ug/L	0.300	1.00
95-47-6	o-Xylene		44.1	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		45.1	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	2018-2089	Matrix:	WATER
Lab Sample ID:	1203990221		
Client Sample:	QC for batch 1746875	Client:	ARSL004
Client ID:	LCS for batch 1746875	Method:	SW-846:8260B
Batch ID:	1746875	Inst:	VOA6.I
Run Date:	03/20/2018 11:41	Analyst:	JP1
Prep Date:	03/20/2018 11:41		
Data File:	032018V6\6L205L.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		47.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		45.2	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		49.0	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		50.5	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.9	50.0	ug/L	104	(71%-134%)
Bromofluorobenzene	50.5	50.0	ug/L	101	(70%-131%)
Toluene-d8	48.9	50.0	ug/L	98	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-2089

Lab Sample ID: 1203990222

Client Sample: QC for batch 1746875

Client ID: LCS for batch 1746875

Batch ID: 1746875

Run Date: 03/20/2018 13:06

Prep Date: 03/20/2018 13:06

Data File: 032018V6\6L208L.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		52.1	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		301	ug/L	1.50	5.00
107-13-1	Acrylonitrile		257	ug/L	1.50	5.00
107-05-1	Allyl chloride		248	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: 2018-2089
Lab Sample ID: 1203990222
Client Sample: QC for batch 1746875
Client ID: LCS for batch 1746875
Batch ID: 1746875
Run Date: 03/20/2018 13:06
Prep Date: 03/20/2018 13:06
Data File: 032018V6\6L208L.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		237	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		2770	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		260	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		255	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		247	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: 2018-2089
Lab Sample ID: 1203990222
Client Sample: QC for batch 1746875
Client ID: LCS for batch 1746875
Batch ID: 1746875
Run Date: 03/20/2018 13:06
Prep Date: 03/20/2018 13:06
Data File: 032018V6\6L208L.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: WATER

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.0	50.0	ug/L 102	(71%-134%)
Bromofluorobenzene	51.3	50.0	ug/L 103	(70%-131%)
Toluene-d8	48.8	50.0	ug/L 98	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-2089

Lab Sample ID: 1203993951

Client Sample: QC for batch 1746875

Client ID: MB for batch 1746875

Batch ID: 1746875

Run Date: 03/21/2018 12:28

Prep Date: 03/21/2018 12:28

Data File: 032118V6\6L307B.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Project: QC

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

SDG Number: 2018-2089
Lab Sample ID: 1203993951
Client Sample: QC for batch 1746875
Client ID: MB for batch 1746875
Batch ID: 1746875
Run Date: 03/21/2018 12:28
Prep Date: 03/21/2018 12:28
Data File: 032118V6\6L307B.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	J	0.370	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

Page 3 of 3

SDG Number: 2018-2089

Lab Sample ID: 1203993951

Client Sample: QC for batch 1746875

Client ID: MB for batch 1746875

Batch ID: 1746875

Run Date: 03/21/2018 12:28

Prep Date: 03/21/2018 12:28

Data File: 032118V6\6L307B.D

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.6	50.0	ug/L 101	(71%-134%)
Bromofluorobenzene	50.9	50.0	ug/L 102	(70%-131%)
Toluene-d8	49.9	50.0	ug/L 100	(74%-124%)

Tentatively Identified Compound Summary

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-2089
Lab Sample ID: 1203993952
Client Sample: QC for batch 1746875
Client ID: LCS for batch 1746875
Batch ID: 1746875
Run Date: 03/21/2018 10:35
Prep Date: 03/21/2018 10:35
Data File: 032118V6\6L303L.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		49.4	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		46.1	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		47.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		45.7	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		46.6	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		46.7	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		44.6	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		44.9	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		45.5	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		45.4	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		45.9	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		42.0	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		47.0	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		44.3	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		46.0	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		45.3	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		45.9	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		44.1	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		43.2	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		43.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		48.8	ug/L	0.300	1.00
78-93-3	2-Butanone		322	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		44.5	ug/L	0.300	1.00
591-78-6	2-Hexanone		341	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		44.2	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		46.6	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		260	ug/L	1.50	5.00
67-64-1	Acetone		323	ug/L	1.50	10.0
75-05-8	Acetonitrile		1110	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		43.8	ug/L	0.300	1.00
108-86-1	Bromobenzene		44.2	ug/L	0.300	1.00
74-97-5	Bromochloromethane		45.8	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		49.9	ug/L	0.300	1.00
75-25-2	Bromoform		56.3	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-2089
Lab Sample ID: 1203993952
Client Sample: QC for batch 1746875
Client ID: LCS for batch 1746875
Batch ID: 1746875
Run Date: 03/21/2018 10:35
Prep Date: 03/21/2018 10:35
Data File: 032118V6\6L303L.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		47.2	ug/L	0.300	1.00
75-15-0	Carbon disulfide		229	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		48.6	ug/L	0.300	1.00
108-90-7	Chlorobenzene		43.4	ug/L	0.300	1.00
75-00-3	Chloroethane		49.9	ug/L	0.300	1.00
67-66-3	Chloroform		45.3	ug/L	0.300	1.00
74-87-3	Chloromethane		45.5	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		43.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		45.6	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		41.0	ug/L	0.300	1.00
60-29-7	Ethyl ether		40.0	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		44.2	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	45.4	ug/L	0.300	1.00
74-88-4	Iodomethane		217	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		45.5	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		43.4	ug/L	1.00	10.0
91-20-3	Naphthalene		48.0	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		47.0	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		43.4	ug/L	0.300	1.00
108-88-3	Toluene		43.3	ug/L	0.300	1.00
79-01-6	Trichloroethylene		46.6	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		50.8	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		252	ug/L	1.50	5.00
75-01-4	Vinyl chloride		45.5	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		46.8	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		49.2	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		87.3	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5090	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		46.4	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		44.8	ug/L	0.300	1.00
95-47-6	o-Xylene		43.8	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		46.1	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-2089
Lab Sample ID: 1203993952
Client Sample: QC for batch 1746875
Client ID: LCS for batch 1746875
Batch ID: 1746875
Run Date: 03/21/2018 10:35
Prep Date: 03/21/2018 10:35
Data File: 032118V6\6L303L.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		45.2	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		46.0	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		47.7	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		50.2	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.4	50.0	ug/L	105	(71%-134%)
Bromofluorobenzene	52.9	50.0	ug/L	106	(70%-131%)
Toluene-d8	51.4	50.0	ug/L	103	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-2089
Lab Sample ID: 1203993953
Client Sample: QC for batch 1746875
Client ID: LCS for batch 1746875
Batch ID: 1746875
Run Date: 03/21/2018 11:32
Prep Date: 03/21/2018 11:32
Data File: 032118V6\6L305L.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		50.1	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		292	ug/L	1.50	5.00
107-13-1	Acrylonitrile		252	ug/L	1.50	5.00
107-05-1	Allyl chloride		240	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: 2018-2089
Lab Sample ID: 1203993953
Client Sample: QC for batch 1746875
Client ID: LCS for batch 1746875
Batch ID: 1746875
Run Date: 03/21/2018 11:32
Prep Date: 03/21/2018 11:32
Data File: 032118V6\6L305L.D

Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		232	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		2660	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		254	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		251	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		245	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		240	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:	2018-2089	Matrix:	WATER
Lab Sample ID:	1203993953		
Client Sample:	QC for batch 1746875	Client:	ARSL004
Client ID:	LCS for batch 1746875	Method:	SW-846:8260B
Batch ID:	1746875	Inst:	VOA6.I
Run Date:	03/21/2018 11:32	Analyst:	JP1
Prep Date:	03/21/2018 11:32	Purge Vol:	5 mL
Data File:	032118V6\6L305L.D	Column:	DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.2	50.0	ug/L	102 (71%-134%)
Bromofluorobenzene	50.2	50.0	ug/L	100 (70%-131%)
Toluene-d8	48.3	50.0	ug/L	97 (74%-124%)

Semi-Volatile Analysis

Case Narrative

**GC/MS Semivolatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-2089
Work Order #: 445476**

Product: Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry
Analytical Method: SW846 3510C/8270D
Analytical Procedure: GL-OA-E-009 REV# 40
Analytical Batch: 1745680

Preparation Method: SW846 3510C
Preparation Procedure: GL-OA-E-013 REV# 32
Preparation Batch: 1745679

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445476002	CAAN-18-151444
445476006	CAAN-18-151451
1203986541	Method Blank (MB)
1203986542	Laboratory Control Sample (LCS)
1203986543	445476002(CAAN-18-151444) Matrix Spike (MS)
1203986544	445476002(CAAN-18-151444) Matrix Spike Duplicate (MSD)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

CCV Requirements

All Calibration Verification Standards (CCV) did not meet the acceptance criteria as outlined in Method 8270D for samples 445476002 (CAAN-18-151444) and 445476006 (CAAN-18-151451) 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

MS/MSD Relative Percent Difference (RPD) Statement

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

Sample	Analyte	Value
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1203986543MS and 1203986544MSD (CAAN-18-151444)	Benzidine	63* (0%-30%)
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Miscellaneous Information

TIC Comment

Tentatively identified compounds (TIC) were requested for samples 445476002 (CAAN-18-151444) and 445476006 (CAAN-18-151451) in this SDG in this batch.

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: 2018-2089 GEL Work Order: 445476

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: 30 MAR 2018

Title: Data Validator

Sample Data Summary

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

Page 1 of 3

SDG Number: 2018-2089

Lab Sample ID: 445476002

Date Collected: 03/06/2018 10:56

Date Received: 03/08/2018 08:50

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1745680

Inst: MSDA.I

Dilution: 1

Run Date: 03/09/2018 17:32

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 03/09/2018 08:09

Aliquot: 1000 mL

Final Volume: 1 mL

Data File: 030918a.s\Ac0920.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**

Page 2 of 3

SDG Number: 2018-2089

Lab Sample ID: 445476002

Date Collected: 03/06/2018 10:56

Date Received: 03/08/2018 08:50

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSDA.I

Dilution: 1

Batch ID: 1745680

Run Date: 03/09/2018 17:32

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 03/09/2018 08:09

Aliquot: 1000 mL

Final Volume: 1 mL

Data File: 030918a.s\Ac0920.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.300	ug/L	0.300	1.00
65-85-0	Benzoic acid	U	6.00	ug/L	6.00	20.0
100-51-6	Benzyl alcohol	U	3.00	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate	U	3.00	ug/L	3.00	10.0
218-01-9	Chrysene	U	0.300	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate	U	3.00	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate	U	3.00	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene	U	0.300	ug/L	0.300	1.00
132-64-9	Dibenzofuran	U	3.00	ug/L	3.00	10.0
84-66-2	Diethylphthalate	U	3.00	ug/L	3.00	10.0
131-11-3	Dimethylphthalate	U	3.00	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine	U	3.00	ug/L	3.00	10.0
206-44-0	Fluoranthene	U	0.300	ug/L	0.300	1.00
86-73-7	Fluorene	U	0.300	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene	U	3.00	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene	U	3.00	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene	U	3.00	ug/L	3.00	10.0
67-72-1	Hexachloroethane	U	3.00	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.300	ug/L	0.300	1.00
78-59-1	Isophorone	U	3.50	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.00	ug/L	3.00	10.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.00	ug/L	3.00	10.0
55-18-5	N-Nitrosodiethylamine	U	3.00	ug/L	3.00	10.0
621-64-7	N-Nitrosodi-n-propylamine	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	1.00

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

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SDG Number: 2018-2089
Lab Sample ID: 445476002

Client ID: CAAN-18-151444
Batch ID: 1745680
Run Date: 03/09/2018 17:32
Prep Date: 03/09/2018 08:09
Data File: 030918a.s\Ac0920.D

Date Collected: 03/06/2018 10:56
Date Received: 03/08/2018 08:50
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSDA.I
Analyst: JMB3
Aliquot: 1000 mL
Column: DB-5ms

Matrix: W

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

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	35.0	100	ug/L	35	(32%-124%)
2-Fluorobiphenyl	29.4	50.0	ug/L	59	(32%-112%)
2-Fluorophenol	29.2	100	ug/L	29	(15%-88%)
Nitrobenzene-d5	31.8	50.0	ug/L	64	(36%-115%)
Phenol-d5	19.2	100	ug/L	19	(15%-91%)
p-Terphenyl-d14	38.3	50.0	ug/L	77	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	1.846	6.38	ug/L	0	J
000079-01-6	Trichloroethylene	2.099	4.64	ug/L	97	NJ

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

Page 1 of 3

SDG Number: 2018-2089

Lab Sample ID: 445476006

Date Collected: 03/06/2018 10:56

Date Received: 03/08/2018 08:50

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Batch ID: 1745680

Inst: MSDA.I

Dilution: 1

Run Date: 03/09/2018 18:53

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 03/09/2018 08:09

Aliquot: 960 mL

Final Volume: 1 mL

Data File: 030918a.s\Ac0923.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.13	ug/L	3.13	10.4
120-82-1	1,2,4-Trichlorobenzene	U	3.13	ug/L	3.13	10.4
95-50-1	1,2-Dichlorobenzene	U	3.13	ug/L	3.13	10.4
122-66-7	Azobenzene	U	3.13	ug/L	3.13	10.4
	<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**

Page 2 of 3

SDG Number: 2018-2089

Lab Sample ID: 445476006

Date Collected: 03/06/2018 10:56

Date Received: 03/08/2018 08:50

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSDA.I

Dilution: 1

Batch ID: 1745680

Run Date: 03/09/2018 18:53

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 03/09/2018 08:09

Aliquot: 960 mL

Final Volume: 1 mL

Data File: 030918a.s\Ac0923.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	1.04

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

Page 3 of 3

SDG Number: 2018-2089
Lab Sample ID: 445476006

Client ID: CAAN-18-151451
Batch ID: 1745680
Run Date: 03/09/2018 18:53
Prep Date: 03/09/2018 08:09
Data File: 030918a.s\Ac0923.D

Date Collected: 03/06/2018 10:56
Date Received: 03/08/2018 08:50
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSDA.I
Analyst: JMB3
Aliquot: 960 mL
Column: DB-5ms

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	66.8	104	ug/L	64 (32%-124%)
2-Fluorobiphenyl	28.3	52.1	ug/L	54 (32%-112%)
2-Fluorophenol	35.9	104	ug/L	35 (15%-88%)
Nitrobenzene-d5	28.5	52.1	ug/L	55 (36%-115%)
Phenol-d5	22.2	104	ug/L	21 (15%-91%)
p-Terphenyl-d14	37.0	52.1	ug/L	71 (36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	1.846	5.67	ug/L	0	J

Quality Control Summary

Semi-Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-2089

Matrix Type: LIQUID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203986541	MB for batch 1745679	44	26	69	62	67	76
1203986542	LCS for batch 1745679	48	30	79	67	87	89
445476002	CAAN-18-151444	29	19	64	59	35	77
1203986543	CAAN-18-151444MS	53	43	63	60	68	65
1203986544	CAAN-18-151444MSD	60	47	72	67	75	72
445476006	CAAN-18-151451	35	21	55	54	64	71

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: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1745679

Matrix: WATER

Lab Sample ID 1203986542

Instrument: MSDA.I

Analysis Date: 03/09/2018 13:54

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1745679

Inj. Vol: 1 uL

Batch ID: 1745680

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-nitrosomethylamine	50.0	0.0	23.4	47	30-88
110-86-1	LCS Pyridine	50.0	0.0	25.9	52	27-89
62-53-3	LCS Aniline	50.0	0.0	39.4	79	49-112
108-95-2	LCS Phenol	50.0	0.0	14.9	30	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	38.3	77	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	36.7	73	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	23.5	47	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	23.9	48	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	24.8	50	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)ether	50.0	0.0	36.5	73	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	34.9	70	44-102
95-48-7	LCS o-Cresol	50.0	0.0	33.4	67	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	34.2	68	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	41.0	82	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	21.3	43	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	36.9	74	53-115
78-59-1	LCS Isophorone	50.0	0.0	35.1	70	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	38.0	76	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	34.3	69	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	37.2	74	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	38.4	77	53-109
65-85-0	LCS Benzoic acid	100	0.0	23.3	23	21-74

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1745679

Matrix: WATER

Lab Sample ID 1203986542

Instrument: MSDA.I

Analysis Date: 03/09/2018 13:54

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1745679

Inj. Vol: 1 uL

Batch ID: 1745680

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	49.1	98	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	23.5	47	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	39.2	78	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	30.9	62	42-103
91-20-3	LCS Naphthalene	50.0	0.0	29.4	59	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	32.2	64	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	23.1	46	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	37.8	76	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	39.2	78	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	33.8	68	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	43.2	86	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	55.0	110	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	42.0	84	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	37.8	76	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	40.1	80	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	35.9	72	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	37.5	75	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	47.3	95	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	37.9	76	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	40.1	80	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	41.6	83	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	13.2	26	15-137

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1745679

Matrix: WATER

Lab Sample ID 1203986542

Instrument: MSDA.I

Analysis Date: 03/09/2018 13:54

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1745679

Inj. Vol: 1 uL

Batch ID: 1745680

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	LCS Fluorene	50.0	0.0	37.1	74	52-114
7005-72-3	LCS 4-Chlorophenylphenylether	50.0	0.0	39.0	78	52-121
100-01-6	LCS 4-Nitroaniline	50.0	0.0	51.3	103	44-137
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	43.4	87	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	38.3	77	55-113
122-66-7	LCS Azobenzene	50.0	0.0	38.6	77	53-115
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	37.3	75	54-116
118-74-1	LCS Hexachlorobenzene	50.0	0.0	36.9	74	54-115
87-86-5	LCS Pentachlorophenol	50.0	0.0	48.3	97	41-116
85-01-8	LCS Phenanthrene	50.0	0.0	37.1	74	55-110
120-12-7	LCS Anthracene	50.0	0.0	37.1	74	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	40.6	81	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	38.3	77	54-118
129-00-0	LCS Pyrene	50.0	0.0	38.1	76	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	40.3	81	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	37.4	75	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	37.4	75	57-112
218-01-9	LCS Chrysene	50.0	0.0	38.6	77	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	32.5	65	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	37.3	75	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	38.6	77	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	38.9	78	40-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-2089

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1745679

Matrix: WATER

Lab Sample ID 1203986542

Instrument: MSDA.I

Analysis Date: 03/09/2018 13:54

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1745679

Inj. Vol: 1 uL

Batch ID: 1745680

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	38.0	76	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	38.2	76	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	36.8	74	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	24.2	48	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	38.6	77	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	33.8	68	44-102
1912-24-9	LCS Atrazine	50.0	0.0	44.0	88	60-131
92-87-5	LCS Benzidine	100	0.0	104	104	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	42.4	85	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	27.7	55	39-99

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-2089

Sample Type: Matrix Spike

Client ID: CAAN-18-151444MS

Matrix: W

Lab Sample ID 1203986543

Instrument: MSDA.I

Analysis Date: 03/09/2018 17:59

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1745679

Inj. Vol: 1 uL

Batch ID: 1745680

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-nitrosomethylamine	116	0.00 U	62.7	54	25-106
110-86-1	MS Pyridine	116	0.00 U	66.2	57	24-93
62-53-3	MS Aniline	116	0.00 U	84.7	73	37-113
108-95-2	MS Phenol	116	0.00 U	50.5	43	23-82
111-44-4	MS bis(2-Chloroethyl) ether	116	0.00 U	74.8	64	39-114
95-57-8	MS 2-Chlorophenol	116	0.00 U	72.4	62	37-108
541-73-1	MS 1,3-Dichlorobenzene	116	0.00 U	57.3	49	27-97
106-46-7	MS 1,4-Dichlorobenzene	116	0.00 U	57.7	50	28-97
95-50-1	MS 1,2-Dichlorobenzene	116	0.00 U	59.5	51	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)ether	116	0.00 U	76.2	66	32-127
100-51-6	MS Benzyl alcohol	116	0.00 U	79.1	68	37-116
95-48-7	MS o-Cresol	116	0.00 U	73.0	63	34-109
65794-96-9	MS m,p-Cresols	116	0.00 U	80.3	69	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	116	0.00 U	82.0	70	42-118
67-72-1	MS Hexachloroethane	116	0.00 U	54.0	46	29-94
98-95-3	MS Nitrobenzene	116	0.00 U	72.9	63	38-123
78-59-1	MS Isophorone	116	0.00 U	68.5	59	43-120
88-75-5	MS 2-Nitrophenol	116	0.00 U	73.5	63	39-115
105-67-9	MS 2,4-Dimethylphenol	116	0.00 U	65.8	57	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	116	0.00 U	72.3	62	42-118
120-83-2	MS 2,4-Dichlorophenol	116	0.00 U	73.7	63	40-111
65-85-0	MS Benzoic acid	233	0.00 U	115	49	17-95

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-2089

Sample Type: Matrix Spike

Client ID: CAAN-18-151444MS

Matrix: W

Lab Sample ID 1203986543

Instrument: MSDA.I

Analysis Date: 03/09/2018 17:59

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1745679

Inj. Vol: 1 uL

Batch ID: 1745680

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS 4-Chloroaniline	116	0.00 U	98.1	84	44-138
87-68-3	MS Hexachlorobutadiene	116	0.00 U	56.3	48	26-98
59-50-7	MS Parachlorometa cresol 4-Chloro-3-methylphenol	116	0.00 U	77.9	67	41-122
91-57-6	MS 2-Methylnaphthalene	116	0.00 U	63.8	55	29-109
91-20-3	MS Naphthalene	116	0.00 U	63.0	54	31-108
90-12-0	MS 1-Methylnaphthalene	116	0.00 U	66.2	57	33-112
77-47-4	MS Hexachlorocyclopentadiene	116	0.00 U	45.6	39	26-79
88-06-2	MS 2,4,6-Trichlorophenol	116	0.00 U	73.3	63	39-124
95-95-4	MS 2,4,5-Trichlorophenol	116	0.00 U	76.5	66	42-120
91-58-7	MS 2-Chloronaphthalene	116	0.00 U	68.6	59	29-113
88-74-4	MS 2-Nitroaniline o-Nitroaniline	116	0.00 U	83.5	72	41-121
99-09-2	MS 3-Nitroaniline m-Nitroaniline	116	0.00 U	106	92	42-144
131-11-3	MS Dimethylphthalate	116	0.00 U	81.3	70	45-128
606-20-2	MS 2,6-Dinitrotoluene	116	0.00 U	73.9	64	46-124
121-14-2	MS 2,4-Dinitrotoluene	116	0.00 U	78.2	67	45-125
208-96-8	MS Acenaphthylene	116	0.00 U	73.3	63	35-120
83-32-9	MS Acenaphthene	116	0.00 U	75.9	65	35-117
51-28-5	MS 2,4-Dinitrophenol	116	0.00 U	84.9	73	27-122
132-64-9	MS Dibenzofuran	116	0.00 U	76.6	66	38-113
58-90-2	MS 2,3,4,6-Tetrachlorophenol	116	0.00 U	77.3	67	40-128
84-66-2	MS Diethylphthalate	116	0.00 U	80.7	69	43-127
100-02-7	MS 4-Nitrophenol	116	0.00 U	56.7	49	17-85

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-2089

Sample Type: Matrix Spike

Client ID: CAAN-18-151444MS

Matrix: W

Lab Sample ID 1203986543

Instrument: MSDA.I

Analysis Date: 03/09/2018 17:59

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1745679

Inj. Vol: 1 uL

Batch ID: 1745680

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS Fluorene	116	0.00 U	74.4	64	39-117
7005-72-3	MS 4-Chlorophenylphenylether	116	0.00 U	78.3	67	39-121
100-01-6	MS 4-Nitroaniline	116	0.00 U	99.9	86	30-133
534-52-1	MS 2-Methyl-4,6-dinitrophenol	116	0.00 U	79.4	68	32-126
122-39-4	MS Diphenylamine	116	0.00 U	74.5	64	37-118
122-66-7	MS Azobenzene	116	0.00 U	76.3	66	38-120
101-55-3	MS 4-Bromophenylphenylether	116	0.00 U	73.5	63	39-121
118-74-1	MS Hexachlorobenzene	116	0.00 U	73.5	63	40-118
87-86-5	MS Pentachlorophenol	116	0.00 U	89.2	77	35-121
85-01-8	MS Phenanthrene	116	0.00 U	73.1	63	40-115
120-12-7	MS Anthracene	116	0.00 U	73.3	63	38-120
84-74-2	MS Di-n-butylphthalate	116	0.00 U	80.8	69	41-128
206-44-0	MS Fluoranthene	116	0.00 U	76.0	65	41-119
129-00-0	MS Pyrene	116	0.00 U	70.0	60	35-128
85-68-7	MS Butylbenzylphthalate	116	0.00 U	78.0	67	40-129
117-81-7	MS bis(2-Ethylhexyl)phthalate	116	0.00 U	77.3	66	38-131
56-55-3	MS Benzo(a)anthracene	116	0.00 U	73.3	63	39-120
218-01-9	MS Chrysene	116	0.00 U	76.1	65	41-124
117-84-0	MS Di-n-octylphthalate	116	0.00 U	74.4	64	37-134
205-99-2	MS Benzo(b)fluoranthene	116	0.00 U	70.9	61	31-122
207-08-9	MS Benzo(k)fluoranthene	116	0.00 U	74.3	64	33-123
50-32-8	MS Benzo(a)pyrene	116	0.00 U	76.4	66	32-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 8

SDG Number: 2018-2089

Sample Type: Matrix Spike

Client ID: CAAN-18-151444MS

Matrix: W

Lab Sample ID 1203986543

Instrument: MSDA.I

Analysis Date: 03/09/2018 17:59

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1745679

Inj. Vol: 1 uL

Batch ID: 1745680

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
193-39-5	MS Indeno(1,2,3-cd)pyrene	116	0.00 U	83.4	72	27-121
53-70-3	MS Dibenzo(a,h)anthracene	116	0.00 U	85.2	73	30-125
191-24-2	MS Benzo(ghi)perylene	116	0.00 U	80.6	69	24-126
123-91-1	MS 1,4-Dioxane	116	0.00 U	66.7	57	24-110
930-55-2	MS N-Nitrosopyrrolidine	116	0.00 U	84.7	73	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	116	0.00 U	69.5	60	32-101
1912-24-9	MS Atrazine	116	0.00 U	80.7	69	42-129
92-87-5	MS Benzidine	233	0.00 U	98.6	42	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	116	0.00 U	81.0	70	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	116	0.00 U	59.7	51	26-102

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-2089

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-18-151444MSD

Matrix: W

Lab Sample ID 1203986544

Instrument: MSDA.I

Analysis Date: 03/09/2018 18:26

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1745679

Inj. Vol: 1 uL

Batch ID: 1745680

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-nitrosomethylamine	116	0.00	U	68.3	59	25-106	9	0-30
110-86-1	MSD Pyridine	116	0.00	U	72.6	62	24-93	9	0-30
62-53-3	MSD Aniline	116	0.00	U	89.6	77	37-113	6	0-30
108-95-2	MSD Phenol	116	0.00	U	55.2	47	23-82	9	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	116	0.00	U	83.3	72	39-114	11	0-30
95-57-8	MSD 2-Chlorophenol	116	0.00	U	81.7	70	37-108	12	0-30
541-73-1	MSD 1,3-Dichlorobenzene	116	0.00	U	55.0	47	27-97	4	0-30
106-46-7	MSD 1,4-Dichlorobenzene	116	0.00	U	55.4	48	28-97	4	0-30
95-50-1	MSD 1,2-Dichlorobenzene	116	0.00	U	57.4	49	28-99	4	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)ether	116	0.00	U	83.5	72	32-127	9	0-30
100-51-6	MSD Benzyl alcohol	116	0.00	U	85.0	73	37-116	7	0-30
95-48-7	MSD o-Cresol	116	0.00	U	80.5	69	34-109	10	0-30
65794-96-9	MSD m,p-Cresols	116	0.00	U	88.3	76	36-120	10	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine N-Nitrosodipropylamine	116	0.00	U	89.0	77	42-118	8	0-30
67-72-1	MSD Hexachloroethane	116	0.00	U	52.0	45	29-94	4	0-30
98-95-3	MSD Nitrobenzene	116	0.00	U	81.1	70	38-123	11	0-30
78-59-1	MSD Isophorone	116	0.00	U	75.7	65	43-120	10	0-30
88-75-5	MSD 2-Nitrophenol	116	0.00	U	85.5	74	39-115	15	0-30
105-67-9	MSD 2,4-Dimethylphenol	116	0.00	U	73.6	63	39-107	11	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	116	0.00	U	80.3	69	42-118	11	0-30
120-83-2	MSD 2,4-Dichlorophenol	116	0.00	U	84.7	73	40-111	14	0-30
65-85-0	MSD Benzoic acid	233	0.00	U	120	52	17-95	4	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-2089

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-18-151444MSD

Matrix: W

Lab Sample ID 1203986544

Instrument: MSDA.I

Analysis Date: 03/09/2018 18:26

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1745679

Inj. Vol: 1 uL

Batch ID: 1745680

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
106-47-8	MSD 4-Chloroaniline	116	0.00	U 102	88	44-138	4	0-30
87-68-3	MSD Hexachlorobutadiene	116	0.00	U 57.4	49	26-98	2	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	116	0.00	U 85.8	74	41-122	10	0-30
91-57-6	MSD 2-Methylnaphthalene	116	0.00	U 68.9	59	29-109	8	0-30
91-20-3	MSD Naphthalene	116	0.00	U 67.8	58	31-108	7	0-30
90-12-0	MSD 1-Methylnaphthalene	116	0.00	U 72.4	62	33-112	9	0-30
77-47-4	MSD Hexachlorocyclopentadiene	116	0.00	U 48.7	42	26-79	7	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	116	0.00	U 82.7	71	39-124	12	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	116	0.00	U 84.6	73	42-120	10	0-30
91-58-7	MSD 2-Chloronaphthalene	116	0.00	U 74.1	64	29-113	8	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	116	0.00	U 90.7	78	41-121	8	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	116	0.00	U 112	96	42-144	5	0-30
131-11-3	MSD Dimethylphthalate	116	0.00	U 87.4	75	45-128	7	0-30
606-20-2	MSD 2,6-Dinitrotoluene	116	0.00	U 80.3	69	46-124	8	0-30
121-14-2	MSD 2,4-Dinitrotoluene	116	0.00	U 84.2	72	45-125	7	0-30
208-96-8	MSD Acenaphthylene	116	0.00	U 79.1	68	35-120	8	0-30
83-32-9	MSD Acenaphthene	116	0.00	U 81.3	70	35-117	7	0-30
51-28-5	MSD 2,4-Dinitrophenol	116	0.00	U 92.4	80	27-122	9	0-30
132-64-9	MSD Dibenzofuran	116	0.00	U 81.7	70	38-113	6	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	116	0.00	U 86.1	74	40-128	11	0-30
84-66-2	MSD Diethylphthalate	116	0.00	U 87.2	75	43-127	8	0-30
100-02-7	MSD 4-Nitrophenol	116	0.00	U 56.7	49	17-85	0	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 7 of 8

SDG Number: 2018-2089

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-18-151444MSD

Matrix: W

Lab Sample ID 1203986544

Instrument: MSDA.I

Analysis Date: 03/09/2018 18:26

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1745679

Inj. Vol: 1 uL

Batch ID: 1745680

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
86-73-7	MSD Fluorene	116	0.00 U	79.5	68	39-117	7	0-30
7005-72-3	MSD 4-Chlorophenylphenylether	116	0.00 U	83.0	71	39-121	6	0-30
100-01-6	MSD 4-Nitroaniline <i>p-Nitroaniline</i>	116	0.00 U	105	90	30-133	5	0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	116	0.00 U	87.0	75	32-126	9	0-30
122-39-4	MSD Diphenylamine	116	0.00 U	81.6	70	37-118	9	0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	116	0.00 U	82.3	71	38-120	8	0-30
101-55-3	MSD 4-Bromophenylphenylether	116	0.00 U	79.5	68	39-121	8	0-30
118-74-1	MSD Hexachlorobenzene	116	0.00 U	80.0	69	40-118	8	0-30
87-86-5	MSD Pentachlorophenol	116	0.00 U	98.6	85	35-121	10	0-30
85-01-8	MSD Phenanthrene	116	0.00 U	79.5	68	40-115	8	0-30
120-12-7	MSD Anthracene	116	0.00 U	80.0	69	38-120	9	0-30
84-74-2	MSD Di-n-butylphthalate	116	0.00 U	86.7	75	41-128	7	0-30
206-44-0	MSD Fluoranthene	116	0.00 U	82.3	71	41-119	8	0-30
129-00-0	MSD Pyrene	116	0.00 U	75.6	65	35-128	8	0-30
85-68-7	MSD Butylbenzylphthalate	116	0.00 U	85.1	73	40-129	9	0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	116	0.00 U	85.1	73	38-131	10	0-30
56-55-3	MSD Benzo(a)anthracene	116	0.00 U	80.0	69	39-120	9	0-30
218-01-9	MSD Chrysene	116	0.00 U	82.8	71	41-124	8	0-30
117-84-0	MSD Di-n-octylphthalate	116	0.00 U	82.1	71	37-134	10	0-30
205-99-2	MSD Benzo(b)fluoranthene	116	0.00 U	79.0	68	31-122	11	0-30
207-08-9	MSD Benzo(k)fluoranthene	116	0.00 U	80.9	70	33-123	9	0-30
50-32-8	MSD Benzo(a)pyrene	116	0.00 U	83.5	72	32-118	9	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 8 of 8

SDG Number: 2018-2089

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-18-151444MSD

Matrix: W

Lab Sample ID 1203986544

Instrument: MSDA.I

Analysis Date: 03/09/2018 18:26

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1745679

Inj. Vol: 1 uL

Batch ID: 1745680

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits	
193-39-5	MSD	Indeno(1,2,3-cd)pyrene	116	0.00	U	89.0	77	27-121	7	0-30
53-70-3	MSD	Dibenzo(a,h)anthracene	116	0.00	U	90.6	78	30-125	6	0-30
191-24-2	MSD	Benzo(ghi)perylene	116	0.00	U	83.7	72	24-126	4	0-30
123-91-1	MSD	1,4-Dioxane	116	0.00	U	70.5	61	24-110	6	0-30
930-55-2	MSD	N-Nitrosopyrrolidine	116	0.00	U	88.2	76	47-119	4	0-30
95-94-3	MSD	1,2,4,5-Tetrachlorobenzene	116	0.00	U	74.0	64	32-101	6	0-30
1912-24-9	MSD	Atrazine	116	0.00	U	87.7	75	42-129	8	0-30
92-87-5	MSD	Benzidine	233	0.00	U	189	81	15-130	63 *	0-30
91-94-1	MSD	3,3'-Dichlorobenzidine	116	0.00	U	92.2	79	34-124	13	0-30
120-82-1	MSD	1,2,4-Trichlorobenzene	116	0.00	U	63.6	55	26-102	6	0-30

Method Blank Summary

Page 1 of 1

SDG Number:	2018-2089	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1745679	Instrument ID:	MSDA.I	Data File:	030918a.s\Ac0911.D
Lab Sample ID:	1203986541	Prep Date:	03/09/2018 08:09	Analyzed:	03/09/18 13:27
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 1745679	1203986542	030918a.s\Ac0912.D	03/09/18	1354
02 CAAN-18-151444	445476002	030918a.s\Ac0920.D	03/09/18	1732
03 CAAN-18-151444MS	1203986543	030918a.s\Ac0921.D	03/09/18	1759
04 CAAN-18-151444MSD	1203986544	030918a.s\Ac0922.D	03/09/18	1826
05 CAAN-18-151451	445476006	030918a.s\Ac0923.D	03/09/18	1853

Quality Control Data

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

Page 1 of 3

SDG Number: 2018-2089

Lab Sample ID: 1203986541

Client Sample: QC for batch 1745679

Client ID: MB for batch 1745679

Batch ID: 1745680

Run Date: 03/09/2018 13:27

Prep Date: 03/09/2018 08:09

Data File: 030918a.s\Ac0911.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: MSDA.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	U	3.00	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene	U	3.00	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
122-66-7	Azobenzene	U	3.00	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene	U	3.00	ug/L	3.00	10.0
123-91-1	1,4-Dioxane	U	3.00	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene	U	0.300	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.00	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol	U	3.00	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol	U	3.00	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol	U	3.00	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol	U	3.00	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol	U	5.00	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene	U	3.00	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene	U	3.00	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene	U	0.410	ug/L	0.410	1.00
95-57-8	2-Chlorophenol	U	3.00	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.00	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene	U	0.300	ug/L	0.300	1.00
88-75-5	2-Nitrophenol	U	3.00	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine	U	3.00	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether	U	3.00	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol	U	3.00	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.30	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether	U	3.00	ug/L	3.00	10.0
100-02-7	4-Nitrophenol	U	3.00	ug/L	3.00	10.0
83-32-9	Acenaphthene	U	0.300	ug/L	0.300	1.00
208-96-8	Acenaphthylene	U	0.300	ug/L	0.300	1.00
62-53-3	Aniline	U	4.20	ug/L	4.20	10.0
120-12-7	Anthracene	U	0.300	ug/L	0.300	1.00
1912-24-9	Atrazine	U	3.00	ug/L	3.00	10.0
92-87-5	Benzidine	U	3.90	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene	U	0.300	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene	U	0.300	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene	U	0.300	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene	U	0.300	ug/L	0.300	1.00

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

Page 2 of 3

SDG Number: 2018-2089

Lab Sample ID: 1203986541

Client Sample: QC for batch 1745679

Client ID: MB for batch 1745679

Batch ID: 1745680

Run Date: 03/09/2018 13:27

Prep Date: 03/09/2018 08:09

Data File: 030918a.s\Ac0911.D

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSDA.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	1.00

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

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SDG Number: 2018-2089

Lab Sample ID: 1203986541

Client Sample: QC for batch 1745679

Client ID: MB for batch 1745679

Batch ID: 1745680

Run Date: 03/09/2018 13:27

Prep Date: 03/09/2018 08:09

Data File: 030918a.s\Ac0911.D

Matrix: WATER

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSDA.I

Analyst: JMB3

Aliquot: 1000 mL

Column: DB-5ms

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	66.8	100	ug/L 67	(32%-124%)
2-Fluorobiphenyl	31.0	50.0	ug/L 62	(32%-112%)
2-Fluorophenol	43.7	100	ug/L 44	(15%-88%)
Nitrobenzene-d5	34.4	50.0	ug/L 69	(36%-115%)
Phenol-d5	26.3	100	ug/L 26	(15%-91%)
p-Terphenyl-d14	37.8	50.0	ug/L 76	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	1.84	7.79	ug/L	0	J
000079-01-6	Trichloroethylene	2.099	4.27	ug/L	97	NJ
000215-62-3	Dibenz(a,c)acridine	14.445	13.2	ug/L	90	NJ

Semi-Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-2089
Lab Sample ID: 1203986542
Client Sample: QC for batch 1745679
Client ID: LCS for batch 1745679
Batch ID: 1745680
Run Date: 03/09/2018 13:54
Prep Date: 03/09/2018 08:09
Data File: 030918a.s\Ac0912.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSDA.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
95-94-3	1,2,4,5-Tetrachlorobenzene		33.8	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		27.7	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		24.8	ug/L	3.00	10.0
122-66-7	Azobenzene		38.6	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		23.5	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		23.9	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		24.2	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		32.2	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		40.1	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		39.2	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		37.8	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		38.4	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		34.3	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		47.3	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		40.1	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		37.8	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		33.8	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		36.7	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		43.4	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		30.9	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		38.0	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		42.4	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		37.3	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		39.2	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		49.1	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		39.0	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		13.2	ug/L	3.00	10.0
83-32-9	Acenaphthene		37.5	ug/L	0.300	1.00
208-96-8	Acenaphthylene		35.9	ug/L	0.300	1.00
62-53-3	Aniline		39.4	ug/L	4.20	10.0
120-12-7	Anthracene		37.1	ug/L	0.300	1.00
1912-24-9	Atrazine		44.0	ug/L	3.00	10.0
92-87-5	Benzidine		104	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		37.4	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		38.9	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		37.3	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		36.8	ug/L	0.300	1.00

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-2089
Lab Sample ID: 1203986542
Client Sample: QC for batch 1745679
Client ID: LCS for batch 1745679
Batch ID: 1745680
Run Date: 03/09/2018 13:54
Prep Date: 03/09/2018 08:09
Data File: 030918a.s\Ac0912.D

Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSDA.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		38.6	ug/L	0.300	1.00
65-85-0	Benzoic acid		23.3	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		34.9	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		40.3	ug/L	3.00	10.0
218-01-9	Chrysene		38.6	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		40.6	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		32.5	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		38.2	ug/L	0.300	1.00
132-64-9	Dibenzofuran		37.9	ug/L	3.00	10.0
84-66-2	Diethylphthalate		41.6	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		42.0	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		38.3	ug/L	3.00	10.0
206-44-0	Fluoranthene		38.3	ug/L	0.300	1.00
86-73-7	Fluorene		37.1	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		36.9	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		23.5	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		23.1	ug/L	3.00	10.0
67-72-1	Hexachloroethane		21.3	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		38.0	ug/L	0.300	1.00
78-59-1	Isophorone		35.1	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		23.4	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		41.0	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		38.6	ug/L	3.00	10.0
91-20-3	Naphthalene		29.4	ug/L	0.300	1.00
98-95-3	Nitrobenzene		36.9	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		48.3	ug/L	3.00	10.0
85-01-8	Phenanthrene		37.1	ug/L	0.300	1.00
108-95-2	Phenol		14.9	ug/L	3.00	10.0
129-00-0	Pyrene		38.1	ug/L	0.300	1.00
110-86-1	Pyridine		25.9	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		36.5	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		37.2	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		38.3	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		37.4	ug/L	3.00	1.00

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Sample Summary**

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SDG Number: 2018-2089	Matrix: WATER
Lab Sample ID: 1203986542	
Client Sample: QC for batch 1745679	Client: ARSL004
Client ID: LCS for batch 1745679	Method: SW846 3510C/8270D
Batch ID: 1745680	Inst: MSDA.I
Run Date: 03/09/2018 13:54	Analyst: JMB3
Prep Date: 03/09/2018 08:09	Aliquot: 1000 mL
Data File: 030918a.s\Ac0912.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		34.2	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		55.0	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		33.4	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		43.2	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		51.3	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	86.9	100	ug/L	87	(32%-124%)
2-Fluorobiphenyl	33.7	50.0	ug/L	67	(32%-112%)
2-Fluorophenol	47.9	100	ug/L	48	(15%-88%)
Nitrobenzene-d5	39.3	50.0	ug/L	79	(36%-115%)
Phenol-d5	30.1	100	ug/L	30	(15%-91%)
p-Terphenyl-d14	44.5	50.0	ug/L	89	(36%-121%)

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-2089
Lab Sample ID: 1203986543
Client Sample: QC for batch 1745679
Client ID: CAAN-18-151444MS
Batch ID: 1745680
Run Date: 03/09/2018 17:59
Prep Date: 03/09/2018 08:09
Data File: 030918a.s\Ac0921.D

Date Collected: 03/06/2018 10:56
Date Received: 03/08/2018 08:50
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSDA.I
Analyst: JMB3
Aliquot: 430 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		69.5	ug/L	6.98	23.3
120-82-1	1,2,4-Trichlorobenzene		59.7	ug/L	6.98	23.3
95-50-1	1,2-Dichlorobenzene		59.5	ug/L	6.98	23.3
122-66-7	Azobenzene		76.3	ug/L	6.98	23.3
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		57.3	ug/L	6.98	23.3
106-46-7	1,4-Dichlorobenzene		57.7	ug/L	6.98	23.3
123-91-1	1,4-Dioxane		66.7	ug/L	6.98	23.3
90-12-0	1-Methylnaphthalene		66.2	ug/L	0.698	2.33
58-90-2	2,3,4,6-Tetrachlorophenol		77.3	ug/L	6.98	23.3
95-95-4	2,4,5-Trichlorophenol		76.5	ug/L	6.98	23.3
88-06-2	2,4,6-Trichlorophenol		73.3	ug/L	6.98	23.3
120-83-2	2,4-Dichlorophenol		73.7	ug/L	6.98	23.3
105-67-9	2,4-Dimethylphenol		65.8	ug/L	6.98	23.3
51-28-5	2,4-Dinitrophenol		84.9	ug/L	11.6	46.5
121-14-2	2,4-Dinitrotoluene		78.2	ug/L	6.98	23.3
606-20-2	2,6-Dinitrotoluene		73.9	ug/L	6.98	23.3
91-58-7	2-Chloronaphthalene		68.6	ug/L	0.953	2.33
95-57-8	2-Chlorophenol		72.4	ug/L	6.98	23.3
534-52-1	2-Methyl-4,6-dinitrophenol		79.4	ug/L	6.98	23.3
91-57-6	2-Methylnaphthalene		63.8	ug/L	0.698	2.33
88-75-5	2-Nitrophenol		73.5	ug/L	6.98	23.3
91-94-1	3,3'-Dichlorobenzidine		81.0	ug/L	6.98	23.3
101-55-3	4-Bromophenylphenylether		73.5	ug/L	6.98	23.3
59-50-7	Parachlorometa cresol		77.9	ug/L	6.98	23.3
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		98.1	ug/L	7.67	23.3
7005-72-3	4-Chlorophenylphenylether		78.3	ug/L	6.98	23.3
100-02-7	4-Nitrophenol		56.7	ug/L	6.98	23.3
83-32-9	Acenaphthene		75.9	ug/L	0.698	2.33
208-96-8	Acenaphthylene		73.3	ug/L	0.698	2.33
62-53-3	Aniline		84.7	ug/L	9.77	23.3
120-12-7	Anthracene		73.3	ug/L	0.698	2.33
1912-24-9	Atrazine		80.7	ug/L	6.98	23.3
92-87-5	Benzidine		98.6	ug/L	9.07	23.3
56-55-3	Benzo(a)anthracene		73.3	ug/L	0.698	2.33
50-32-8	Benzo(a)pyrene		76.4	ug/L	0.698	2.33
205-99-2	Benzo(b)fluoranthene		70.9	ug/L	0.698	2.33
191-24-2	Benzo(ghi)perylene		80.6	ug/L	0.698	2.33

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SDG Number: 2018-2089
Lab Sample ID: 1203986543
Client Sample: QC for batch 1745679
Client ID: CAAN-18-151444MS
Batch ID: 1745680
Run Date: 03/09/2018 17:59
Prep Date: 03/09/2018 08:09
Data File: 030918a.s\Ac0921.D

Date Collected: 03/06/2018 10:56
Date Received: 03/08/2018 08:50
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSDA.I
Analyst: JMB3
Aliquot: 430 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		74.3	ug/L	0.698	2.33
65-85-0	Benzoic acid		115	ug/L	14.0	46.5
100-51-6	Benzyl alcohol		79.1	ug/L	6.98	23.3
85-68-7	Butylbenzylphthalate		78.0	ug/L	6.98	23.3
218-01-9	Chrysene		76.1	ug/L	0.698	2.33
84-74-2	Di-n-butylphthalate		80.8	ug/L	6.98	23.3
117-84-0	Di-n-octylphthalate		74.4	ug/L	6.98	23.3
53-70-3	Dibenzo(a,h)anthracene		85.2	ug/L	0.698	2.33
132-64-9	Dibenzofuran		76.6	ug/L	6.98	23.3
84-66-2	Diethylphthalate		80.7	ug/L	6.98	23.3
131-11-3	Dimethylphthalate		81.3	ug/L	6.98	23.3
88-85-7	Dinoseb	U	6.98	ug/L	6.98	23.3
122-39-4	Diphenylamine		74.5	ug/L	6.98	23.3
206-44-0	Fluoranthene		76.0	ug/L	0.698	2.33
86-73-7	Fluorene		74.4	ug/L	0.698	2.33
118-74-1	Hexachlorobenzene		73.5	ug/L	6.98	23.3
87-68-3	Hexachlorobutadiene		56.3	ug/L	6.98	23.3
77-47-4	Hexachlorocyclopentadiene		45.6	ug/L	6.98	23.3
67-72-1	Hexachloroethane		54.0	ug/L	6.98	23.3
193-39-5	Indeno(1,2,3-cd)pyrene		83.4	ug/L	0.698	2.33
78-59-1	Isophorone		68.5	ug/L	8.14	23.3
62-75-9	N-Methyl-N-nitrosomethylamine		62.7	ug/L	6.98	23.3
924-16-3	N-Nitrosodi-n-butylamine	U	6.98	ug/L	6.98	23.3
55-18-5	N-Nitrosodiethylamine	U	6.98	ug/L	6.98	23.3
621-64-7	N-Nitrosodi-n-propylamine		82.0	ug/L	6.98	23.3
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		84.7	ug/L	6.98	23.3
91-20-3	Naphthalene		63.0	ug/L	0.698	2.33
98-95-3	Nitrobenzene		72.9	ug/L	6.98	23.3
608-93-5	Pentachlorobenzene	U	6.98	ug/L	6.98	23.3
87-86-5	Pentachlorophenol		89.2	ug/L	6.98	23.3
85-01-8	Phenanthrene		73.1	ug/L	0.698	2.33
108-95-2	Phenol		50.5	ug/L	6.98	23.3
129-00-0	Pyrene		70.0	ug/L	0.698	2.33
110-86-1	Pyridine		66.2	ug/L	6.98	23.3
108-60-1	bis(2-Chloro-1-methylethyl)ether		76.2	ug/L	6.98	23.3
111-91-1	bis(2-Chloroethoxy)methane		72.3	ug/L	6.98	23.3
111-44-4	bis(2-Chloroethyl) ether		74.8	ug/L	6.98	23.3
117-81-7	bis(2-Ethylhexyl)phthalate		77.3	ug/L	6.98	2.33

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SDG Number: 2018-2089
Lab Sample ID: 1203986543
Client Sample: QC for batch 1745679
Client ID: CAAN-18-151444MS
Batch ID: 1745680
Run Date: 03/09/2018 17:59
Prep Date: 03/09/2018 08:09
Data File: 030918a.s\Ac0921.D

Date Collected: 03/06/2018 10:56
Date Received: 03/08/2018 08:50
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSDA.I
Analyst: JMB3
Aliquot: 430 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		80.3	ug/L	8.60	23.3
99-09-2	3-Nitroaniline		106	ug/L	6.98	23.3
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		73.0	ug/L	6.98	23.3
88-74-4	2-Nitroaniline		83.5	ug/L	6.98	23.3
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		99.9	ug/L	6.98	23.3
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	159	233	ug/L	68	(32%-124%)
2-Fluorobiphenyl	69.9	116	ug/L	60	(32%-112%)
2-Fluorophenol	124	233	ug/L	53	(15%-88%)
Nitrobenzene-d5	72.9	116	ug/L	63	(36%-115%)
Phenol-d5	99.0	233	ug/L	43	(15%-91%)
p-Terphenyl-d14	75.3	116	ug/L	65	(36%-121%)

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SDG Number: 2018-2089
Lab Sample ID: 1203986544
Client Sample: QC for batch 1745679
Client ID: CAAN-18-151444MSD
Batch ID: 1745680
Run Date: 03/09/2018 18:26
Prep Date: 03/09/2018 08:09
Data File: 030918a.s\Ac0922.D

Date Collected: 03/06/2018 10:56
Date Received: 03/08/2018 08:50
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSDA.I
Analyst: JMB3
Aliquot: 430 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		74.0	ug/L	6.98	23.3
120-82-1	1,2,4-Trichlorobenzene		63.6	ug/L	6.98	23.3
95-50-1	1,2-Dichlorobenzene		57.4	ug/L	6.98	23.3
122-66-7	Azobenzene		82.3	ug/L	6.98	23.3
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		55.0	ug/L	6.98	23.3
106-46-7	1,4-Dichlorobenzene		55.4	ug/L	6.98	23.3
123-91-1	1,4-Dioxane		70.5	ug/L	6.98	23.3
90-12-0	1-Methylnaphthalene		72.4	ug/L	0.698	2.33
58-90-2	2,3,4,6-Tetrachlorophenol		86.1	ug/L	6.98	23.3
95-95-4	2,4,5-Trichlorophenol		84.6	ug/L	6.98	23.3
88-06-2	2,4,6-Trichlorophenol		82.7	ug/L	6.98	23.3
120-83-2	2,4-Dichlorophenol		84.7	ug/L	6.98	23.3
105-67-9	2,4-Dimethylphenol		73.6	ug/L	6.98	23.3
51-28-5	2,4-Dinitrophenol		92.4	ug/L	11.6	46.5
121-14-2	2,4-Dinitrotoluene		84.2	ug/L	6.98	23.3
606-20-2	2,6-Dinitrotoluene		80.3	ug/L	6.98	23.3
91-58-7	2-Chloronaphthalene		74.1	ug/L	0.953	2.33
95-57-8	2-Chlorophenol		81.7	ug/L	6.98	23.3
534-52-1	2-Methyl-4,6-dinitrophenol		87.0	ug/L	6.98	23.3
91-57-6	2-Methylnaphthalene		68.9	ug/L	0.698	2.33
88-75-5	2-Nitrophenol		85.5	ug/L	6.98	23.3
91-94-1	3,3'-Dichlorobenzidine		92.2	ug/L	6.98	23.3
101-55-3	4-Bromophenylphenylether		79.5	ug/L	6.98	23.3
59-50-7	Parachlorometa cresol		85.8	ug/L	6.98	23.3
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		102	ug/L	7.67	23.3
7005-72-3	4-Chlorophenylphenylether		83.0	ug/L	6.98	23.3
100-02-7	4-Nitrophenol		56.7	ug/L	6.98	23.3
83-32-9	Acenaphthene		81.3	ug/L	0.698	2.33
208-96-8	Acenaphthylene		79.1	ug/L	0.698	2.33
62-53-3	Aniline		89.6	ug/L	9.77	23.3
120-12-7	Anthracene		80.0	ug/L	0.698	2.33
1912-24-9	Atrazine		87.7	ug/L	6.98	23.3
92-87-5	Benzidine		189	ug/L	9.07	23.3
56-55-3	Benzo(a)anthracene		80.0	ug/L	0.698	2.33
50-32-8	Benzo(a)pyrene		83.5	ug/L	0.698	2.33
205-99-2	Benzo(b)fluoranthene		79.0	ug/L	0.698	2.33
191-24-2	Benzo(ghi)perylene		83.7	ug/L	0.698	2.33

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Sample Summary**

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SDG Number: 2018-2089
Lab Sample ID: 1203986544
Client Sample: QC for batch 1745679
Client ID: CAAN-18-151444MSD
Batch ID: 1745680
Run Date: 03/09/2018 18:26
Prep Date: 03/09/2018 08:09
Data File: 030918a.s\Ac0922.D

Date Collected: 03/06/2018 10:56
Date Received: 03/08/2018 08:50
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSDA.I
Analyst: JMB3
Aliquot: 430 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		80.9	ug/L	0.698	2.33
65-85-0	Benzoic acid		120	ug/L	14.0	46.5
100-51-6	Benzyl alcohol		85.0	ug/L	6.98	23.3
85-68-7	Butylbenzylphthalate		85.1	ug/L	6.98	23.3
218-01-9	Chrysene		82.8	ug/L	0.698	2.33
84-74-2	Di-n-butylphthalate		86.7	ug/L	6.98	23.3
117-84-0	Di-n-octylphthalate		82.1	ug/L	6.98	23.3
53-70-3	Dibenzo(a,h)anthracene		90.6	ug/L	0.698	2.33
132-64-9	Dibenzofuran		81.7	ug/L	6.98	23.3
84-66-2	Diethylphthalate		87.2	ug/L	6.98	23.3
131-11-3	Dimethylphthalate		87.4	ug/L	6.98	23.3
88-85-7	Dinoseb	U	6.98	ug/L	6.98	23.3
122-39-4	Diphenylamine		81.6	ug/L	6.98	23.3
206-44-0	Fluoranthene		82.3	ug/L	0.698	2.33
86-73-7	Fluorene		79.5	ug/L	0.698	2.33
118-74-1	Hexachlorobenzene		80.0	ug/L	6.98	23.3
87-68-3	Hexachlorobutadiene		57.4	ug/L	6.98	23.3
77-47-4	Hexachlorocyclopentadiene		48.7	ug/L	6.98	23.3
67-72-1	Hexachloroethane		52.0	ug/L	6.98	23.3
193-39-5	Indeno(1,2,3-cd)pyrene		89.0	ug/L	0.698	2.33
78-59-1	Isophorone		75.7	ug/L	8.14	23.3
62-75-9	N-Methyl-N-nitrosomethylamine		68.3	ug/L	6.98	23.3
924-16-3	N-Nitrosodi-n-butylamine	U	6.98	ug/L	6.98	23.3
55-18-5	N-Nitrosodiethylamine	U	6.98	ug/L	6.98	23.3
621-64-7	N-Nitrosodi-n-propylamine		89.0	ug/L	6.98	23.3
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		88.2	ug/L	6.98	23.3
91-20-3	Naphthalene		67.8	ug/L	0.698	2.33
98-95-3	Nitrobenzene		81.1	ug/L	6.98	23.3
608-93-5	Pentachlorobenzene	U	6.98	ug/L	6.98	23.3
87-86-5	Pentachlorophenol		98.6	ug/L	6.98	23.3
85-01-8	Phenanthrene		79.5	ug/L	0.698	2.33
108-95-2	Phenol		55.2	ug/L	6.98	23.3
129-00-0	Pyrene		75.6	ug/L	0.698	2.33
110-86-1	Pyridine		72.6	ug/L	6.98	23.3
108-60-1	bis(2-Chloro-1-methylethyl)ether		83.5	ug/L	6.98	23.3
111-91-1	bis(2-Chloroethoxy)methane		80.3	ug/L	6.98	23.3
111-44-4	bis(2-Chloroethyl) ether		83.3	ug/L	6.98	23.3
117-81-7	bis(2-Ethylhexyl)phthalate		85.1	ug/L	6.98	2.33

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

Page 3 of 3

SDG Number: 2018-2089	Date Collected: 03/06/2018 10:56	Matrix: W
Lab Sample ID: 1203986544	Date Received: 03/08/2018 08:50	
Client Sample: QC for batch 1745679	Client: ARSL004	Project: QC
Client ID: CAAN-18-151444MSD	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1745680	Inst: MSDA.I	Dilution: 1
Run Date: 03/09/2018 18:26	Analyst: JMB3	Inj. Vol: 1 uL
Prep Date: 03/09/2018 08:09	Aliquot: 430 mL	Final Volume: 1 mL
Data File: 030918a.s\Ac0922.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		88.3	ug/L	8.60	23.3
99-09-2	3-Nitroaniline		112	ug/L	6.98	23.3
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		80.5	ug/L	6.98	23.3
88-74-4	2-Nitroaniline		90.7	ug/L	6.98	23.3
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		105	ug/L	6.98	23.3
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	174	233	ug/L	75	(32%-124%)
2-Fluorobiphenyl	77.9	116	ug/L	67	(32%-112%)
2-Fluorophenol	139	233	ug/L	60	(15%-88%)
Nitrobenzene-d5	83.5	116	ug/L	72	(36%-115%)
Phenol-d5	108	233	ug/L	47	(15%-91%)
p-Terphenyl-d14	84.0	116	ug/L	72	(36%-121%)

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-2089
Work Order #: 445476**

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: 1746747

Prep Batch Number: 1746744

Sample Analysis

Sample ID	Client ID
445476001	445476001 (CAAN-18-151443)
445476005	445476005 (CAAN-18-151450)
1203989263	Interference Check Sample (ICS)
1203988797	Method Blank (MB)
1203988798	Laboratory Control Sample (LCS)
1203988799	445469001(CTUA-17-151330) Matrix Spike (MS)
1203988800	445469001(CTUA-17-151330) 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 445469001 (NonSDG) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

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

Internal Standard Area Acceptance

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

Retention Time

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

Technical Information

Holding Time Specifications

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

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Manual Integrations

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

Method Comments

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

Additional Comments

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

Perchlorate Isotope Ratio

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

System Configuration

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

Electronic Packaging Comment

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

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

Chromatographic Columns

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

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

Dionex: IonPac AG-16 2 x 50 mm.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-2089 GEL Work Order: 445476

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 16 MAR 2018

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAAN-18-151443Date Received: 08-MAR-18GEL Job No (SDG): 2018-2089GEL Sample ID: 445476001Date Filtered: 14-MAR-18Injection 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	0.230	ug/L		1	14-MAR-18 17:25	per0314019a
	Perchlorate Isotope Ratio			3.1			1	14-MAR-18 17:25	per0314019a
14797-73-0	Perchlorate-101	.05	.2	0.230	ug/L		1	14-MAR-18 17:25	per0314019a
	Perchlorate-O(18)			0.443	ug/L		1	14-MAR-18 17:25	per0314019a

^ 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: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAAN-18-151450Date Received: 08-MAR-18GEL Job No (SDG): 2018-2089GEL Sample ID: 445476005Date Filtered: 14-MAR-18Injection 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	0.230	ug/L		1	14-MAR-18 17:36	per0314020a
	Perchlorate Isotope Ratio			2.9			1	14-MAR-18 17:36	per0314020a
14797-73-0	Perchlorate-101	.05	.2	0.247	ug/L		1	14-MAR-18 17:36	per0314020a
	Perchlorate-O(18)			0.423	ug/L		1	14-MAR-18 17:36	per0314020a

^ 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): 2018-2089

Extract Batch Code: 1746744

Date Filtered: 14-MAR-18

Matrix: WATER

Sample ID: 1203988798

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.203	ug/L	102		85 - 115
Perchlorate Isotope Ratio		3.11				-
Perchlorate-101	0.200	.203	ug/L	101		85 - 115
Perchlorate-O(18)		.482	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): 2018-2089

Extract Batch Code: 1746744

Date Extracted: 14-MAR-18

GEL MS/PS ID: 1203988799

Client ID: CTUA-17-151330

GEL MSD/PSD ID: 1203988800

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	0.576	ug/L	0.754	89	.726	75	4	30	75 - 125
Perchlorate Isotope Ratio	0	3.15		3.05		2.93		4		-
Perchlorate-101	0.200	0.568	ug/L	0.768	100	.77	101	0	30	75 - 125
Perchlorate-O(18)	0	0.473	ug/L	0.476		.484		2		-

^ 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: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 14-MAR-18GEL Job No (SDG): 2018-2089GEL Sample ID: 1203988797Date Filtered: 14-MAR-18Injection 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	14-MAR-18 16:19	per0314013a
	Perchlorate Isotope Ratio						1	14-MAR-18 16:19	per0314013a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	14-MAR-18 16:19	per0314013a
	Perchlorate-O(18)			0.473	ug/L		1	14-MAR-18 16:19	per0314013a

^ 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: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 14-MAR-18GEL Job No (SDG): 2018-2089GEL Sample ID: 1203988798Date Filtered: 14-MAR-18Injection 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	14-MAR-18 16:30	per0314014a
	Perchlorate Isotope Ratio			3.11			1	14-MAR-18 16:30	per0314014a
14797-73-0	Perchlorate-101	.05	.2	0.203	ug/L		1	14-MAR-18 16:30	per0314014a
	Perchlorate-O(18)			0.482	ug/L		1	14-MAR-18 16:30	per0314014a

^ 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: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2018-2089GEL Sample ID: 1203989263Date Filtered: 14-MAR-18Injection 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	0.222	ug/L		1	14-MAR-18 16:41	per0314015a
	Perchlorate Isotope Ratio			3.05			1	14-MAR-18 16:41	per0314015a
14797-73-0	Perchlorate-101	.05	.2	0.227	ug/L		1	14-MAR-18 16:41	per0314015a
	Perchlorate-O(18)			0.467	ug/L		1	14-MAR-18 16:41	per0314015a

^ 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: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CTUA-17-151330MSDate Received: 08-MAR-18GEL Job No (SDG): 2018-2089GEL Sample ID: 1203988799Date Filtered: 14-MAR-18Injection 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	0.754	ug/L		1	14-MAR-18 17:03	per0314017a
	Perchlorate Isotope Ratio			3.05			1	14-MAR-18 17:03	per0314017a
14797-73-0	Perchlorate-101	.05	.2	0.768	ug/L		1	14-MAR-18 17:03	per0314017a
	Perchlorate-O(18)			0.476	ug/L		1	14-MAR-18 17:03	per0314017a

^ 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: 1746744Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CTUA-17-151330MSDDate Received: 08-MAR-18GEL Job No (SDG): 2018-2089GEL Sample ID: 1203988800Date Filtered: 14-MAR-18Injection 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	0.726	ug/L		1	14-MAR-18 17:14	per0314018a
	Perchlorate Isotope Ratio			2.93			1	14-MAR-18 17:14	per0314018a
14797-73-0	Perchlorate-101	.05	.2	0.770	ug/L		1	14-MAR-18 17:14	per0314018a
	Perchlorate-O(18)			0.484	ug/L		1	14-MAR-18 17:14	per0314018a

^ 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 =

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

Explosives by LCMSMS Analysis

Case Narrative

**Explosives by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-2089
Work Order #: 445476**

Method/Analysis Information

Procedure: The Processing, Extraction, and Analysis of Nitroaromatics, Nitroamines, and Nitrate Esters by SW-846 8330B

Analytical Method: SW846 3535A/8330B

Prep Method: SW846 3535A

Analytical Batch Number: 1746310

Prep Batch Number: 1746309

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 3535A/8330B:

Sample ID	Client ID
445476003	CAAN-18-151444
445476007	CAAN-18-151451
1203987814	Method Blank (MB)
1203987815	Laboratory Control Sample (LCS)
1203987816	445476003(CAAN-18-151444) Matrix Spike (MS)
1203987817	445476003(CAAN-18-151444) Matrix Spike Duplicate (MSD)

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-068 REV# 7.

Calibration Information

Initial Calibration

All initial calibration requirements for this analysis have been met for this SDG.

Calibration Verification Standard Requirements

All associated calibration verification standards (ICV and CCV) for this analysis met the acceptance criteria.

Calibration Blank Requirements

All initial and continuing calibration blanks (ICB and CCB) bracketing the analyses associated with this batch for this analysis were within acceptance criteria. Due to software limitations, the CCBs and/or the ICBs may have a concentration for target analytes in the Found column. These values should be zero.

CRI Requirements

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

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

The MB analyzed with this SDG for this analysis met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries were within the established acceptance limits.

QC Sample Designation

Client sample 445476003 (CAAN-18-151444) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS spike recoveries were within the established acceptance limits for this analysis.

MS/MSD Relative Percent Difference (RPD) Statement

The RPDs between the MS and MSD met the acceptance limits for this analysis.

Internal Standard (ISTD) Acceptance

The internal standard responses were within the required acceptance criteria for all samples and QC in this SDG.

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. 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

In accordance with GEL SOP GL-OA-056, all sample and QC extracts are diluted 1:1 v/v with LC reagent grade Water. The samples in this SDG in this analytical batch for this analysis did not require any additional dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG in this analytical batch for this analysis.

Miscellaneous Information**Manual Integrations**

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

Additional Comments

Due to software limitations, all initial calibration blanks must be designated as XIB001 in order for the forms to be correct. Due to software limitations, file extensions such as DL, RE, etc. may not appear on the generated

forms and/or raw data. Relative Retention Time (RRT) is used by the laboratory to establish peak identity. The RRT of each target analyte is calculated using the retention time of the corresponding internal standard. The RRT of each analyte in a sample must be within 2.0 of the analyte's calculated RRT in the ICV.

System Configuration

The laboratory utilizes an Agilent 1100 liquid chromatography instrument for either Primary or Secondary analyte analysis. It is coupled with an Applied Biosystems 4000 Mass Spectrometer/ Mass Spectrometer, designated as either LC/MS/MS #3 or LC/MS/MS #4. The laboratory also utilizes a Shimadzu Nexera XC liquid chromatography instrument for Primary and/or Secondary analyte analysis. It is coupled with an Applied Biosystems 5500 Mass Spectrometer/ Mass Spectrometer, designated as LC/MS/MS #5. All are fitted with an APCI (Atmospheric Pressure Chemical Ionization) probe that is operated in the negative ionization mode for both the Primary and Secondary analyte 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 Explosives analysis was performed on a ABSciex 5500 Qtrap LC/MS/MS.

The detection of the Primary and Secondary Nitroaromatic and Nitramine analytes is accomplished through analysis on the following reversed phase column:

Phenomenex: Ultracarb 5u ODS (20), 250 x 4.60 mm ID.

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: 2018-2089 GEL Work Order: 445476

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 20 MAR 2018

Title: Group Leader

Sample Data Summary

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-18-151444

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Matrix: WATER

GEL Sample ID: 445476003

Sample Amount 910 mL

Date Received: 08-MAR-18

Moisture: .

Extraction Batch ID: 1746309

Extraction Type Sol Exchange

Date Extracted: 12-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0315018.wiff

Date Analyzed: 15-MAR-18 19:42

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.0879	U	0.0879	0.275
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.0879	U	0.0879	0.275
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.0879	U	0.0879	0.275
<i>121-82-4</i>	<i>RDX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.0879	U	0.0879	0.275
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.0879	U	0.0879	0.275
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.0879	U	0.0879	0.275
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.0879	U	0.0879	0.549
<i>479-45-8</i>	<i>Tetryl</i>				
606-20-2	2,6-Dinitrotoluene	.0879	U	0.0879	0.275
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
98-95-3	Nitrobenzene	.0879	U	0.0879	0.275
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.0879	U	0.0879	0.275
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.0879	U	0.0879	0.275
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	.0879	U	0.0879	0.275
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
88-72-2	o-Nitrotoluene	.0901	U	0.0901	0.275
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-18-151444

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Matrix: WATER

GEL Sample ID: 445476003

Sample Amount 910 mL

Date Received: 08-MAR-18

Moisture: .

Extraction Batch ID: 1746309

Extraction Type Sol Exchange

Date Extracted: 12-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-11-5	PETN	.11	U	0.110	0.549
<i>78-11-5</i>	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.165	U	0.165	0.549
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	.33	U	0.330	1.10
<i>3058-38-6</i>	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	.33	U	0.330	1.10
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	.33	U	0.330	1.10
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	.549	U	0.549	2.75
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	.549	U	0.549	2.75
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-18-151451

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Matrix: WATER

GEL Sample ID: 445476007

Sample Amount 910 mL

Date Received: 08-MAR-18

Moisture: .

Extraction Batch ID: 1746309

Extraction Type Sol Exchange

Date Extracted: 12-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0315021.wiff

Date Analyzed: 15-MAR-18 21:28

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.0879	U	0.0879	0.275
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.0879	U	0.0879	0.275
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.0879	U	0.0879	0.275
<i>121-82-4</i>	<i>RDX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.0879	U	0.0879	0.275
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.0879	U	0.0879	0.275
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.0879	U	0.0879	0.275
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.0879	U	0.0879	0.549
<i>479-45-8</i>	<i>Tetryl</i>				
606-20-2	2,6-Dinitrotoluene	.0879	U	0.0879	0.275
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
98-95-3	Nitrobenzene	.0879	U	0.0879	0.275
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.0879	U	0.0879	0.275
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.0879	U	0.0879	0.275
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	.0879	U	0.0879	0.275
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
88-72-2	o-Nitrotoluene	.0901	U	0.0901	0.275
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-18-151451

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Matrix: WATER

GEL Sample ID: 445476007

Sample Amount 910 mL

Date Received: 08-MAR-18

Moisture: .

Extraction Batch ID: 1746309

Extraction Type Sol Exchange

Date Extracted: 12-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-11-5	PETN	.11	U	0.110	0.549
<i>78-11-5</i>	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.165	U	0.165	0.549
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	.33	U	0.330	1.10
<i>3058-38-6</i>	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	.33	U	0.330	1.10
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	.33	U	0.330	1.10
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	.549	U	0.549	2.75
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	.549	U	0.549	2.75
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				

Quality Control Summary

High Explosives Surrogate Recovery Summary**Lab Name:** GEL Laboratories LLC**GEL Job No (SDG):** 2018-2089**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
445476003	CAAN-18-151444	93	55 - 115	
445476007	CAAN-18-151451	95	55 - 115	
1203987814	MB for batch 1746309	88	55 - 115	
1203987815	LCS for batch 1746309	89	55 - 115	
1203987816	CAAN-18-151444MS	96	55 - 115	
1203987817	CAAN-18-151444MSD	87	55 - 115	

DNT = 3,4-Dinitrotoluene

3B
High Explosives LCS/LCS Duplicate Summary

Lab Name: GEL Laboratories LLC

Client ID: LCS

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Extract Batch Code: 1746309

Date Extracted: 12-MAR-18

GEL LCS ID: 1203987815

GEL LCSDUP ID: .

Analysis Date/Time: 15-MAR-18 19:06

DUP Analysis Date/Time:

Reporting Units: ug/L

QC Type: LCS/LCSD

Compound	Spike Added	LCS Conc	LCS Rec #	LCSD Conc	LCSD Rec #	RPD #	RPD	Recovery Limits
1,3,5-Trinitrobenzene	5	4.49	90					70 - 110
2,4,6-Trinitrotoluene	5	4.02	80					69 - 113
2,4-Diamino-6-nitrotoluene	5	4.4	88					50 - 121
2,4-Dinitrotoluene	5	4.37	87					71 - 110
2,6-Diamino-4-nitrotoluene	5	4.55	91					53 - 127
2,6-Dinitrotoluene	5	4.23	85					72 - 105
2-Amino-4,6-dinitrotoluene	5	4.25	85					70 - 112
3,5-Dinitroaniline	5	4.33	87					70 - 121
4-Amino-2,6-dinitrotoluene	5	4.38	88					74 - 116
HMX	5	4.52	90					58 - 113
Nitrobenzene	5	4.25	85					64 - 115
PETN	5	4.68	94					57 - 126
RDX	5	4.31	86					64 - 117
TATB	4	3.2	80					47 - 135
Tetryl	5	4.51	90					55 - 122
m-Dinitrobenzene	5	4.5	90					74 - 117
m-Nitrotoluene	5	3.93	79					66 - 114
o-Nitrotoluene	5	4.39	88					64 - 115
p-Nitrotoluene	5	4.35	87					66 - 127
tris(o-cresyl) phosphate	5	3.2	64					43 - 104

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

3
High Explosives MS/MSD Summary

Lab Name: GEL Laboratories LLC

Client ID: CAAN-18-151444

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Extract Batch Code: 1746309

Date Extracted: 12-MAR-18

GEL Spike ID: 1203987816

GEL SpikeDup ID: 1203987817

Analysis Date/Time: 15-MAR-18 20:17

MSD Analysis Date/Time: 15-MAR-18 20:53

Reporting Units: ug/L

QC Type: MS/MSD

Compound	Spike Added	Sample Conc	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Rec Limits
Nitrobenzene	5.49451	0	4.14	75	4.16	77	1	30	62 - 116
PETN	5.49451	0	5.45	99	4.3	80	24	30	51 - 131
RDX	5.49451	0	4.82	88	4.57	85	5	30	57 - 125
TATB	4.3956	0	3.83	87	3.68	85	4	30	38 - 149
Tetryl	5.49451	0	4.34	79	4.24	79	2	30	50 - 126
m-Dinitrobenzene	5.49451	0	4.7	85	4.77	89	1	30	74 - 117
m-Nitrotoluene	5.49451	0	3.98	72	3.65	68	9	30	59 - 120
o-Nitrotoluene	5.49451	0	4.29	78	3.84	71	11	30	56 - 119
p-Nitrotoluene	5.49451	0	4.3	78	4.02	75	7	30	61 - 129
tris(o-cresyl) phosphate	5.49451	0	3.63	66	2.8	52	26	30	38 - 105
1,3,5-Trinitrobenzene	5.49451	0	4.92	90	5.09	95	3	30	67 - 111
2,4,6-Trinitrotoluene	5.49451	0	4.64	84	3.82	71	19	30	66 - 112
2,4-Diamino-6-nitrotoluene	5.49451	0	4.93	90	5.41	101	9	30	50 - 121
2,4-Dinitrotoluene	5.49451	0	5.35	97	4.91	91	9	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.49451	0	4.41	80	4.92	92	11	30	53 - 127
2,6-Dinitrotoluene	5.49451	0	4.93	90	4.04	75	20	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.49451	0	5.04	92	4.29	80	16	30	67 - 115
3,5-Dinitroaniline	5.49451	0	5.14	93	4.52	84	13	30	70 - 121
4-Amino-2,6-dinitrotoluene	5.49451	0	5.19	94	4.17	78	22	30	65 - 120
HMX	5.49451	0	4.92	90	4.83	90	2	30	44 - 128

#Column to be used to flag recovery and RPD values with an asterisk

Quality Control Data

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1746309

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Matrix: WATER

GEL Sample ID: 1203987814

Sample Amount 1000 mL

Date Received: 08-MAR-18

Moisture: .

Extraction Batch ID: 1746309

Extraction Type Sol Exchange

Date Extracted: 12-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0315016.wiff

Date Analyzed: 15-MAR-18 18:30

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.08	U	0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.08	U	0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.08	U	0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.08	U	0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.08	U	0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.08	U	0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.08	U	0.080	0.500
<i>479-45-8</i>	<i>Tetryl</i>				
606-20-2	2,6-Dinitrotoluene	.08	U	0.080	0.250
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
98-95-3	Nitrobenzene	.08	U	0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.08	U	0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.08	U	0.080	0.250
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	.08	U	0.080	0.250
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
88-72-2	o-Nitrotoluene	.082	U	0.082	0.250
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1746309

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Matrix: WATER

GEL Sample ID: 1203987814

Sample Amount 1000 mL

Date Received: 08-MAR-18

Moisture: .

Extraction Batch ID: 1746309

Extraction Type Sol Exchange

Date Extracted: 12-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-11-5	PETN	.1	U	0.100	0.500
<i>78-11-5</i>	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.15	U	0.150	0.500
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	.3	U	0.300	1.00
<i>3058-38-6</i>	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	.3	U	0.300	1.00
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	.3	U	0.300	1.00
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	.5	U	0.500	2.50
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	.5	U	0.500	2.50
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1746309

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Matrix: WATER

GEL Sample ID: 1203987815

Sample Amount 1000 mL

Date Received: 08-MAR-18

Moisture: .

Extraction Batch ID: 1746309

Extraction Type Sol Exchange

Date Extracted: 12-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0315017.wiff

Date Analyzed: 15-MAR-18 19:06

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	3.2		0.300	1.00
<i>3058-38-6</i>	<i>TATB</i>				
78-30-8	tris(o-cresyl) phosphate	3.2		0.300	1.00
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
99-08-1	m-Nitrotoluene	3.93		0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	4.02		0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	4.23		0.080	0.250
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.25		0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
98-95-3	Nitrobenzene	4.25		0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
121-82-4	RDX	4.31		0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
618-87-1	3,5-Dinitroaniline	4.33		0.300	1.00
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
99-99-0	p-Nitrotoluene	4.35		0.150	0.500
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	4.37		0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.38		0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
88-72-2	o-Nitrotoluene	4.39		0.082	0.250
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1746309

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Matrix: WATER

GEL Sample ID: 1203987815

Sample Amount 1000 mL

Date Received: 08-MAR-18

Moisture: .

Extraction Batch ID: 1746309

Extraction Type Sol Exchange

Date Extracted: 12-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
6629-29-4	2,4-Diamino-6-nitrotoluene	4.4		0.500	2.50
6629-29-4	2,4-Diamino-6-nitrotoluene				
99-35-4	1,3,5-Trinitrobenzene	4.49		0.080	0.250
99-35-4	1,3,5-Trinitrobenzene				
99-65-0	m-Dinitrobenzene	4.5		0.080	0.250
99-65-0	m-Dinitrobenzene				
479-45-8	Tetryl	4.51		0.080	0.500
479-45-8	Tetryl				
2691-41-0	HMX	4.52		0.080	0.250
2691-41-0	HMX				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.55		0.500	2.50
59229-75-3	2,6-Diamino-4-nitrotoluene				
78-11-5	PETN	4.68		0.100	0.500
78-11-5	PETN				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-18-151444(445476003MS)MS

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Matrix: WATER

GEL Sample ID: 1203987816

Sample Amount 910 mL

Date Received: 08-MAR-18

Moisture: .

Extraction Batch ID: 1746309

Extraction Type Sol Exchange

Date Extracted: 12-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0315019.wiff

Date Analyzed: 15-MAR-18 20:17

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-30-8	tris(o-cresyl) phosphate	3.63		0.330	1.10
78-30-8	tris(o-cresyl) phosphate				
3058-38-6	TATB	3.83		0.330	1.10
3058-38-6	TATB				
99-08-1	m-Nitrotoluene	3.98		0.0879	0.275
99-08-1	m-Nitrotoluene				
98-95-3	Nitrobenzene	4.14		0.0879	0.275
98-95-3	Nitrobenzene				
88-72-2	o-Nitrotoluene	4.29		0.0901	0.275
88-72-2	o-Nitrotoluene				
99-99-0	p-Nitrotoluene	4.3		0.165	0.549
99-99-0	p-Nitrotoluene				
479-45-8	Tetryl	4.34		0.0879	0.549
479-45-8	Tetryl				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.41		0.549	2.75
59229-75-3	2,6-Diamino-4-nitrotoluene				
118-96-7	2,4,6-Trinitrotoluene	4.64		0.0879	0.275
118-96-7	2,4,6-Trinitrotoluene				
99-65-0	m-Dinitrobenzene	4.7		0.0879	0.275
99-65-0	m-Dinitrobenzene				
121-82-4	RDX	4.82		0.0879	0.275
121-82-4	RDX				
2691-41-0	HMX	4.92		0.0879	0.275
2691-41-0	HMX				
99-35-4	1,3,5-Trinitrobenzene	4.92		0.0879	0.275
99-35-4	1,3,5-Trinitrobenzene				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-18-151444(445476003MS)MS

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Matrix: WATER

GEL Sample ID: 1203987816

Sample Amount 910 mL

Date Received: 08-MAR-18

Moisture: .

Extraction Batch ID: 1746309

Extraction Type Sol Exchange

Date Extracted: 12-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
606-20-2	2,6-Dinitrotoluene	4.93		0.0879	0.275
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	4.93		0.549	2.75
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	5.04		0.0879	0.275
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
618-87-1	3,5-Dinitroaniline	5.14		0.330	1.10
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	5.19		0.0879	0.275
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	5.35		0.0879	0.275
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
78-11-5	PETN	5.45		0.110	0.549
<i>78-11-5</i>	<i>PETN</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-18-151444(445476003MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Matrix: WATER

GEL Sample ID: 1203987817

Sample Amount 930 mL

Date Received: 08-MAR-18

Moisture: .

Extraction Batch ID: 1746309

Extraction Type Sol Exchange

Date Extracted: 12-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0315020.wiff

Date Analyzed: 15-MAR-18 20:53

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-30-8	tris(o-cresyl) phosphate	2.8		0.323	1.08
78-30-8	tris(o-cresyl) phosphate				
99-08-1	m-Nitrotoluene	3.65		0.086	0.269
99-08-1	m-Nitrotoluene				
3058-38-6	TATB	3.68		0.323	1.08
3058-38-6	TATB				
118-96-7	2,4,6-Trinitrotoluene	3.82		0.086	0.269
118-96-7	2,4,6-Trinitrotoluene				
88-72-2	o-Nitrotoluene	3.84		0.0882	0.269
88-72-2	o-Nitrotoluene				
99-99-0	p-Nitrotoluene	4.02		0.161	0.538
99-99-0	p-Nitrotoluene				
606-20-2	2,6-Dinitrotoluene	4.04		0.086	0.269
606-20-2	2,6-Dinitrotoluene				
98-95-3	Nitrobenzene	4.16		0.086	0.269
98-95-3	Nitrobenzene				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.17		0.086	0.269
19406-51-0	4-Amino-2,6-dinitrotoluene				
479-45-8	Tetryl	4.24		0.086	0.538
479-45-8	Tetryl				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.29		0.086	0.269
35572-78-2	2-Amino-4,6-dinitrotoluene				
78-11-5	PETN	4.3		0.108	0.538
78-11-5	PETN				
618-87-1	3,5-Dinitroaniline	4.52		0.323	1.08
618-87-1	3,5-Dinitroaniline				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-18-151444(445476003MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2018-2089

Matrix: WATER

GEL Sample ID: 1203987817

Sample Amount 930 mL

Date Received: 08-MAR-18

Moisture: .

Extraction Batch ID: 1746309

Extraction Type Sol Exchange

Date Extracted: 12-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
121-82-4	RDX	4.57		0.086	0.269
<i>121-82-4</i>	<i>RDX</i>				
99-65-0	m-Dinitrobenzene	4.77		0.086	0.269
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
2691-41-0	HMX	4.83		0.086	0.269
<i>2691-41-0</i>	<i>HMX</i>				
121-14-2	2,4-Dinitrotoluene	4.91		0.086	0.269
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.92		0.538	2.69
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	5.09		0.086	0.269
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	5.41		0.538	2.69
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2018-2089Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 15-MAR-18 09:35GEL Data File: EXP0315001.wiffInstrument ID: LCMSMS5Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2018-2089Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 15-MAR-18 10:11GEL Data File: EXP0315002.wiffInstrument ID: LCMSMS5Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0
RDX	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MXN	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
PETN	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-2089

Lab Code: GEL

Lab Sample ID: XIBLK02

Analysis Date: 15-MAR-18 14:55

GEL Data File: EXP0315010.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-2089

Lab Code: GEL

Lab Sample ID: XIBLK03

Analysis Date: 15-MAR-18 17:17

GEL Data File: EXP0315014.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
Nitrobenzene	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0
HMX	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-2089

Lab Code: GEL

Lab Sample ID: XIBLK04

Analysis Date: 15-MAR-18 23:15

GEL Data File: EXP0315024.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-2089

Lab Code: GEL

Lab Sample ID: XIBLK05

Analysis Date: 16-MAR-18 00:26

GEL Data File: EXP0315026.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-2089
Work Order #: 445476

Product: Determination of Metals by ICP

Analytical Method: SW846 3005A/6010C

Analytical Procedure: GL-MA-E-013 REV# 30

Analytical Batch: 1745495

Product: Determination of Metals by ICP-MS

Analytical Method: SW846 3005A/6020A

Analytical Procedure: GL-MA-E-014 REV# 32

Analytical Batch: 1745486

Product: Inorganic Calculations

Analytical Method: SM:A2340B

Analytical Procedure: GL-GC-E-107 REV# 10

Analytical Batch: 1752213

Product: Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

Analytical Method: EPA 245.2 1974

Analytical Procedure: GL-MA-E-010 REV# 36

Analytical Batch: 1745780

Preparation Method: SW846 3005A

Preparation Procedure: GL-MA-E-006 REV# 14

Preparation Batches: 1745485 and 1745494

Preparation Method: EPA 245.1/245.2 Prep

Preparation Procedure: GL-MA-E-010 REV# 36

Preparation Batch: 1745779

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445476001	CAAN-18-151443
445476002	CAAN-18-151444
445476005	CAAN-18-151450
445476006	CAAN-18-151451
1203986121	Method Blank (MB) ICP
1203986122	Laboratory Control Sample (LCS)
1203986125	445476001(CAAN-18-151443L) Serial Dilution (SD)
1203986123	445476001(CAAN-18-151443D) Sample Duplicate (DUP)
1203986124	445476001(CAAN-18-151443S) Matrix Spike (MS)
1203986104	Method Blank (MB) ICP-MS
1203986105	Laboratory Control Sample (LCS)
1203986108	445476001(CAAN-18-151443L) Serial Dilution (SD)
1203986106	445476001(CAAN-18-151443D) Sample Duplicate (DUP)
1203986107	445476001(CAAN-18-151443S) Matrix Spike (MS)
1203986777	Method Blank (MB) CVAA

1203986778	Laboratory Control Sample (LCS)
1203986781	445469001(NonSDGL) Serial Dilution (SD)
1203986779	445469001(NonSDGD) Sample Duplicate (DUP)
1203986780	445469001(NonSDGS) Matrix Spike (MS)

Samples 445476001,002,005 and 006 in this SDG were analyzed for metals and mercury on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 445476001 (CAAN-18-151443) and 445476005 (CAAN-18-151450)-ICP.

ICSA/ICSAB Statement

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Miscellaneous Information

Additional Comments

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

Hardness = 2.497 (Ca) + 4.118 (Mg)

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-2089 GEL Work Order: 445476

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: 04 APR 2018

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-2089**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 445476001**BASIS:** As Received**DATE COLLECTED** 06-MAR-18**CLIENT ID:** CAAN-18-151443**LEVEL:** Low**DATE RECEIVED** 08-MAR-18**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	AXS5	03/12/18 11:20	031218W1-5	1745780

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-2089

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 445476001

BASIS: As Received

DATE COLLECTED 06-MAR-18

CLIENT ID: CAAN-18-151443

LEVEL: Low

DATE RECEIVED 08-MAR-18

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	03/19/18 16:07	031918-1	1745495
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	03/21/18 23:08	180321-3	1745486
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	03/21/18 23:08	180321-3	1745486
7440-39-3	Barium	15.2	ug/L		1	5	5	1	P	HSC	03/19/18 16:07	031918-1	1745495
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	03/19/18 16:07	031918-1	1745495
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	03/19/18 16:07	031918-1	1745495
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/21/18 23:08	180321-3	1745486
7440-70-2	Calcium	10100	ug/L		50	200	200	1	P	HSC	03/19/18 16:07	031918-1	1745495
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	03/21/18 23:08	180321-3	1745486
7440-48-4	Cobalt	1.81	ug/L	J	1	5	5	1	P	HSC	03/19/18 16:07	031918-1	1745495
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	03/19/18 16:07	031918-1	1745495
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	03/19/18 16:07	031918-1	1745495
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	03/21/18 23:08	180321-3	1745486
7439-95-4	Magnesium	2880	ug/L		110	300	300	1	P	HSC	03/20/18 15:09	032018-2	1745495
7439-96-5	Manganese	4	ug/L	J	2	10	10	1	P	HSC	03/19/18 16:07	031918-1	1745495
7439-98-7	Molybdenum	1.35	ug/L		0.2	0.5	0.5	1	MS	BAJ	03/21/18 23:08	180321-3	1745486
7440-02-0	Nickel	0.697	ug/L	J	0.6	2	2	1	MS	BAJ	03/21/18 23:08	180321-3	1745486
7440-09-7	Potassium	1040	ug/L		50	150	150	1	P	HSC	03/19/18 16:07	031918-1	1745495
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	03/21/18 23:08	180321-3	1745486
7631-86-9	Silica	63000	ug/L		53	213	213	1	P	HSC	03/19/18 16:07	031918-1	1745495
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/21/18 23:08	180321-3	1745486
7440-23-5	Sodium	11000	ug/L		100	300	300	1	P	HSC	03/20/18 15:09	032018-2	1745495
7440-24-6	Strontium	57.4	ug/L		1	5	5	1	P	HSC	03/19/18 16:07	031918-1	1745495
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/21/18 23:08	180321-3	1745486
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	03/19/18 16:07	031918-1	1745495
7440-61-1	Uranium	0.387	ug/L		0.067	0.2	0.2	1	MS	BAJ	03/22/18 05:30	180321-4	1745486
7440-62-2	Vanadium	5.18	ug/L		1	5	5	1	P	HSC	03/19/18 16:07	031918-1	1745495
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	03/20/18 15:09	032018-2	1745495

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-2089**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 445476001**BASIS:** As Received**DATE COLLECTED** 06-MAR-18**CLIENT ID:** CAAN-18-151443**LEVEL:** Low**DATE RECEIVED** 08-MAR-18**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	37.1	mg/L		0.453	1.24	1.24	1		JJ2	04/02/18 10:42		1752213

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1745486	1745485	SW846 3005A	50	mL	50	mL	03/08/18	JXM8
1745495	1745494	SW846 3005A	50	mL	50	mL	03/08/18	JXM8
1745780	1745779	EPA 245.1/245.2 Prep	20	mL	20	mL	03/09/18	AXS5

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-2089**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 445476002**BASIS:** As Received**DATE COLLECTED** 06-MAR-18**CLIENT ID:** CAAN-18-151444**LEVEL:** Low**DATE RECEIVED** 08-MAR-18**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	AXS5	03/12/18 11:21	031218W1-5	1745780

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1745780	1745779	EPA 245.1/245.2 Prep	20	mL	20	mL	03/09/18	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-2089**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 445476005**BASIS:** As Received**DATE COLLECTED** 06-MAR-18**CLIENT ID:** CAAN-18-151450**LEVEL:** Low**DATE RECEIVED** 08-MAR-18**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	AXS5	03/12/18 11:23	031218W1-5	1745780

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-2089

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 445476005

BASIS: As Received

DATE COLLECTED 06-MAR-18

CLIENT ID: CAAN-18-151450

LEVEL: Low

DATE RECEIVED 08-MAR-18

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	HSC	03/19/18 16:04	031918-1	1745495
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	03/21/18 23:24	180321-3	1745486
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	03/21/18 23:24	180321-3	1745486
7440-39-3	Barium	14.6	ug/L		1	5	5	1	P	HSC	03/19/18 16:04	031918-1	1745495
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	03/19/18 16:04	031918-1	1745495
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	03/19/18 16:04	031918-1	1745495
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/21/18 23:24	180321-3	1745486
7440-70-2	Calcium	9680	ug/L		50	200	200	1	P	HSC	03/19/18 16:04	031918-1	1745495
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	03/21/18 23:24	180321-3	1745486
7440-48-4	Cobalt	2	ug/L	J	1	5	5	1	P	HSC	03/19/18 16:04	031918-1	1745495
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	03/19/18 16:04	031918-1	1745495
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	03/19/18 16:04	031918-1	1745495
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	03/21/18 23:24	180321-3	1745486
7439-95-4	Magnesium	2790	ug/L		110	300	300	1	P	HSC	03/20/18 15:05	032018-2	1745495
7439-96-5	Manganese	3.77	ug/L	J	2	10	10	1	P	HSC	03/19/18 16:04	031918-1	1745495
7439-98-7	Molybdenum	1.29	ug/L		0.2	0.5	0.5	1	MS	BAJ	03/21/18 23:24	180321-3	1745486
7440-02-0	Nickel	0.725	ug/L	J	0.6	2	2	1	MS	BAJ	03/21/18 23:24	180321-3	1745486
7440-09-7	Potassium	978	ug/L		50	150	150	1	P	HSC	03/19/18 16:04	031918-1	1745495
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	03/21/18 23:24	180321-3	1745486
7631-86-9	Silica	59200	ug/L		53	213	213	1	P	HSC	03/19/18 16:04	031918-1	1745495
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/21/18 23:24	180321-3	1745486
7440-23-5	Sodium	10100	ug/L		100	300	300	1	P	HSC	03/20/18 15:05	032018-2	1745495
7440-24-6	Strontium	56.1	ug/L		1	5	5	1	P	HSC	03/19/18 16:04	031918-1	1745495
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/21/18 23:24	180321-3	1745486
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	03/19/18 16:04	031918-1	1745495
7440-61-1	Uranium	0.381	ug/L		0.067	0.2	0.2	1	MS	BAJ	03/22/18 05:47	180321-4	1745486
7440-62-2	Vanadium	4.46	ug/L	J	1	5	5	1	P	HSC	03/19/18 16:04	031918-1	1745495
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	03/20/18 15:05	032018-2	1745495

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-2089**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 445476005**BASIS:** As Received**DATE COLLECTED** 06-MAR-18**CLIENT ID:** CAAN-18-151450**LEVEL:** Low**DATE RECEIVED** 08-MAR-18**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	35.7	mg/L		0.453	1.24	1.24	1		JJ2	04/02/18 10:42		1752213

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1745486	1745485	SW846 3005A	50	mL	50	mL	03/08/18	JXM8
1745495	1745494	SW846 3005A	50	mL	50	mL	03/08/18	JXM8
1745780	1745779	EPA 245.1/245.2 Prep	20	mL	20	mL	03/09/18	AXS5

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-2089**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 445476006**BASIS:** As Received**DATE COLLECTED** 06-MAR-18**CLIENT ID:** CAAN-18-151451**LEVEL:** Low**DATE RECEIVED** 08-MAR-18**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	AXS5	03/12/18 11:28	031218W1-5	1745780

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1745780	1745779	EPA 245.1/245.2 Prep	20	mL	20	mL	03/09/18	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2018-2089

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>
1203986104	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	2	ug/L	+/-5	U	MS	2	5
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203986121	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	120	ug/L	+/-300	J	P	100	300
	Strontium	-1.03	ug/L	+/-5	J	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203986777	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. 2018-2089 **Client ID:** CAAN-18-151443S

Contract: ESHL00114 **Level:** Low

Matrix: WATER **% Solids:**

Sample ID: 445476001 **Spike ID:** 1203986107

<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	49.9		1	U	50	99.5		MS
Arsenic	ug/L	75-125	50.4		2	U	50	97.4		MS
Cadmium	ug/L	75-125	50.7		0.3	U	50	101		MS
Chromium	ug/L	75-125	50.7		3	U	50	96		MS
Lead	ug/L	75-125	48.4		0.5	U	50	96.7		MS
Molybdenum	ug/L	75-125	53.4		1.35		50	104		MS
Nickel	ug/L	75-125	49.1		0.697	J	50	96.8		MS
Selenium	ug/L	75-125	49.4		2	U	50	98.7		MS
Silver	ug/L	75-125	52.4		0.3	U	50	105		MS
Thallium	ug/L	75-125	45.4		0.6	U	50	90.7		MS
Uranium	ug/L	75-125	48.6		0.387		50	96.4		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-2089 Client ID: CAAN-18-151443S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 445476001 Spike ID: 1203986124

<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	4740		68	U	5000	94.7		P
Barium	ug/L	75-125	488		15.2		500	94.6		P
Beryllium	ug/L	75-125	475		1	U	500	95		P
Boron	ug/L	75-125	507		15	U	500	99.8		P
Calcium	ug/L	75-125	14800		10100		5000	93.3		P
Cobalt	ug/L	75-125	479		1.81	J	500	95.5		P
Copper	ug/L	75-125	486		3	U	500	97.3		P
Iron	ug/L	75-125	4910		30	U	5000	97.9		P
Magnesium	ug/L	75-125	7810		2880		5000	98.7		P
Manganese	ug/L	75-125	479		4	J	500	95		P
Potassium	ug/L	75-125	5680		1040		5000	92.7		P
Silica	ug/L		71400		63000		10700	78.7	N/A	P
Sodium	ug/L	75-125	16000		11000		5000	98.4		P
Strontium	ug/L	75-125	574		57.4		500	103		P
Tin	ug/L	75-125	479		2.5	U	500	95.8		P
Vanadium	ug/L	75-125	489		5.18		500	96.8		P
Zinc	ug/L	75-125	459		3.3	U	500	91.8		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-2089 Client ID: CTUA-17-151330S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 445469001 Spike ID: 1203986780

<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.: 2018-2089

Lab Code: GEL

Contract: ESHL00114

Client ID: CAAN-18-151443D

Matrix: WATER

Level: Low

Sample ID: 445476001

Duplicate ID: 1203986106

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L		2 U		2 U				MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L		3 U		3 U				MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.35		1.38		2.05		MS
Nickel	ug/L	+/- 2	0.697 J		0.729 J		4.49		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	0.387		0.375		3.15		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
-6-
Duplicate Sample Summary

SDG No.: 2018-2089

Lab Code: GEL

Contract: ESHL00114

Client ID: CAAN-18-151443D

Matrix: WATER

Level: Low

Sample ID: 445476001

Duplicate ID: 1203986123

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	15.2		14.9		2.08		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	10100		10000		1.11		P
Cobalt	ug/L	+/-5	1.81 J		1.87 J		3.3		P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	2880		2880		.274		P
Manganese	ug/L	+/-10	4 J		3.79 J		5.4		P
Potassium	ug/L	+/-20%	1040		1030		1.36		P
Silica	ug/L	+/-20%	63000		61400		2.61		P
Sodium	ug/L	+/-20%	11000		11600		4.72		P
Strontium	ug/L	+/-20%	57.4		56.9		.77		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	5.18		5.24		1.18		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
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Duplicate Sample Summary

SDG No.: 2018–2089**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CTUA–17–151330D**Matrix:** WATER**Level:** Low**Sample ID:** 445469001**Duplicate ID:** 1203986779**Percent Solids for Dup:** N/A

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

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-2089

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>
1203986105								
	Antimony	ug/L	50	51.1		102	80-120	MS
	Arsenic	ug/L	50	53.3		107	80-120	MS
	Cadmium	ug/L	50	52.9		106	80-120	MS
	Chromium	ug/L	50	52.4		105	80-120	MS
	Lead	ug/L	50	51.3		103	80-120	MS
	Molybdenum	ug/L	50	53.8		108	80-120	MS
	Nickel	ug/L	50	53.7		107	80-120	MS
	Selenium	ug/L	50	53.5		107	80-120	MS
	Silver	ug/L	50	55.4		111	80-120	MS
	Thallium	ug/L	50	48.8		97.6	80-120	MS
	Uranium	ug/L	50	50.6		101	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-2089

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>
1203986122								
	Iron	ug/L	5000	4940		98.8	80-120	P
	Magnesium	ug/L	5000	5010		100	80-120	P
	Manganese	ug/L	500	489		97.7	80-120	P
	Potassium	ug/L	5000	4630		92.5	80-120	P
	Silica	ug/L	10700	10100		94.3	80-120	P
	Sodium	ug/L	5000	4830		96.5	80-120	P
	Strontium	ug/L	500	510		102	80-120	P
	Tin	ug/L	500	485		97.1	80-120	P
	Vanadium	ug/L	500	490		97.9	80-120	P
	Zinc	ug/L	500	466		93.2	80-120	P
	Aluminum	ug/L	5000	4900		97.9	80-120	P
	Barium	ug/L	500	482		96.3	80-120	P
	Beryllium	ug/L	500	478		95.6	80-120	P
	Boron	ug/L	500	499		99.8	80-120	P
	Calcium	ug/L	5000	4960		99.2	80-120	P
	Cobalt	ug/L	500	489		97.9	80-120	P
	Copper	ug/L	500	485		97	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-2089

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>
1203986778	Mercury	ug/L	2	2.07		103	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2018-2089

Client ID: CAAN-18-151443L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 445476001

Serial Dilution ID: 1203986108

<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	1.35		1.56	J	15.185			MS
Nickel	.697	J	3	U	15.495			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.387		.425	J	9.819			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2018-2089

Client ID: CAAN-18-151443L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 445476001

Serial Dilution ID: 1203986125

<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	15.2		15.3	J	.832			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	10100		10400		2.695		10	P
Cobalt	1.81	J	5	U	159.155			P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	2880		3140		9.223			P
Manganese	4	J	10	U	12.492			P
Potassium	1040		1090		4.214			P
Silica	63000		63600		.907		10	P
Sodium	11000		10100		8.459		10	P
Strontium	57.4		62.4		8.778		10	P
Tin	2.5	U	12.5	U				P
Vanadium	5.18		5	U	15.97			P
Zinc	3.3	U	16.5	U				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2018-2089 **Client ID:** CTUA-17-151330L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 445469001 **Serial Dilution ID:** 1203986781

<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 #: 2018-2089
Work Order #: 445476**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1745644

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
445476002	CAAN-18-151444
445476006	CAAN-18-151451
1203986467	Method Blank (MB)
1203986468	Laboratory Control Sample (LCS)
1203986469	445476002(CAAN-18-151444) Sample Duplicate (DUP)
1203986472	445476002(CAAN-18-151444) 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 445476002 (CAAN-18-151444) 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:	1745736	Method:	WSP-CN(T)
Prep Batch :	1745735	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
445476002	CAAN-18-151444
445476006	CAAN-18-151451
1203986676	Method Blank (MB)
1203986677	Laboratory Control Sample (LCS)
1203986679	445476002(CAAN-18-151444) Sample Duplicate (DUP)
1203986681	445476002(CAAN-18-151444) 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# 21.

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.

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 445476002 (CAAN-18-151444) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1745475

Method: WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
445476001	CAAN-18-151443
445476005	CAAN-18-151450
1203986083	Method Blank (MB)
1203986084	Laboratory Control Sample (LCS)
1203986085	445469001(NonSDG) Sample Duplicate (DUP)
1203986086	445469001(NonSDG) 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 445469001 (NonSDG) 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 Dilutions

The following samples 1203986085 (Non SDG 445469001DUP) and 1203986086 (Non SDG 445469001PS) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Sample Re-analysis

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

Miscellaneous Information

Manual Integrations

Samples 1203986085 (Non SDG 445469001DUP), 1203986086 (Non SDG 445469001PS), 445476001 (CAAN-18-151443) and 445476005 (CAAN-18-151450) were manually integrated to correctly position the baseline as set in the calibration standards.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product: Ammonia Nitrogen
Analytical Batch: 1744739 **Method:** NH3
Prep Batch : 1744738 **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
445476001	CAAN-18-151443
445476005	CAAN-18-151450
1203984480	Method Blank (MB)
1203984481	Laboratory Control Sample (LCS)
1203986322	445461001(NonSDG) Sample Duplicate (DUP)
1203986324	445476001(CAAN-18-151443) Sample Duplicate (DUP)
1203986323	445461001(NonSDG) Matrix Spike (MS)
1203986325	445476001(CAAN-18-151443) 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# 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.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 445461001 (NonSDG) and 445476001 (CAAN-18-151443) were selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Ammonia	1203986323 (Non SDG 445461001MS)	87.3* (90%-110%)
	1203986325 (CAAN-18-151443MS)	78.4* (90%-110%)

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
Nitrogen, Ammonia	1203986324 (CAAN-18-151443DUP)	abs(.0461 - .206)* (+/- .05 mg/L)

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

Sample1203984481 (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:	Total Kjeldahl Nitrogen		
Analytical Batch:	1744737	Method:	TKN
Prep Batch :	1744736	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
445476002	CAAN-18-151444
445476006	CAAN-18-151451
1203984476	Method Blank (MB)
1203984477	Laboratory Control Sample (LCS)
1203984478	444683002(CAWA-18-12) Sample Duplicate (DUP)
1203986260	445461001(NonSDG) Sample Duplicate (DUP)
1203984479	444683002(CAWA-18-12) Matrix Spike (MS)
1203986262	445461001(NonSDG) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-104 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 Nutrient analysis was performed on a Lachat QuickChem FIA+ 8000 Series.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 444683002 (CAWA-18-12) and 445461001 (NonSDG) 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

Sample445476002 (CAAN-18-151444) was re-analyzed due to instrument failure. The results from the reanalysis are reported. Sample445476002 (CAAN-18-151444) was re-analyzed due to (its) proximity to an overrange sample. The results from the reanalysis are reported. Samples445476002 (CAAN-18-151444) and 445476006 (CAAN-18-151451) were re-analyzed to verify the results.

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1745313

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
445476001	CAAN-18-151443
445476005	CAAN-18-151450
1203985744	Method Blank (MB)
1203985745	Laboratory Control Sample (LCS)
1203986196	445461001(NonSDG) Sample Duplicate (DUP)
1203986197	445476001(CAAN-18-151443) Sample Duplicate (DUP)
1203986200	445461001(NonSDG) Post Spike (PS)
1203986201	445476001(CAAN-18-151443) 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# 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+ 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

Samples 445461001 (NonSDG) and 445476001 (CAAN-18-151443) were selected for QC analysis.

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

The percent recoveries (%R) obtained from the spike analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The spike recovery falls outside of the GEL acceptance limits but within the client specified limits.

Analyte	Sample	Value
Nitrogen, Nitrate/Nitrite	1203986201 (CAAN-18-151443PS)	112* (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

Sample1203985745 (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:	Total Phosphorus		
Analytical Batch:	1744746	Method:	PO4
Prep Batch :	1744745	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
445476001	CAAN-18-151443
445476005	CAAN-18-151450
1203984495	Method Blank (MB)
1203984496	Laboratory Control Sample (LCS)
1203986265	445476001(CAAN-18-151443) Sample Duplicate (DUP)
1203987049	445524002(NonSDG) Sample Duplicate (DUP)
1203986266	445476001(CAAN-18-151443) Matrix Spike (MS)
1203987050	445524002(NonSDG) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-103 REV# 11.

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 445476001 (CAAN-18-151443) and 445524002 (NonSDG) 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

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1746577

Method: TDS

Sample Analysis

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

Sample ID	Client ID
445476001	CAAN-18-151443
445476005	CAAN-18-151450
1203988403	Method Blank (MB)
1203988404	Laboratory Control Sample (LCS)
1203988407	445469001(NonSDG) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-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 445469001 (NonSDG) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1746355

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
445476001	CAAN-18-151443
445476005	CAAN-18-151450
1203987912	Laboratory Control Sample (LCS)
1203987915	445476001(CAAN-18-151443) 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# 16.

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 Scientific Orion Star A212 Conductivity Meter.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Calibration Verification Information

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

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 445476001 (CAAN-18-151443) 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: 1745501 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
445476001	CAAN-18-151443
445476005	CAAN-18-151450
1203986136	Laboratory Control Sample (LCS)
1203986137	445053002(CASA-18-151410) 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# 23.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 445053002 (CASA-18-151410) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

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

Sample	Analyte	Value
1203986137 (CASA-18-151410DUP)	pH	Received 03-MAR-18, out of holding 01-MAR-18
445476001 (CAAN-18-151443)	pH	Received 08-MAR-18, out of holding 06-MAR-18
445476005 (CAAN-18-151450)	pH	Received 08-MAR-18, out of holding 06-MAR-18

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: 1745500 **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
445476001	CAAN-18-151443
445476005	CAAN-18-151450
1203986131	Laboratory Control Sample (LCS)
1203986132	445053002(CASA-18-151410) Sample Duplicate (DUP)
1203986134	445053002(CASA-18-151410) 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 445053002 (CASA-18-151410) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-2089 GEL Work Order: 445476


The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Aubrey Kingsbury

Date: 28 MAR 2018

Title: Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: March 28, 2018

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: 2018-2089

Client Sample ID: CAAN-18-151443
Sample ID: 445476001
Matrix: W
Collect Date: 06-MAR-18 10:56
Receive Date: 08-MAR-18
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	LXA2	03/08/18	1710	1745475	1
Chloride		1.62	0.067	0.200	mg/L		1					
Fluoride		0.245	0.033	0.100	mg/L		1					
Sulfate		2.02	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.206	0.017	0.050	mg/L	1.00	1	KLP1	03/09/18	1056	1744739	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.425	0.017	0.050	mg/L		1	KLP1	03/09/18	1201	1745313	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.0486	0.020	0.050	mg/L	1.00	1	KLP1	03/13/18	1539	1744746	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		116	3.40	14.3	mg/L			KLP1	03/13/18	1347	1746577	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		58.0	1.45	4.00	mg/L			RXB5	03/10/18	1752	1745500	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		122	1.00	1.00	umhos/cm		1	HXC1	03/12/18	1244	1746355	7
PH "As Received"												
pH at Temp 18.9C	H	8.00	0.010	0.100	SU		1	RXB5	03/10/18	1751	1745501	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	03/09/18	0820	1744738
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	03/13/18	0900	1744745

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: March 28, 2018

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: 2018-2089

Client Sample ID: CAAN-18-151443
Sample ID: 445476001

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

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: March 28, 2018

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: 2018-2089

Client Sample ID: CAAN-18-151444
Sample ID: 445476002
Matrix: W
Collect Date: 06-MAR-18 10:56
Receive Date: 08-MAR-18
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L		1	TSM	03/10/18	0232	1745644	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	03/09/18	0704	1745736	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	03/09/18	1414	1744737	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	03/09/18	0617	1745735
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	03/09/18	0900	1744736

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: March 28, 2018

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: 2018-2089

Client Sample ID: CAAN-18-151450
Sample ID: 445476005
Matrix: W
Collect Date: 06-MAR-18 10:56
Receive Date: 08-MAR-18
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	LXA2	03/08/18	1740	1745475	1
Chloride		1.64	0.067	0.200	mg/L		1					
Fluoride		0.220	0.033	0.100	mg/L		1					
Sulfate		2.04	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.048	0.017	0.050	mg/L	1.00	1	KLP1	03/09/18	1103	1744739	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.297	0.017	0.050	mg/L		1	KLP1	03/09/18	1210	1745313	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.0464	0.020	0.050	mg/L	1.00	1	KLP1	03/13/18	1542	1744746	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		151	3.40	14.3	mg/L			KLP1	03/13/18	1347	1746577	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		57.0	1.45	4.00	mg/L			RXB5	03/10/18	1755	1745500	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		126	1.00	1.00	umhos/cm		1	HXC1	03/12/18	1247	1746355	7
PH "As Received"												
pH at Temp 18.4C	H	8.02	0.010	0.100	SU		1	RXB5	03/10/18	1753	1745501	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	03/09/18	0820	1744738
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	03/13/18	0900	1744745

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: March 28, 2018

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: 2018-2089

Client Sample ID: CAAN-18-151450
Sample ID: 445476005

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

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: March 28, 2018

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: 2018-2089

Client Sample ID: CAAN-18-151451
Sample ID: 445476006
Matrix: W
Collect Date: 06-MAR-18 10:56
Receive Date: 08-MAR-18
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L		1	TSM	03/10/18	0444	1745644	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	03/09/18	0707	1745736	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	03/09/18	1407	1744737	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	03/09/18	0617	1745735
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	03/09/18	0900	1744736

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

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

Quality Control Summary

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QC Summary

Report Date: March 28, 2018

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

Contact: Ms. Nita Patel

Workorder: 445476

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1745644										
QC1203986469	445476002	DUP									
Total Organic Carbon Average		U	ND	U	ND	mg/L	N/A		TSM	03/10/18	03:16
QC1203986468	LCS										
Total Organic Carbon Average	10.0				10.0	mg/L	100	(80%-120%)		03/09/18	17:49
QC1203986467	MB										
Total Organic Carbon Average			U		ND	mg/L				03/09/18	17:37
QC1203986472	445476002	PS									
Total Organic Carbon Average	10.0	U	ND		10.5	mg/L	103	(75%-125%)		03/10/18	04:00
Flow Injection Analysis											
Batch	1745736										
QC1203986679	445476002	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	03/09/18	07:05
QC1203986677	LCS										
Cyanide, Total	50.0				48.9	ug/L	97.8	(90%-110%)		03/09/18	06:47
QC1203986676	MB										
Cyanide, Total			U		ND	ug/L				03/09/18	06:46
QC1203986681	445476002	MS									
Cyanide, Total	100	U	ND		96.7	ug/L	96.7	(90%-110%)		03/09/18	07:06
Ion Chromatography											
Batch	1745475										
QC1203986085	445469001	DUP									
Bromide			0.215		0.225	mg/L	4.32 ^	(+/-0.200)	LXA2	03/08/18	16:10

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QC Summary

Workorder: 445476

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1745475										
Chloride		24.8		24.8	mg/L	0.0303		(0%-20%)	LXA2	03/10/18	04:03
Fluoride		0.280		0.292	mg/L	4.17	^	(+/-0.100)		03/08/18	16:10
Sulfate		37.4		37.3	mg/L	0.269		(0%-20%)		03/10/18	04:03
QC1203986084	LCS										
Bromide	1.25			1.25	mg/L		100	(80%-120%)		03/08/18	14:11
Chloride	5.00			4.79	mg/L		95.8	(80%-120%)			
Fluoride	2.50			2.54	mg/L		102	(80%-120%)			
Sulfate	10.0			9.79	mg/L		97.9	(80%-120%)			
QC1203986083	MB										
Bromide			U	ND	mg/L					03/08/18	13:41
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203986086	445469001	PS									
Bromide	1.25	0.215		1.44	mg/L		98.2	(75%-125%)		03/08/18	16:40
Chloride	5.00	4.96		10.3	mg/L		107	(75%-125%)		03/10/18	04:33
Fluoride	2.50	0.280		2.69	mg/L		96.3	(75%-125%)		03/08/18	16:40
Sulfate	10.0	7.48		17.6	mg/L		101	(75%-125%)		03/10/18	04:33

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QC Summary

Workorder: 445476

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1744737										
QC1203984478	444683002	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	03/09/18	13:28
QC1203986260	445461001	DUP									
Nitrogen, Total Kjeldahl			0.790		0.820	mg/L	3.73	(0%-20%)		03/09/18	13:44
QC1203984477	LCS										
Nitrogen, Total Kjeldahl	1.00				0.961	mg/L	96.1	(90%-110%)		03/09/18	13:26
QC1203984476	MB										
Nitrogen, Total Kjeldahl			U		ND	mg/L				03/09/18	13:25
QC1203984479	444683002	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND		1.07	mg/L	104	(90%-110%)		03/09/18	13:29
QC1203986262	445461001	MS									
Nitrogen, Total Kjeldahl	1.00		0.790		1.71	mg/L	92	(90%-110%)		03/09/18	13:45
Batch	1744739										
QC1203986322	445461001	DUP									
Nitrogen, Ammonia			0.147		0.110	mg/L	28.8 ^	(+/-0.050)	KLP1	03/09/18	10:54
QC1203986324	445476001	DUP									
Nitrogen, Ammonia			0.206	J	0.0461	mg/L	127* ^	(+/-0.050)		03/09/18	10:57
QC1203984481	LCS										
Nitrogen, Ammonia	1.00				1.01	mg/L	101	(90%-110%)		03/09/18	10:37
QC1203984480	MB										
Nitrogen, Ammonia			J		0.0284	mg/L				03/09/18	10:25
QC1203986323	445461001	MS									
Nitrogen, Ammonia	1.00		0.147		1.02	mg/L	87.3 *	(90%-110%)		03/09/18	10:55

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QC Summary

Workorder: 445476

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1744739										
QC1203986325	445476001	MS									
Nitrogen, Ammonia	1.00	0.206		0.990	mg/L		78.4 *	(90%-110%)	KLP1	03/09/18	11:02
Batch	1744746										
QC1203986265	445476001	DUP									
Phosphorus, Total as P	J	0.0486		0.0551	mg/L	12.5 ^		(+/-0.050)	KLP1	03/13/18	15:40
QC1203987049	445524002	DUP									
Phosphorus, Total as P		0.146		0.147	mg/L	0.683 ^		(+/-0.050)		03/13/18	15:43
QC1203984496	LCS										
Phosphorus, Total as P	1.00			1.08	mg/L		108	(80%-124%)		03/13/18	15:25
QC1203984495	MB										
Phosphorus, Total as P			U	ND	mg/L					03/13/18	15:24
QC1203986266	445476001	MS									
Phosphorus, Total as P	1.00	J	0.0486	1.16	mg/L		111	(63%-139%)		03/13/18	15:41
QC1203987050	445524002	MS									
Phosphorus, Total as P	1.00		0.146	1.26	mg/L		111	(63%-139%)		03/13/18	15:44
Batch	1745313										
QC1203986196	445461001	DUP									
Nitrogen, Nitrate/Nitrite		1.09		1.09	mg/L	0		(0%-20%)	KLP1	03/09/18	11:55
QC1203986197	445476001	DUP									
Nitrogen, Nitrate/Nitrite		0.425		0.424	mg/L	0.236		(0%-20%)		03/09/18	12:02
QC1203985745	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.04	mg/L		104	(90%-110%)		03/09/18	11:35
QC1203985744	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					03/09/18	11:19

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QC Summary

Workorder: 445476

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1745313										
QC1203986200	445461001	PS									
Nitrogen, Nitrate/Nitrite	1.00	1.09		2.15	mg/L		106	(90%-110%)	KLP1	03/09/18	11:57
QC1203986201	445476001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.425		1.54	mg/L		112 *	(90%-110%)		03/09/18	12:08
Solids Analysis											
Batch	1746577										
QC1203988407	445469001	DUP									
Total Dissolved Solids		254		253	mg/L	1.12		(0%-5%)	KLP1	03/13/18	13:47
QC1203988404	LCS										
Total Dissolved Solids	300			297	mg/L		99	(95%-105%)		03/13/18	13:47
QC1203988403	MB										
Total Dissolved Solids			U	ND	mg/L					03/13/18	13:47
Titration and Ion Analysis											
Batch	1745500										
QC1203986132	445053002	DUP									
Alkalinity, Total as CaCO3		148		148	mg/L	0		(0%-20%)	RXB5	03/10/18	16:53
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203986131	LCS										
Alkalinity, Total as CaCO3	100			107	mg/L		107	(90%-110%)		03/10/18	16:44
QC1203986134	445053002	MS									
Alkalinity, Total as CaCO3	100	148		250	mg/L		102	(80%-120%)		03/10/18	16:53
Batch	1745501										
QC1203986137	445053002	DUP									
pH	H	6.76	H	6.68	SU	1.19		(0%-5%)	RXB5	03/10/18	16:50

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QC Summary

Workorder: 445476

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1745501										
QC1203986136	LCS										
pH	7.00			6.99	SU		99.9	(99%-101%)	RXB5	03/10/18	15:30
Batch	1746355										
QC1203987915	445476001	DUP									
Conductivity		122		123	umhos/cm	0.981		(0%-10%)	HXC1	03/12/18	12:45
QC1203987912	LCS										
Conductivity	1410			1400	umhos/cm		99.4	(95%-105%)		03/12/18	12:39

Notes:

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

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QC Summary

Workorder: 445476

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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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 #: 2018-2089
Work Order #: 445476**

Product: Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Procedure: GL-RAD-A-011 REV# 26

Analytical Batch: 1745470

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445476002	CAAN-18-151444
445476006	CAAN-18-151451
1203986068	Method Blank (MB)
1203986069	445476002(CAAN-18-151444) Sample Duplicate (DUP)
1203986070	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Blank Information

Aliquots for samples 1203986068 (MB) and 1203986070 (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.

Tracer/Carrier Yield

The QC sample (see below) did not meet the client's yield requirement; however, GEL's standard yield requirement was met and the duplicate sample met the client's yield requirement. The QC sample and duplicate meet the duplication requirement and they are both non-detects.

Sample	Analyte	Value
445476002 (CAAN-18-151444)	Americium-243 Tracer	124* (50%-105%)

Technical Information

Recounts

Samples 1203986069 (CAAN-18-151444DUP) and 445476002 (CAAN-18-151444) were recounted due to high carrier/tracer yield. The recounts are reported. Sample 1203986068 (MB) was recounted due to a peak shift. The recount is reported.

Product: ISOPU

Analytical Method: HASL-300:ISOPU

Analytical Procedure: GL-RAD-A-011 REV# 26

Analytical Batch: 1745471

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445476002	CAAN-18-151444
445476006	CAAN-18-151451
1203986071	Method Blank (MB)
1203986072	445476002(CAAN-18-151444) Sample Duplicate (DUP)
1203986073	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Blank Information

Aliquots for samples 1203986071 (MB) and 1203986073 (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.

Product: IsoU

Analytical Method: HASL-300:ISOU

Analytical Procedure: GL-RAD-A-011 REV# 26

Analytical Batch: 1745472

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445476002	CAAN-18-151444
445476006	CAAN-18-151451
1203986074	Method Blank (MB)
1203986075	445476002(CAAN-18-151444) Sample Duplicate (DUP)
1203986076	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Blank Information

Aliquots for samples 1203986074 (MB) and 1203986076 (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.

CSU

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

Sample	Analyte	Value
1203986074 (MB)	Uranium-233/234, Uranium-235/236 and Uranium-238	Blank result > 1.65 CSU

Technical Information

Recounts

Samples 1203986075 (CAAN-18-151444DUP) and 445476002 (CAAN-18-151444) were recounted due to high relative percent difference/relative error ratio. The recounts are reported.

Product: Gammaspec

Analytical Method: EPA:901.1

Analytical Procedure: GL-RAD-A-013 REV# 27

Analytical Batch: 1745746

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445476002	CAAN-18-151444
445476006	CAAN-18-151451
1203986695	Method Blank (MB)
1203986696	445476002(CAAN-18-151444) Sample Duplicate (DUP)
1203986697	Laboratory Control Sample (LCS)

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

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: GFPC, Sr90, liquid

Analytical Method: EPA:905.0

Analytical Procedure: GL-RAD-A-004 REV# 19

Analytical Batch: 1746698

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445476002	CAAN-18-151444
445476006	CAAN-18-151451
1203988669	Method Blank (MB)
1203988670	445591005(CAAN-18-151491) Sample Duplicate (DUP)
1203988671	445591005(CAAN-18-151491) Matrix Spike (MS)
1203988672	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Blank Information

Aliquots for samples 1203988669 (MB) and 1203988672 (LCS) were changed to 1.0 per client request.

Duplication Criteria between QC Sample and Duplicate Sample

The QC Sample and the Duplicate, (See Below), did not meet the relative error ratio requirement; however, both sample and duplicate results are less than the minimum detectable concentration.

Sample	Analyte	Value
1203988670 (CAAN-18-151491DUP)	Strontium-90	RPD 0 N/A RER 1.03* (0-1)

Technical Information

Recounts

Sample 1203988672 (LCS) was recounted due to low recovery. The recount is reported. Sample 1203988671 (CAAN-18-151491MS) was recounted due to high recovery. The recount is reported. Sample 1203988670 (CAAN-18-151491DUP) was recounted due to a suspected false positive. The recount is reported.

Miscellaneous Information

Additional Comments

The matrix spike, 1203988671 (CAAN-18-151491MS), aliquot was reduced to conserve sample volume.

Product: WSP-GrossA/B

Analytical Method: EPA 900.0/SW846 9310

Analytical Procedure: GL-RAD-A-001 REV# 19

Analytical Batch: 1746730

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
------------------------------	--

445476002	CAAN-18-151444
445476006	CAAN-18-151451
1203988747	Method Blank (MB)
1203988748	445591003(CAAN-18-151479) Sample Duplicate (DUP)
1203988749	445591003(CAAN-18-151479) Matrix Spike (MS)
1203988750	445591003(CAAN-18-151479) Matrix Spike Duplicate (MSD)
1203988751	Laboratory Control Sample (LCS)

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

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Blank Information

Aliquots for samples 1203988747 (MB) and 1203988751 (LCS) were changed to 1.0 per client request.

Blank Decision Level

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

Sample	Analyte	Value
1203988747 (MB)	BETA	Blank result > DL

Technical Information

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.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1203988749 (CAAN-18-151479MS) and 1203988750 (CAAN-18-151479MSD), aliquots were reduced to conserve sample volume.

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: 2018-2089 GEL Work Order: 445476

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature:



Name: Kate Gellatly

Date: 30 MAR 2018

Title: Analyst I

Sample Data Summary

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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Report Date: March 30, 2018

Client Sample ID: CAAN-18-151444
Sample ID: 445476002
Matrix: W
Collect Date: 06-MAR-18
Receive Date: 08-MAR-18
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
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Rad Alpha Spec Analysis

Alphaspec Am241 Liquid "As Received"

Americium-241	U	0.00588	+/-0.00464	0.0275	0.0118	+/-0.00465	0.050	pCi/L			HAKB	03/17/18	1536	1745470	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	-0.00623	+/-0.00804	0.0441	0.0192	+/-0.00804	0.050	pCi/L			HAKB	03/15/18	1256	1745471	2
Plutonium-239/240	U	0.00415	+/-0.00831	0.0475	0.0209	+/-0.00831	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.294	+/-0.0284	0.0869	0.0402	+/-0.032	1.00	pCi/L			HAKB	03/19/18	1007	1745472	3
Uranium-235/236	U	0.0412	+/-0.015	0.0412	0.0166	+/-0.0151	1.00	pCi/L							
Uranium-238		0.193	+/-0.0227	0.0532	0.0234	+/-0.0245	0.500	pCi/L							

Rad Gamma Spec Analysis

Gammasespec "As Received"

Cesium-137	U	-2.0	+/-1.48	4.86	2.15	+/-1.55	8.00	pCi/L			BSW1	03/09/18	1051	1745746	4
Cobalt-60	U	0.284	+/-1.14	4.75	1.96	+/-1.15	8.00	pCi/L							
Neptunium-237	U	1.55	+/-2.34	8.99	4.11	+/-2.36		pCi/L							
Potassium-40	U	14.3	+/-26.7	48.2	20.0	+/-26.7		pCi/L							
Sodium-22	U	0.833	+/-1.25	4.89	2.05	+/-1.27		pCi/L							

Rad Gas Flow Proportional Counting

GFPC, Sr90, liquid "As Received"

Strontium-90	U	0.287	+/-0.125	0.388	0.165	+/-0.127	0.500	pCi/L			KSD1	03/17/18	1338	1746698	5
<i>WSP-GrossA/B "As Received"</i>															
Beta	U	1.12	+/-0.656	2.15	0.915	+/-0.663	3.00	pCi/L			AXH4	03/23/18	1230	1746730	6
Alpha	U	-0.0876	+/-0.280	1.82	0.520	+/-0.281	3.00	pCi/L			AXH4	03/26/18	1138	1746730	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"	1745470	124 *	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1745471	83.9	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1745472	73.7	(50%-105%)

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Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAAN-18-151444

Sample ID: 445476002

Report Date: March 30, 2018

Project: ESHL00114

Client ID: ARSL004

Parameter	Qualifier	Result Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test							Batch ID	Recovery%	Acceptable Limits				
Strontium Carrier		GFPC, Sr90, liquid "As Received"						1746698	97.7	(50%-105%)				

Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAAN-18-151451

Sample ID: 445476006

Matrix: W

Collect Date: 06-MAR-18

Receive Date: 08-MAR-18

Collector: Client

Report Date: March 30, 2018

Project: ESHL00114

Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241	U	0.00411	+/-0.00769	0.0385	0.0164	+/-0.00769	0.050	pCi/L			HAKB	03/15/18	1256	1745470	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	0.0131	+/-0.00618	0.0463	0.0202	+/-0.0062	0.050	pCi/L			HAKB	03/15/18	1256	1745471	2
Plutonium-239/240	U	0.00218	+/-0.00578	0.050	0.022	+/-0.00578	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.365	+/-0.0346	0.104	0.0483	+/-0.0394	1.00	pCi/L			HAKB	03/15/18	1235	1745472	3
Uranium-235/236		0.0635	+/-0.0173	0.0494	0.0199	+/-0.0176	1.00	pCi/L							
Uranium-238		0.214	+/-0.0263	0.0637	0.028	+/-0.0284	0.500	pCi/L							
Rad Gamma Spec Analysis															
<i>Gammasespec "As Received"</i>															
Cesium-137	U	0.242	+/-1.66	6.56	2.77	+/-1.66	8.00	pCi/L			BSW1	03/09/18	1052	1745746	4
Cobalt-60	U	-2.83	+/-1.93	6.43	2.41	+/-2.04	8.00	pCi/L							
Neptunium-237	U	-0.478	+/-3.45	11.9	5.33	+/-3.45		pCi/L							
Potassium-40	U	22.4	+/-27.9	121	52.5	+/-28.4		pCi/L							
Sodium-22	U	2.41	+/-2.25	9.98	4.21	+/-2.32		pCi/L							
Rad Gas Flow Proportional Counting															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	-0.0232	+/-0.111	0.432	0.187	+/-0.112	0.500	pCi/L			KSD1	03/17/18	1338	1746698	5
<i>WSP-GrossA/B "As Received"</i>															
Beta	U	1.55	+/-0.765	2.44	1.06	+/-0.776	3.00	pCi/L			AXH4	03/23/18	1230	1746730	6
Alpha	U	0.760	+/-0.599	2.09	0.686	+/-0.602	3.00	pCi/L			AXH4	03/26/18	1138	1746730	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"	1745470	93.7	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1745471	91	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1745472	72.8	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1746698	97.7	(50%-105%)

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Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAAN-18-151451

Sample ID: 445476006

Report Date: March 30, 2018

Project: ESHL00114

Client ID: ARSL004

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

Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

Quality Control Summary

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QC Summary

Report Date: March 30, 2018

Page 1 of 6

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

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 445476

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1745470										
QC1203986069	445476002	DUP									
Americium-241	U	0.00588	U	0.00171	pCi/L	0.213		(0-1)	HAKB	03/17/18	15:36
	Uncert:	+/-0.00464		+/-0.00513							
	TPU:	+/-0.00465		+/-0.00513							
**Americium-243 Tracer	2.62	3.25		2.48	pCi/L		94.6	(50%-105%)			
	Uncert:	+/-0.0619		+/-0.0669							
	TPU:	+/-0.124		+/-0.129							
QC1203986070	LCS										
Americium-241	1.97			2.03	pCi/L		103	(80%-120%)	HAKB	03/15/18	12:56
	Uncert:			+/-0.0601							
	TPU:			+/-0.108							
**Americium-243 Tracer	2.10			1.65	pCi/L		78.6	(50%-105%)			
	Uncert:			+/-0.0607							
	TPU:			+/-0.111							
QC1203986068	MB										
Americium-241			U	0.00672	pCi/L				HAKB	03/17/18	15:36
	Uncert:			+/-0.00752							
	TPU:			+/-0.00752							
**Americium-243 Tracer	2.10			1.76	pCi/L		84.1	(50%-105%)			
	Uncert:			+/-0.0595							
	TPU:			+/-0.110							
Batch	1745471										
QC1203986072	445476002	DUP									
Plutonium-238	U	-0.00623	U	-0.0055	pCi/L	0.0302		(0-1)	HAKB	03/15/18	12:56
	Uncert:	+/-0.00804		+/-0.0041							
	TPU:	+/-0.00804		+/-0.0041							
Plutonium-239/240	U	0.00415	U	0.00183	pCi/L	0.0753		(0-1)			
	Uncert:	+/-0.00831		+/-0.0071							
	TPU:	+/-0.00831		+/-0.0071							
**Plutonium-242 Tracer	2.47	2.07		2.31	pCi/L		93.5	(50%-105%)			
	Uncert:	+/-0.0719		+/-0.0677							
	TPU:	+/-0.123		+/-0.118							
QC1203986073	LCS										
Plutonium-238			U	0.0295	pCi/L			(80%-120%)	HAKB	03/15/18	12:56
	Uncert:			+/-0.0126							
	TPU:			+/-0.0127							
Plutonium-239/240	1.98			2.10	pCi/L		106	(80%-120%)			
	Uncert:			+/-0.0669							
	TPU:			+/-0.113							
**Plutonium-242 Tracer	1.98			1.50	pCi/L		76	(50%-105%)			
	Uncert:			+/-0.0648							
	TPU:			+/-0.107							

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QC Summary

Workorder: 445476

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1745471										
QC1203986071	MB										
Plutonium-238			U	0.0103	pCi/L				HAKB	03/15/18	12:56
				Uncert: +/-0.00728							
				TPU: +/-0.00729							
Plutonium-239/240			U	0.012	pCi/L						
				Uncert: +/-0.00823							
				TPU: +/-0.00824							
**Plutonium-242 Tracer	1.98			1.74	pCi/L		87.9	(50%-105%)			
				Uncert: +/-0.0592							
				TPU: +/-0.101							
Batch	1745472										
QC1203986075	445476002	DUP									
Uranium-234		0.294		0.374	pCi/L	0.601		(0-1)	HAKB	03/19/18	10:07
		Uncert: +/-0.0284		+/-0.0295							
		TPU: +/-0.032		+/-0.0346							
Uranium-235/236		U	0.0412	0.0594	pCi/L	0.318		(0-1)			
		Uncert: +/-0.015		+/-0.0132							
		TPU: +/-0.0151		+/-0.0135							
Uranium-238		0.193		0.146	pCi/L	0.508		(0-1)			
		Uncert: +/-0.0227		+/-0.0199							
		TPU: +/-0.0245		+/-0.0211							
**Uranium-232 Tracer	2.61	1.92		2.15	pCi/L		82.4	(50%-105%)			
		Uncert: +/-0.0814		+/-0.0765							
		TPU: +/-0.150		+/-0.145							
QC1203986076	LCS										
Uranium-234				2.71	pCi/L				HAKB	03/15/18	12:35
		Uncert: +/-0.0664		+/-0.0664							
		TPU: +/-0.144		+/-0.144							
Uranium-235/236				0.183	pCi/L						
		Uncert: +/-0.0197		+/-0.0197							
		TPU: +/-0.0214		+/-0.0214							
Uranium-238	2.70			2.64	pCi/L		97.8	(80%-120%)			
		Uncert: +/-0.0655		+/-0.0655							
		TPU: +/-0.140		+/-0.140							
**Uranium-232 Tracer	2.09			1.82	pCi/L		87.3	(50%-105%)			
		Uncert: +/-0.0595		+/-0.0595							
		TPU: +/-0.114		+/-0.114							
QC1203986074	MB										
Uranium-234			U	0.0304	pCi/L				HAKB	03/15/18	12:35
		Uncert: +/-0.0111		+/-0.0111							
		TPU: +/-0.0113		+/-0.0113							
Uranium-235/236			U	0.0114	pCi/L						
		Uncert: +/-0.00687		+/-0.00687							
		TPU: +/-0.00689		+/-0.00689							
Uranium-238			U	0.013	pCi/L						
		Uncert: +/-0.00717		+/-0.00717							
		TPU: +/-0.0072		+/-0.0072							

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QC Summary

Workorder: 445476

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1745472										
**Uranium-232 Tracer											
	2.09			1.66	pCi/L		79.7	(50%-105%)			
	Uncert:			+/-0.0631							
	TPU:			+/-0.118							
Rad Gamma Spec											
Batch	1745746										
QC1203986696 445476002 DUP											
Cesium-137	U	-2.0	U	0.340	pCi/L	0.406		(0-1)	BSW1	03/09/18	13:26
	Uncert:	+/-1.48		+/-1.33							
	TPU:	+/-1.55		+/-1.34							
Cobalt-60	U	0.284	U	1.32	pCi/L	0.205		(0-1)			
	Uncert:	+/-1.14		+/-1.36							
	TPU:	+/-1.15		+/-1.39							
Neptunium-237	U	1.55	U	-0.918	pCi/L	0.261		(0-1)			
	Uncert:	+/-2.34		+/-2.35							
	TPU:	+/-2.36		+/-2.36							
Potassium-40	U	14.3	U	-8.77	pCi/L	0.274		(0-1)			
	Uncert:	+/-26.7		+/-15.3							
	TPU:	+/-26.7		+/-15.5							
Sodium-22	U	0.833	U	-0.429	pCi/L	0.258		(0-1)			
	Uncert:	+/-1.25		+/-1.17							
	TPU:	+/-1.27		+/-1.18							
QC1203986697 LCS											
Americium-241	34300			34400	pCi/L		100	(80%-120%)	BSW1	03/09/18	11:05
	Uncert:			+/-332							
	TPU:			+/-1720							
Cesium-137	12900			13200	pCi/L		102	(80%-120%)			
	Uncert:			+/-191							
	TPU:			+/-587							
Cobalt-60	10800			10900	pCi/L		101	(80%-120%)			
	Uncert:			+/-195							
	TPU:			+/-494							
Neptunium-237			U	-76.9	pCi/L						
	Uncert:			+/-59.0							
	TPU:			+/-61.7							
Potassium-40			U	87.7	pCi/L						
	Uncert:			+/-115							
	TPU:			+/-117							
Sodium-22			U	34.2	pCi/L						
	Uncert:			+/-23.1							
	TPU:			+/-24.4							
QC1203986695 MB											
Cesium-137			U	-1.19	pCi/L				BSW1	03/09/18	10:52
	Uncert:			+/-1.05							
	TPU:			+/-1.09							
Cobalt-60			U	1.73	pCi/L						
	Uncert:			+/-1.41							

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QC Summary

Workorder: 445476

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gamma Spec											
Batch	1745746										
Neptunium-237	TPU:			+/-1.47							
			U	1.50	pCi/L						
	Uncert:			+/-2.19							
Potassium-40	TPU:			+/-2.21							
			U	-25.6	pCi/L						
	Uncert:			+/-13.5							
Sodium-22	TPU:			+/-14.7							
			U	0.488	pCi/L						
	Uncert:			+/-1.01							
	TPU:			+/-1.01							
Rad Gas Flow											
Batch	1746698										
QC1203988670	445591005	DUP									
Strontium-90	U	-0.199	U	0.258	pCi/L	1.03		(0-1)	KSD1	03/19/18	10:51
	Uncert:	+/-0.114		+/-0.107							
	TPU:	+/-0.114		+/-0.109							
**Strontium Carrier	4.30	3.60		3.40	mg		79.1	(50%-105%)			
QC1203988672	LCS										
Strontium-90	23.5			24.3	pCi/L		103	(80%-120%)	KSD1	03/19/18	10:51
	Uncert:			+/-0.589							
	TPU:			+/-2.03							
**Strontium Carrier	4.30			3.30	mg		76.7	(50%-105%)			
QC1203988669	MB										
Strontium-90			U	0.0481	pCi/L				KSD1	03/17/18	13:39
	Uncert:			+/-0.118							
	TPU:			+/-0.118							
**Strontium Carrier	4.30			3.20	mg		74.4	(50%-105%)			
QC1203988671	445591005	MS									
Strontium-90	235	U	-0.199	288	pCi/L		122	(75%-125%)	KSD1	03/19/18	10:51
	Uncert:		+/-0.114	+/-6.91							
	TPU:		+/-0.114	+/-24.8							
**Strontium Carrier	4.30	3.60		2.80	mg		65.1	(50%-105%)			
Batch	1746730										
QC1203988748	445591003	DUP									
Alpha	U	-0.626	U	-0.36	pCi/L	0.245		(0-1)	AXH4	03/26/18	11:38
	Uncert:	+/-0.224		+/-0.318							
	TPU:	+/-0.225		+/-0.319							
Beta	U	0.911	U	0.766	pCi/L	0.0569		(0-1)		03/23/18	12:30
	Uncert:	+/-0.668		+/-0.598							
	TPU:	+/-0.672		+/-0.602							
QC1203988751	LCS										
Alpha	12.1			13.5	pCi/L		112	(80%-120%)	AXH4	03/26/18	11:38
	Uncert:			+/-0.606							
	TPU:			+/-1.31							
Beta	47.0			50.3	pCi/L		107	(80%-120%)		03/23/18	12:30

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QC Summary

Workorder: 445476

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1746730										
				Uncert:							
				TPU:							
QC1203988747	MB										
Alpha			U	-0.01	pCi/L				AXH4	03/26/18	11:38
				Uncert:							
				TPU:							
Beta			U	0.134	pCi/L					03/23/18	12:30
				Uncert:							
				TPU:							
QC1203988749	445591003	MS									
Alpha		403	U	-0.626	398	pCi/L		98.8	(75%-125%)	AXH4	03/26/18
				Uncert:							
				TPU:							
Beta		1570	U	0.911	1680	pCi/L		107	(75%-125%)		03/23/18
				Uncert:							
				TPU:							
QC1203988750	445591003	MSD									
Alpha		403	U	-0.626	408	pCi/L	0.0625	101	(0-1)	AXH4	03/26/18
				Uncert:							
				TPU:							
Beta		1570	U	0.911	1640	pCi/L	0.0687	105	(0-1)		03/23/18
				Uncert:							
				TPU:							

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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QC Summary

Workorder: 445476

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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.