

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]

[illegible]



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"/>	<input type="checkbox"/>	
Field Test for Explosives Results	YES	NO	NA
HE SPOT test result positive. If YES - Do not transport.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

TEST - Field Screen	YES	NO			
The sample has field screening measurements of alpha and beta activity?	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Sample Activity (dpm/100cm <sup>2</sup> )	Shipment Activity (dpm*g/100cm <sup>2</sup> )	Sampled Location	YES	NO	NA
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 type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Alpha ≥ 125	AND Alpha ≥ 1,250,000	AT other locations	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Beta ≥ 1,500	AND Beta ≥ 15,000,000	AT any location	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
The sample Alpha ≥ 16,000,000 dpm*g/100cm <sup>2</sup> or Beta ≥ 160,000,000 dpm*g/100cm <sup>2</sup> . If YES - Do not ship.			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
On the external surface of the sample container, alpha activity ≥ 24 dpm/cm <sup>2</sup> , beta activity ≥ 240 dpm/cm <sup>2</sup> , or surface activity ≥ 0.5 mR/hr. If YES - Do not ship.			<input type="checkbox"/>	<input type="checkbox"/>	<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 type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

TEST - Location	YES	NO		
Prior analytical measurements of radioactive isotopes are available?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Sample Activity (pCi/g)	Shipment Activity (pCi)	YES	NO	NA
Am-241 ≥ 27 pCi/g	AND Am-241 ≥ 270,000 pCi Total	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Cs-137 ≥ 270 pCi/g	AND Cs-137 ≥ 270,000 pCi Total	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pu-238 ≥ 27 pCi/g	AND Pu-238 ≥ 270,000 pCi Total	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pu-239/240 ≥ 27 pCi/g	AND Pu-239/240 ≥ 270,000 pCi Total	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Th-228 ≥ 27 pCi/g	AND Th-228 ≥ 270,000 pCi Total	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
U-234 ≥ 270 pCi/g	AND U-234 ≥ 1,600,000,000 pCi Total	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
U-238 ≥ 270 pCi/g	AND U-238 ≥ unlimited	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
H-3 ≥ 27,000,000 pCi/g	AND H-3 ≥ 27,000,000,000 pCi Total	<input type="checkbox"/>	<input type="checkbox"/>	<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"/>	<input 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 type="checkbox"/>	<input checked="" type="checkbox"/>

TEST - AK	YES	NO	NA
The shippers documented knowledge of the sample positively identifies appropriate labeling.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Documented Field Team Member Statement	YES	NO	NA
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 type="checkbox"/>	<input type="checkbox"/>	<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
(Printed Name) Tanya Vanderk (Signature) Tanya Vanderk	3-7-18 1320

Hazard Assessment Reviewed	Date/Time
(Printed Name) Rane Osh (Signature) Rane Osh	3/7/18 1320



## DATA VALIDATION REPORT

Chain Of Custody No. 2018-2098

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
445591	EPA:120.1	1				
445591	EPA:150.1	1				
445591	EPA:160.1	1				
445591	EPA:170.0	2		1		
445591	EPA:245.2	2				
445591	EPA:300.0	1				
445591	EPA:310.1	1				
445591	EPA:335.4	1				
445591	EPA:350.1	1				
445591	EPA:351.2	1				
445591	EPA:353.2	1				
445591	EPA:365.4	1				
445591	EPA:900	1				
445591	EPA:901.1	1				
445591	EPA:905.0	1				
445591	HASL-300:AM-241	1				
445591	HASL-300:ISOPU	1				
445591	HASL-300:ISOU	1				
445591	SM:A2340B	1				
445591	SW-846:6010C	1				
445591	SW-846:6020	1				
445591	SW-846:6850	1				
445591	SW-846:8260B	1		1		
445591	SW-846:8270D	1				
445591	SW-846:8330B	1				
445591	SW-846:9060	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
445591	EPA:120.1	1746355	1746355	1										1			1				
445591	EPA:150.1	1745501	1745501	1										1			1				
445591	EPA:160.1	1746580	1746580	1					1					1			1				
445591	EPA:170.0	NA	NA	2		1															
445591	EPA:245.2	1746590	1746589	2					1	1				1			1				
445591	EPA:300.0	1746518	1746518	1					1					1			1				
445591	EPA:310.1	1745500	1745500	1						1				1			1				
445591	EPA:335.4	1746224	1746223	1					1	2				1	1		2				
445591	EPA:350.1	1746244	1746243	1					1	1				1			1				
445591	EPA:350.1	1746883	1746882						1	1				1			1				
445591	EPA:351.2	1746248	1746247	1					1	1				1			1				
445591	EPA:353.2	1746242	1746242	1					1					1			1				
445591	EPA:365.4	1744746	1744745	1					1	2				1			2				
445591	EPA:900	1746730	1746730	1					1	1	1			1			1				
445591	EPA:901.1	1746229	1746229	1					1					1			1				
445591	EPA:905.0	1746698	1746698	1					1	1				1			1				
445591	HASL-300:AM-241	1746071	1746071	1					1					1			1				
445591	HASL-300:ISOPU	1746072	1746072	1					1					1			1				
445591	HASL-300:ISOU	1746073	1746073	1					1					1			1				
445591	SM:A2340B	1751872	1751872	1																	
445591	SW-846:6010C	1745995	1745994	1					1	1				1			1				
445591	SW-846:6020	1746000	1745999	1					1	1				1			1				
445591	SW-846:6850	1746747	1746744	1					1	1	1			1							
445591	SW-846:8260B	1746875	1746875	1		1			1					2							
445591	SW-846:8270D	1746893	1746892	1					1	1	1			1							
445591	SW-846:8330B	1746310	1746309	1					1	1	1			1							
445591	SW-846:9060	1746313	1746313	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-18-151446	445591001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAAN-18-151479	445591003	PEB	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203987912	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAAN-18-151446	445591001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAAN-18-151479	445591003	PEB	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-18-151446	1203988421	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAAN-18-151446	445591001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAAN-18-151479	445591003	PEB	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203988417	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203988416	MB	1	0	0	0
EPA:170.0	VOC	CAAN-18-151446	445591001	REG	1	0	0	0
EPA:170.0	VOC	CAAN-18-151449	445591002	FTB	1	0	0	0
EPA:170.0	VOC	CAAN-18-151479	445591003	PEB	1	0	0	0
EPA:170.0	VOC	CAAN-18-151491	445591006	REG	1	0	0	0
EPA:245.2	INORGANIC	CAAN-18-151446	1203988466	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAAN-18-151446	1203988467	MS	0	0	1	0
EPA:245.2	INORGANIC	CAAN-18-151446	445591001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAAN-18-151479	445591003	PEB	1	0	0	0
EPA:245.2	INORGANIC	CAAN-18-151491	445591005	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203988465	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203988464	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAAN-18-151446	1203988268	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAAN-18-151446	445591001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAAN-18-151479	445591003	PEB	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203988267	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203988266	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAAN-18-151446	445591001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAAN-18-151479	445591003	PEB	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-18-151479	1203987614	DUP	1	0	0	0
EPA:335.4	INORGANIC	CAAN-18-151479	1203987618	MS	0	0	1	0
EPA:335.4	INORGANIC	CAAN-18-151479	445591003	PEB	1	0	0	0
EPA:335.4	INORGANIC	CAAN-18-151491	445591005	REG	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203987610	LCS	0	0	1	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	LCSD	1203987611	LCSD	0	0	1	0
EPA:335.4	INORGANIC	MB	1203987609	MB	1	0	0	0
EPA:335.4	INORGANIC	NP160-18-150760	1203987613	DUP	1	0	0	0
EPA:335.4	INORGANIC	NP160-18-150760	1203987617	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAAN-18-151446	1203987673	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAAN-18-151446	1203987674	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAAN-18-151446	445591001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAAN-18-151479	445591003	PEB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-18-151436	1203989095	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-18-151436	1203989096	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203987672	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203989094	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203987671	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203989093	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAAN-18-151479	1203987681	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAAN-18-151479	1203987682	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAAN-18-151479	445591003	PEB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAAN-18-151491	445591005	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203987680	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203987679	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAAN-18-151446	1203987668	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAAN-18-151446	445591001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAAN-18-151479	445591003	PEB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203987666	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203987665	MB	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-18-151446	445591001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAAN-18-151479	445591003	PEB	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-18-151479	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	CAAN-18-151479	445591003	PEB	2	0	0	0
EPA:900	RAD	CAAN-18-151491	445591005	REG	2	0	0	0
EPA:900	RAD	LCS	1203988751	LCS	0	0	2	0

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EPA:900	RAD	MB	1203988747	MB	2	0	0	0
EPA:901.1	RAD	CAAN-18-151479	1203987628	DUP	5	0	0	0
EPA:901.1	RAD	CAAN-18-151479	445591003	PEB	5	0	0	0
EPA:901.1	RAD	CAAN-18-151491	445591005	REG	5	0	0	0
EPA:901.1	RAD	LCS	1203987629	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203987627	MB	5	0	0	0
EPA:905.0	RAD	CAAN-18-151479	445591003	PEB	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	CAAN-18-151491	445591005	REG	1	0	0	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-18-151479	1203987276	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAAN-18-151479	445591003	PEB	1	0	0	0
HASL-300:AM-241	RAD	CAAN-18-151491	445591005	REG	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203987277	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203987275	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAAN-18-151479	1203987279	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAAN-18-151479	445591003	PEB	2	0	0	0
HASL-300:ISOPU	RAD	CAAN-18-151491	445591005	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203987280	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203987278	MB	2	0	0	0
HASL-300:ISOU	RAD	CAAN-18-151479	1203987282	DUP	3	0	0	0
HASL-300:ISOU	RAD	CAAN-18-151479	445591003	PEB	3	0	0	0
HASL-300:ISOU	RAD	CAAN-18-151491	445591005	REG	3	0	0	0
HASL-300:ISOU	RAD	LCS	1203987283	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203987281	MB	3	0	0	0
SM:A2340B	INORGANIC	CAAN-18-151446	445591001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAAN-18-151479	445591003	PEB	1	0	0	0
SW-846:6010C	INORGANIC	CAAN-18-151446	1203987137	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAAN-18-151446	1203987138	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAAN-18-151446	445591001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAAN-18-151479	445591003	PEB	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203987136	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203987135	MB	17	0	0	0
SW-846:6020	INORGANIC	CAAN-18-151446	1203987150	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAAN-18-151446	1203987151	MS	0	0	11	0
SW-846:6020	INORGANIC	CAAN-18-151446	445591001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAAN-18-151479	445591003	PEB	11	0	0	0

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SW-846:6020	INORGANIC	LCS	1203987149	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203987148	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAAN-18-151446	445591001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAAN-18-151479	445591003	PEB	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-18-151449	445591002	FTB	80	3	0	0
SW-846:8260B	VOC	CAAN-18-151479	445591003	PEB	80	3	0	0
SW-846:8260B	VOC	CAAN-18-151491	445591005	REG	80	3	0	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	1203993951	MB	80	3	0	0
SW-846:8270D	SVOC	CAAN-18-151479	1203989123	MS	0	6	76	0
SW-846:8270D	SVOC	CAAN-18-151479	1203989124	MSD	0	6	76	0
SW-846:8270D	SVOC	CAAN-18-151479	445591003	PEB	80	6	0	0
SW-846:8270D	SVOC	CAAN-18-151491	445591005	REG	80	6	0	0
SW-846:8270D	SVOC	LCS	1203989122	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203989121	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-18-151479	445591004	PEB	20	1	0	0
SW-846:8330B	LCMS/MS HIGH	CAAN-18-151491	445591006	REG	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-18-151479	445591003	PEB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAAN-18-151491	445591005	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-18-151437	1203988644	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203988643	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203988642	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

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	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-18-151449	445591002	SW-846:8260B	03-07-2018		03-21-2018	NA				14	14	15	X
CAAN-18-151479	445591003	SW-846:8260B	03-07-2018		03-21-2018	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	1203987135	METHOD BLANK	SW-846:6010C	W	Zinc	-3.54	J	ug/L	10.0
MB	1203987679	METHOD BLANK	EPA:351.2	W	Total Kjeldahl Nitrogen	0.0477	J	mg/L	0.100
CAAN-18-151449	445591002	TRIP BLANK	EPA:170.0	W	Temperature	4		Deg C	

Field Sample ID	Blank Lab	Blank Type	Analytical Method	Parameter Name	Blank Lab Result	Blank Lab Units	Lab Result	Lab Qualifier	Lab Detection Limit	Detect Flag	Detect to Nondetect Factor	Detect to Estimated Factor	Use Factors
CAAN-18-151491	1203987679	METHOD BLANK	EPA:351.2	Total Kjeldahl Nitrogen	0.0477	mg/L	0.893		0.100	Y	5	100	Y
CAAN-18-151446	1203987135	METHOD BLANK	SW-846:6010C	Zinc	-3.54	ug/L	3.30	U	10.0	N	5	100	Y
CAAN-18-151479	1203987135	METHOD BLANK	SW-846:6010C	Zinc	-3.54	ug/L	3.30	U	10.0	N	5	100	Y

6. Any surrogate recoveries outside the control limits?

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

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

No.

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	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-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	-0.00186	pCi/L	-0.00186	pCi/L	0.0348	0.010	W	03/07/2018		1746071	VAL	Y
R-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	0.86	pCi/L	0.86	pCi/L	3.63	0.995	W	03/07/2018		1746229	VAL	Y
R-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	1.85	pCi/L	1.85	pCi/L	4.06	0.965	W	03/07/2018		1746229	VAL	Y
R-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	-0.626	pCi/L	-0.626	pCi/L	1.87	0.224	W	03/07/2018		1746730	VAL	Y
R-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	0.911	pCi/L	0.911	pCi/L	2.25	0.668	W	03/07/2018		1746730	VAL	Y
R-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	2.19	pCi/L	2.19	pCi/L	6.42	1.72	W	03/07/2018		1746229	VAL	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

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-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.00796	pCi/L	0.00796	pCi/L	0.0422	0.00629	W	03/07/2018		1746072	VAL	Y
R-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.00597	pCi/L	0.00597	pCi/L	0.0455	0.00597	W	03/07/2018		1746072	VAL	Y
R-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	0.696	pCi/L	0.696	pCi/L	35.6	21.4	W	03/07/2018		1746229	VAL	Y
R-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-0.257	pCi/L	-0.257	pCi/L	3.37	1.08	W	03/07/2018		1746229	VAL	Y
R-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	0.0514	pCi/L	0.0514	pCi/L	0.353	0.0973	W	03/07/2018		1746698	VAL	Y
R-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	HASL-300:ISOU	Uranium-234	U	U	R5	N	0.0484	pCi/L	0.0484	pCi/L	0.0798	0.0131	W	03/07/2018		1746073	VAL	Y
R-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0216	pCi/L	0.0216	pCi/L	0.0378	0.0101	W	03/07/2018		1746073	VAL	Y
R-30	2018-2098	CAAN-18-151479	PEB	INIT	RAD	HASL-300:ISOU	Uranium-238	U	U	R5	N	0.00874	pCi/L	0.00874	pCi/L	0.0488	0.00757	W	03/07/2018		1746073	VAL	Y
R-30	2018-2098	CAAN-18-151491	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0	pCi/L	0	pCi/L	0.041	0.0103	W	03/07/2018		1746071	VAL	Y
R-30	2018-2098	CAAN-18-151491	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	1.74	pCi/L	1.74	pCi/L	3.01	0.989	W	03/07/2018		1746229	VAL	Y
R-30	2018-2098	CAAN-18-151491	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-0.22	pCi/L	-0.22	pCi/L	3.29	0.947	W	03/07/2018		1746229	VAL	Y
R-30	2018-2098	CAAN-18-151491	REG	INIT	RAD	EPA:900	Gross alpha	U	U	R5	N	0.711	pCi/L	0.711	pCi/L	2.27	0.627	W	03/07/2018		1746730	VAL	Y
R-30	2018-2098	CAAN-18-151491	REG	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	0.724	pCi/L	0.724	pCi/L	2.51	0.725	W	03/07/2018		1746730	VAL	Y
R-30	2018-2098	CAAN-18-151491	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	-1.04	pCi/L	-1.04	pCi/L	6.13	1.73	W	03/07/2018		1746229	VAL	Y
R-30	2018-2098	CAAN-18-151491	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.00634	pCi/L	0.00634	pCi/L	0.0448	0.00969	W	03/07/2018		1746072	VAL	Y
R-30	2018-2098	CAAN-18-151491	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.00000000705	pCi/L	0.00000000705	pCi/L	0.0484	0.00518	W	03/07/2018		1746072	VAL	Y
R-30	2018-2098	CAAN-18-151491	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-23	pCi/L	-23	pCi/L	40.2	11.9	W	03/07/2018		1746229	VAL	Y
R-30	2018-2098	CAAN-18-151491	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-0.182	pCi/L	-0.182	pCi/L	2.99	0.853	W	03/07/2018		1746229	VAL	Y
R-30	2018-2098	CAAN-18-151491	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.199	pCi/L	-0.199	pCi/L	0.499	0.114	W	03/07/2018		1746698	VAL	Y
R-30	2018-2098	CAAN-18-151491	REG	INIT	GENERAL CHEMISTRY	EPA:351.2	Total Kjeldahl Nitrogen		J+	I4a	Y	0.893	mg/L	0.893	mg/L			W	03/07/2018		1746248	VAL	Y
R-30	2018-2098	CAAN-18-151491	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0175	pCi/L	0.0175	pCi/L	0.0351	0.0109	W	03/07/2018		1746073	VAL	Y

### Reason Code

### Description

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 qualify the analyte as not detected and/or any other standard qualify. The analyte is detected in the sample.
R5	Analyte is not detected because the amount reported is less than the MDC.
U_LAB	The analytical laboratory qualified the analyte as not detected.

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## DATA VALIDATION REPORT

### 14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAAN-18-151446	R-30	REG	EPA:120.1	0	1
CAAN-18-151446	R-30	REG	EPA:150.1	0	1
CAAN-18-151446	R-30	REG	EPA:160.1	0	1
CAAN-18-151446	R-30	REG	EPA:170.0	0	1
CAAN-18-151446	R-30	REG	EPA:245.2	0	1
CAAN-18-151446	R-30	REG	EPA:300.0	0	4
CAAN-18-151446	R-30	REG	EPA:310.1	0	2
CAAN-18-151446	R-30	REG	EPA:350.1	0	1
CAAN-18-151446	R-30	REG	EPA:353.2	0	1
CAAN-18-151446	R-30	REG	EPA:365.4	0	1
CAAN-18-151446	R-30	REG	SM:A2340B	0	1
CAAN-18-151446	R-30	REG	SW-846:6010C	0	17
CAAN-18-151446	R-30	REG	SW-846:6020	0	11
CAAN-18-151446	R-30	REG	SW-846:6850	0	1
CAAN-18-151449	R-30	FTB	EPA:170.0	0	1
CAAN-18-151449	R-30	FTB	SW-846:8260B	0	80
CAAN-18-151479	R-30	PEB	EPA:120.1	0	1
CAAN-18-151479	R-30	PEB	EPA:150.1	0	1
CAAN-18-151479	R-30	PEB	EPA:160.1	0	1
CAAN-18-151479	R-30	PEB	EPA:170.0	0	1
CAAN-18-151479	R-30	PEB	EPA:245.2	0	1
CAAN-18-151479	R-30	PEB	EPA:300.0	0	4
CAAN-18-151479	R-30	PEB	EPA:310.1	0	2
CAAN-18-151479	R-30	PEB	EPA:335.4	0	1
CAAN-18-151479	R-30	PEB	EPA:350.1	0	1
CAAN-18-151479	R-30	PEB	EPA:351.2	0	1
CAAN-18-151479	R-30	PEB	EPA:353.2	0	1
CAAN-18-151479	R-30	PEB	EPA:365.4	0	1
CAAN-18-151479	R-30	PEB	EPA:900	0	2
CAAN-18-151479	R-30	PEB	EPA:901.1	0	5
CAAN-18-151479	R-30	PEB	EPA:905.0	0	1
CAAN-18-151479	R-30	PEB	HASL-300:AM-241	0	1
CAAN-18-151479	R-30	PEB	HASL-300:ISOPU	0	2
CAAN-18-151479	R-30	PEB	HASL-300:ISOU	0	3
CAAN-18-151479	R-30	PEB	SM:A2340B	0	1

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	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAAN-18-151479	R-30	PEB	SW-846:6010C	0	17
CAAN-18-151479	R-30	PEB	SW-846:6020	0	11
CAAN-18-151479	R-30	PEB	SW-846:6850	0	1
CAAN-18-151479	R-30	PEB	SW-846:8260B	0	80
CAAN-18-151479	R-30	PEB	SW-846:8270D	0	80
CAAN-18-151479	R-30	PEB	SW-846:8330B	0	20
CAAN-18-151479	R-30	PEB	SW-846:9060	0	1
CAAN-18-151491	R-30	REG	EPA:170.0	0	1
CAAN-18-151491	R-30	REG	EPA:245.2	0	1
CAAN-18-151491	R-30	REG	EPA:335.4	0	1
CAAN-18-151491	R-30	REG	EPA:351.2	0	1
CAAN-18-151491	R-30	REG	EPA:900	0	2
CAAN-18-151491	R-30	REG	EPA:901.1	0	5
CAAN-18-151491	R-30	REG	EPA:905.0	0	1
CAAN-18-151491	R-30	REG	HASL-300:AM-241	0	1
CAAN-18-151491	R-30	REG	HASL-300:ISOPU	0	2
CAAN-18-151491	R-30	REG	HASL-300:ISOU	0	3
CAAN-18-151491	R-30	REG	SW-846:8260B	0	80
CAAN-18-151491	R-30	REG	SW-846:8270D	0	80
CAAN-18-151491	R-30	REG	SW-846:8330B	0	20
CAAN-18-151491	R-30	REG	SW-846:9060	0	1

March 30, 2018

[gel.com](http://gel.com)

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

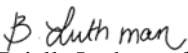
Re: LANL- WQH Water Samples  
Work Order: 445591  
SDG: 2018-2098

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on March 09, 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: 2018-2098  
Enclosures





**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 445591**  
**SDG: 2018-2098**

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# Case Narrative



**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 445591  
SDG # : 2018-2098**

**March 30, 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 09, 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:

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
445591001	CAAN-18-151446
445591002	CAAN-18-151449
445591003	CAAN-18-151479
445591004	CAAN-18-151479
445591005	CAAN-18-151491
445591006	CAAN-18-151491

**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 30 March 2018**

<b>State</b>	<b>Certification</b>
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**



**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>LANI ESTHL</u>		SDG/AR/COC/Work Order: <u>445591</u>
Received By: <u>JA</u>		Date Received: <u>3/9/18</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 5999-4°</u> , <u>5908 1783 5955-5°</u> <u>5908 1783 6002-4°</u> , <u>5908 1783 5988-3°</u> <u>5908 1783 6013-4°</u> , <u>5908 1783 5977-4°</u> , <u>5908 1783 5944-5°</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
Shipped as a DOT Hazardous?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hazard Class Shipped: _____ UN#: _____
COC/Samples marked or classified as radioactive?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/hr Classified as: Rad 1 Rad 2 Rad 3
Is package, COC, and/or Samples marked HAZ?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet Ice <u>Ice Packs</u> Dry ice None Other: *all temperatures are recorded in Celsius <span style="float: right;">TEMP: <u>see above</u></span>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>162-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A (If unknown, select No) VOA vials free of headspace? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Sample ID's and containers affected: <u>CAAL-18-151490 (1 vial) has headspace</u>
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected: <u>Did not receive 1 vial for CAAL-18-151490, rchem WST03-18-151811, rchem WST03-18-151816</u>
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

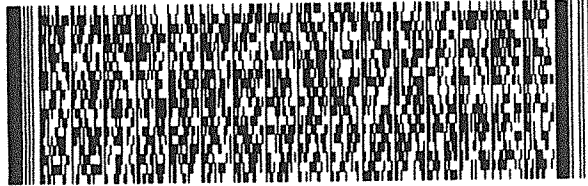
PM (or PMA) review: Initials BL Date 3/12/18 Page 1 of 1

TO: VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 656-8171

REF: P100B0ACPWJPM00LS10



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3 of 3

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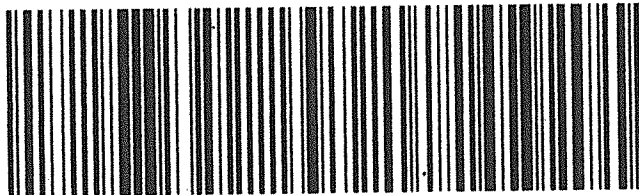
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FRI - 09 MAR 10:30A  
PRIORITY OVERNIGHT

X7 RBWA

29407  
SC-US CHS



TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

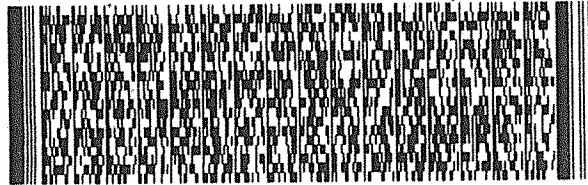
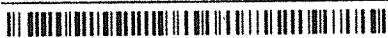
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2 of 2

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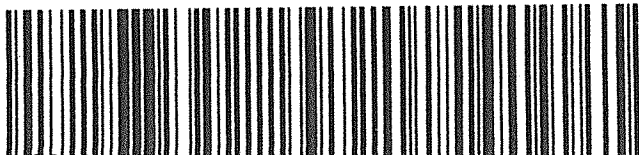
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X7 RBWA

29407  
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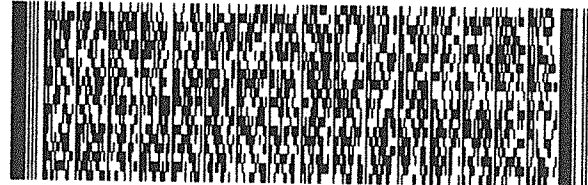
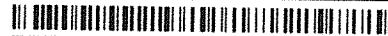


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2 of 3

MPS# 5908 1783 6002

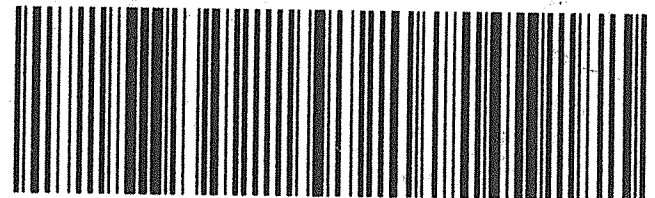
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TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

CAD: 0014176/CAFE2916

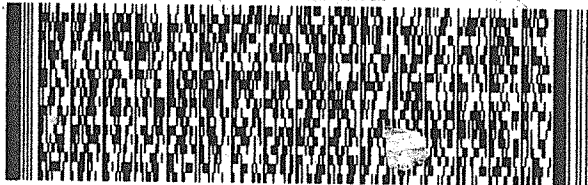
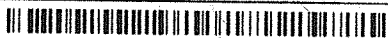
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2 of 2

MPS# 5908 1783 5988

Mstr# 5908 1783 5977

0201

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

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 08MAR18  
ACTWGT: 51.0 LB MAN  
CAD: 0014176/CAFE2916

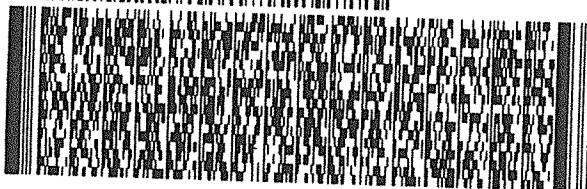
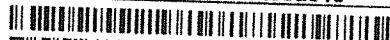
BILL SENDER

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GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: P100B0ACPWJPM00LS10



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1 of 3

TRK# 5908 1783 5999  
0201

## MASTER ##

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

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 08MAR18  
ACTWGT: 59.0 LB MAN  
CAD: 0014176/CAFE2916

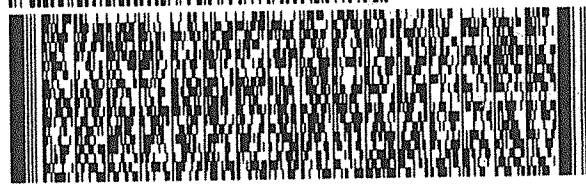
BILL SENDER

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GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: P100B0ACPWJPM00LS10



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1 of 2

TRK# 5908 1783 5977  
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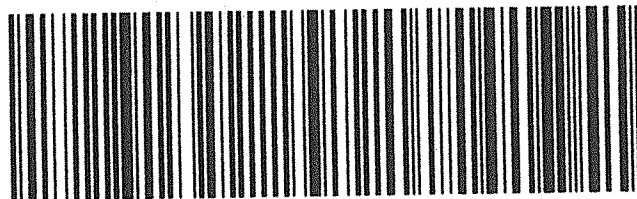
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ORIGIN ID:SAFA (505) 665-  
KEITH GREENE  
LOS ALAMOS NATL LAB.  
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

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REF: P100B0ACPWJPM00LS10



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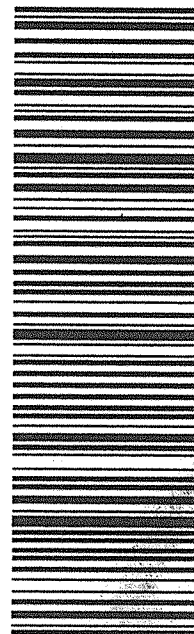
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PRIORITY OVERNIGHT

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## MASTER ##

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# **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 #: 2018-2098  
Work Order #: 445591**

**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).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445591002	CAAN-18-151449
445591003	CAAN-18-151479
445591005	CAAN-18-151491
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)
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 blank 1203993951 (MB) below the reporting limit.

**Miscellaneous Information**

**TIC Comment**

Tentatively identified compounds (TIC) may be requested for samples 445591002 (CAAN-18-151449), 445591003 (CAAN-18-151479) and 445591005 (CAAN-18-151491) 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: 2018-2098 GEL Work Order: 445591

#### The Qualifiers in this report are defined as follows:

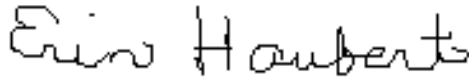
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- B The target analyte was detected in the associated blank.
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- DL Indicates 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: 2018-2098

Lab Sample ID: 445591002

Date Collected: 03/07/2018 11:24

Date Received: 03/09/2018 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Batch ID: 1746875

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Run Date: 03/21/2018 12:56

Inst: VOA6.I

Dilution: 1

Prep Date: 03/21/2018 12:56

Analyst: JP1

Purge Vol: 5 mL

Data File: 032118V6\6L308.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: 2018-2098

Lab Sample ID: 445591002

Date Collected: 03/07/2018 11:24

Date Received: 03/09/2018 08:55

Matrix: W

Client: ARSL004

Method: SW-846:8260B

Project: ESHL00114

Inst: VOA6.I

Analyst: JP1

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Client ID: CAAN-18-151449

Batch ID: 1746875

Run Date: 03/21/2018 12:56

Prep Date: 03/21/2018 12:56

Data File: 032118V6\6L308.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: 2018-2098

Lab Sample ID: 445591002

Date Collected: 03/07/2018 11:24

Date Received: 03/09/2018 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAAN-18-151449

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1746875

Inst: VOA6.I

Dilution: 1

Run Date: 03/21/2018 12:56

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 03/21/2018 12:56

Column: DB-624

Data File: 032118V6\6L308.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	49.4	50.0	ug/L 99	(71%-134%)
Bromofluorobenzene	51.2	50.0	ug/L 102	(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: 2018-2098

Lab Sample ID: 445591003

Date Collected: 03/07/2018 08:38

Date Received: 03/09/2018 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAAN-18-151479

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1746875

Inst: VOA6.I

Dilution: 1

Run Date: 03/21/2018 13:24

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 03/21/2018 13:24

Data File: 032118V6\6L309.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: 2018-2098

Lab Sample ID: 445591003

Date Collected: 03/07/2018 08:38

Date Received: 03/09/2018 08:55

Matrix: W

Client ID: CAAN-18-151479

Batch ID: 1746875

Run Date: 03/21/2018 13:24

Prep Date: 03/21/2018 13:24

Data File: 032118V6\6L309.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
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: 2018-2098

Lab Sample ID: 445591003

Date Collected: 03/07/2018 08:38

Date Received: 03/09/2018 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAAN-18-151479

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1746875

Inst: VOA6.I

Dilution: 1

Run Date: 03/21/2018 13:24

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 03/21/2018 13:24

Data File: 032118V6\6L309.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	48.2	50.0	ug/L 96	(71%-134%)
Bromofluorobenzene	48.7	50.0	ug/L 97	(70%-131%)
Toluene-d8	45.6	50.0	ug/L 91	(74%-124%)

## Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	11.348	14.6	ug/L	0	J
	unknown siloxane	13.744	24.6	ug/L	0	J
	unknown siloxane	15.671	6.64	ug/L	0	J

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

Page 1 of 3

SDG Number: 2018-2098

Lab Sample ID: 445591005

Date Collected: 03/07/2018 11:24

Date Received: 03/09/2018 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAAN-18-151491

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1746875

Inst: VOA6.I

Dilution: 1

Run Date: 03/21/2018 13:52

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 03/21/2018 13:52

Data File: 032118V6\6L310.D

Column: DB-624

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

**Volatile**  
**Certificate of Analysis**  
**Sample Summary**

Page 2 of 3

SDG Number: 2018-2098

Lab Sample ID: 445591005

Date Collected: 03/07/2018 11:24

Date Received: 03/09/2018 08:55

Matrix: W

Client: ARSL004

Method: SW-846:8260B

Project: ESHL00114

Inst: VOA6.I

Analyst: JP1

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Prep Date: 03/21/2018 13:52

Data File: 032118V6\6L310.D

Column: DB-624

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



**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2018-2098  
**Lab Sample ID:** 445591005  
  
**Client ID:** CAAN-18-151491  
**Batch ID:** 1746875  
**Run Date:** 03/21/2018 13:52  
**Prep Date:** 03/21/2018 13:52  
**Data File:** 032118V6\6L310.D

**Date Collected:** 03/07/2018 11:24  
**Date Received:** 03/09/2018 08:55  
**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
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	48.2	50.0	ug/L 96	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	11.348	9.82	ug/L	0	J
	unknown siloxane	13.75	18.2	ug/L	0	J
	unknown siloxane	15.67	5.76	ug/L	0	J

# **Quality Control Summary**

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**Volatile**  
**Surrogate Recovery Report**

Page 1 of 1

**SDG Number: 2018-2098****Matrix Type: LIQUID**

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Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203993952	LCS for batch 1746875	105	103	106
1203993953	LCS for batch 1746875	102	97	100
1203993951	MB for batch 1746875	101	100	102
445591002	CAAN-18-151449	99	98	102
445591003	CAAN-18-151479	96	91	97
445591005	CAAN-18-151491	102	96	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

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**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: 2018-2098

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: 2018-2098

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: 2018-2098

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  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2098

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: 2018-2098

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: 2018-2098

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: 2018-2098

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: 2018-2098

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
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

Page 1 of 2

SDG Number: 2018-2098

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: 2018-2098

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: 2018-2098

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

Page 2 of 4

SDG Number: 2018-2098

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

Page 3 of 4

SDG Number: 2018-2098

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: 2018-2098

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: 2018-2098

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:	2018-2098	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
01 LCS for batch 1746875	1203993952	032118V6\6L303L.D	03/21/18	1035
02 LCS for batch 1746875	1203993953	032118V6\6L305L.D	03/21/18	1132
03 CAAN-18-151449	445591002	032118V6\6L308.D	03/21/18	1256
04 CAAN-18-151479	445591003	032118V6\6L309.D	03/21/18	1324
05 CAAN-18-151491	445591005	032118V6\6L310.D	03/21/18	1352
06 CAAN-18-151479PS	1203989078	032118V6\6L317.D	03/21/18	1708
07 CAAN-18-151479PSD	1203989082	032118V6\6L318.D	03/21/18	1736
08 CAAN-18-151479PS	1203989079	032118V6\6L319.D	03/21/18	1804
09 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:** 2018-2098  
**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:** 2018-2098  
**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
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

SDG Number:	2018-2098	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**

Page 1 of 3

**SDG Number:** 2018-2098  
**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:** 2018-2098  
**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:	2018-2098	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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<b>SDG Number:</b> 2018-2098	<b>Date Collected:</b> 03/07/2018 08:38	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203989082	<b>Date Received:</b> 03/09/2018 08:55	
<b>Client Sample:</b> QC for batch 1746875	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAAN-18-151479PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1746875	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 03/21/2018 17:36	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 03/21/2018 17:36		
<b>Data File:</b> 032118V6\6L318.D	<b>Column:</b> 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**

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<b>SDG Number:</b> 2018-2098	<b>Date Collected:</b> 03/07/2018 08:38	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203989082	<b>Date Received:</b> 03/09/2018 08:55	
<b>Client Sample:</b> QC for batch 1746875	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAAN-18-151479PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1746875	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 03/21/2018 17:36	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 03/21/2018 17:36		
<b>Data File:</b> 032118V6\6L318.D	<b>Column:</b> 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:	2018-2098	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:** 2018-2098  
**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**

<b>SDG Number:</b> 2018-2098	<b>Date Collected:</b> 03/07/2018 08:38	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203989083	<b>Date Received:</b> 03/09/2018 08:55	
<b>Client Sample:</b> QC for batch 1746875	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAAN-18-151479PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1746875	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 03/21/2018 18:32	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 03/21/2018 18:32		
<b>Data File:</b> 032118V6\6L320.D	<b>Column:</b> 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		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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<b>SDG Number:</b>	<b>2018-2098</b>	<b>Date Collected:</b>	<b>03/07/2018 08:38</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203989083</b>	<b>Date Received:</b>	<b>03/09/2018 08:55</b>		
<b>Client Sample:</b>	<b>QC for batch 1746875</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAAN-18-151479PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1746875</b>	<b>Inst:</b>	<b>VOA6.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>03/21/2018 18:32</b>	<b>Analyst:</b>	<b>JP1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>03/21/2018 18:32</b>				
<b>Data File:</b>	<b>032118V6\6L320.D</b>	<b>Column:</b>	<b>DB-624</b>		

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: 2018-2098

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:** 2018-2098  
**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

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SDG Number: 2018-2098

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
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:** 2018-2098  
**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: 2018-2098

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:	2018-2098	Matrix:	WATER
Lab Sample ID:	1203993952		
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 10:35	Analyst:	JP1
Prep Date:	03/21/2018 10:35		
Data File:	032118V6\6L303L.D	Column:	DB-624

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**

Page 1 of 3

SDG Number: 2018-2098

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

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		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:** 2018-2098  
**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**

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<b>SDG Number:</b>	<b>2018-2098</b>	<b>Matrix:</b>	<b>WATER</b>
<b>Lab Sample ID:</b>	<b>1203993953</b>		
<b>Client Sample:</b>	<b>QC for batch 1746875</b>	<b>Client:</b>	<b>ARSL004</b>
<b>Client ID:</b>	<b>LCS for batch 1746875</b>	<b>Method:</b>	<b>SW-846:8260B</b>
<b>Batch ID:</b>	<b>1746875</b>	<b>Inst:</b>	<b>VOA6.I</b>
<b>Run Date:</b>	<b>03/21/2018 11:32</b>	<b>Analyst:</b>	<b>JP1</b>
<b>Prep Date:</b>	<b>03/21/2018 11:32</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Data File:</b>	<b>032118V6\6L305L.D</b>	<b>Column:</b>	<b>DB-624</b>

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 #: 2018-2098  
Work Order #: 445591**

**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:** 1746893

**Preparation Method:** SW846 3510C  
**Preparation Procedure:** GL-OA-E-013 REV# 32  
**Preparation Batch:** 1746892

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445591003	CAAN-18-151479
445591005	CAAN-18-151491
1203989121	Method Blank (MB)
1203989122	Laboratory Control Sample (LCS)
1203989123	445591003(CAAN-18-151479) Matrix Spike (MS)
1203989124	445591003(CAAN-18-151479) 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 445591003 (CAAN-18-151479) and 445591005 (CAAN-18-151491) 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.

**Miscellaneous Information**

**TIC Comment**

Tentatively identified compounds (TIC) were requested for samples 445591003 (CAAN-18-151479) and 445591005 (CAAN-18-151491) 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: 2018-2098 GEL Work Order: 445591

#### 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: 05 APR 2018

Title: Data Validator

# **Sample Data Summary**

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

Page 1 of 3

SDG Number: 2018-2098

Lab Sample ID: 445591003

Date Collected: 03/07/2018 08:38

Date Received: 03/09/2018 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Client ID: CAAN-18-151479

Batch ID: 1746893

Inst: MSDA.I

Dilution: 1

Run Date: 03/14/2018 16:25

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 03/14/2018 08:20

Aliquot: 1000 mL

Final Volume: 1 mL

Data File: 031418a.s\Ac1417.D

Column: DB-5ms

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



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

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SDG Number: 2018-2098

Lab Sample ID: 445591003

Date Collected: 03/07/2018 08:38

Date Received: 03/09/2018 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSDA.I

Dilution: 1

Batch ID: 1746893

Analyst: JMB3

Inj. Vol: 1 uL

Run Date: 03/14/2018 16:25

Aliquot: 1000 mL

Final Volume: 1 mL

Prep Date: 03/14/2018 08:20

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	0.300	ug/L	0.300	10.0
218-01-9	Chrysene	U	0.300	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate	U	0.300	ug/L	0.300	10.0
117-84-0	Di-n-octylphthalate	U	0.300	ug/L	0.300	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	0.300	ug/L	0.300	10.0
131-11-3	Dimethylphthalate	U	0.300	ug/L	0.300	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	0.300	ug/L	0.300	1.00

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

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**SDG Number:** 2018-2098  
**Lab Sample ID:** 445591003  
  
**Client ID:** CAAN-18-151479  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 16:25  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1417.D

**Date Collected:** 03/07/2018 08:38  
**Date Received:** 03/09/2018 08:55  
**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
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol	U	3.00	ug/L	3.00	10.0
88-74-4	2-Nitroaniline	U	3.00	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline	U	3.00	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	66.9	100	ug/L	67	(32%-124%)
2-Fluorobiphenyl	31.5	50.0	ug/L	63	(32%-112%)
2-Fluorophenol	42.9	100	ug/L	43	(15%-88%)
Nitrobenzene-d5	33.8	50.0	ug/L	68	(36%-115%)
Phenol-d5	25.7	100	ug/L	26	(15%-91%)
p-Terphenyl-d14	41.9	50.0	ug/L	84	(36%-121%)

**Tentatively Identified Compound Summary**

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

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

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SDG Number: 2018-2098

Lab Sample ID: 445591005

Date Collected: 03/07/2018 11:24

Date Received: 03/09/2018 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Client ID: CAAN-18-151491

Batch ID: 1746893

Inst: MSDA.I

Dilution: 1

Run Date: 03/14/2018 17:46

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 03/14/2018 08:20

Aliquot: 950 mL

Final Volume: 1 mL

Data File: 031418a.s\Ac1420.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.16	ug/L	3.16	10.5
120-82-1	1,2,4-Trichlorobenzene	U	3.16	ug/L	3.16	10.5
95-50-1	1,2-Dichlorobenzene	U	3.16	ug/L	3.16	10.5
122-66-7	Azobenzene	U	3.16	ug/L	3.16	10.5
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene	U	3.16	ug/L	3.16	10.5
106-46-7	1,4-Dichlorobenzene	U	3.16	ug/L	3.16	10.5
123-91-1	1,4-Dioxane	U	3.16	ug/L	3.16	10.5
90-12-0	1-Methylnaphthalene	U	0.316	ug/L	0.316	1.05
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.16	ug/L	3.16	10.5
95-95-4	2,4,5-Trichlorophenol	U	3.16	ug/L	3.16	10.5
88-06-2	2,4,6-Trichlorophenol	U	3.16	ug/L	3.16	10.5
120-83-2	2,4-Dichlorophenol	U	3.16	ug/L	3.16	10.5
105-67-9	2,4-Dimethylphenol	U	3.16	ug/L	3.16	10.5
51-28-5	2,4-Dinitrophenol	U	5.26	ug/L	5.26	21.1
121-14-2	2,4-Dinitrotoluene	U	3.16	ug/L	3.16	10.5
606-20-2	2,6-Dinitrotoluene	U	3.16	ug/L	3.16	10.5
91-58-7	2-Chloronaphthalene	U	0.432	ug/L	0.432	1.05
95-57-8	2-Chlorophenol	U	3.16	ug/L	3.16	10.5
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.16	ug/L	3.16	10.5
91-57-6	2-Methylnaphthalene	U	0.316	ug/L	0.316	1.05
88-75-5	2-Nitrophenol	U	3.16	ug/L	3.16	10.5
91-94-1	3,3'-Dichlorobenzidine	U	3.16	ug/L	3.16	10.5
101-55-3	4-Bromophenylphenylether	U	3.16	ug/L	3.16	10.5
59-50-7	Parachlorometa cresol	U	3.16	ug/L	3.16	10.5
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline	U	3.47	ug/L	3.47	10.5
7005-72-3	4-Chlorophenylphenylether	U	3.16	ug/L	3.16	10.5
100-02-7	4-Nitrophenol	U	3.16	ug/L	3.16	10.5
83-32-9	Acenaphthene	U	0.316	ug/L	0.316	1.05
208-96-8	Acenaphthylene	U	0.316	ug/L	0.316	1.05
62-53-3	Aniline	U	4.42	ug/L	4.42	10.5
120-12-7	Anthracene	U	0.316	ug/L	0.316	1.05
1912-24-9	Atrazine	U	3.16	ug/L	3.16	10.5
92-87-5	Benzidine	U	4.11	ug/L	4.11	10.5
56-55-3	Benzo(a)anthracene	U	0.316	ug/L	0.316	1.05
50-32-8	Benzo(a)pyrene	U	0.316	ug/L	0.316	1.05
205-99-2	Benzo(b)fluoranthene	U	0.316	ug/L	0.316	1.05
191-24-2	Benzo(ghi)perylene	U	0.316	ug/L	0.316	1.05

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

Page 2 of 3

**SDG Number:** 2018-2098  
**Lab Sample ID:** 445591005  
  
**Client ID:** CAAN-18-151491  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 17:46  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1420.D

**Date Collected:** 03/07/2018 11:24  
**Date Received:** 03/09/2018 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 950 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
207-08-9	Benzo(k)fluoranthene	U	0.316	ug/L	0.316	1.05
65-85-0	Benzoic acid	U	6.32	ug/L	6.32	21.1
100-51-6	Benzyl alcohol	U	3.16	ug/L	3.16	10.5
85-68-7	Butylbenzylphthalate	U	0.316	ug/L	0.316	10.5
218-01-9	Chrysene	U	0.316	ug/L	0.316	1.05
84-74-2	Di-n-butylphthalate	U	0.316	ug/L	0.316	10.5
117-84-0	Di-n-octylphthalate	U	0.316	ug/L	0.316	10.5
53-70-3	Dibenzo(a,h)anthracene	U	0.316	ug/L	0.316	1.05
132-64-9	Dibenzofuran	U	3.16	ug/L	3.16	10.5
84-66-2	Diethylphthalate	U	0.316	ug/L	0.316	10.5
131-11-3	Dimethylphthalate	U	0.316	ug/L	0.316	10.5
88-85-7	Dinoseb	U	3.16	ug/L	3.16	10.5
122-39-4	Diphenylamine	U	3.16	ug/L	3.16	10.5
206-44-0	Fluoranthene	U	0.316	ug/L	0.316	1.05
86-73-7	Fluorene	U	0.316	ug/L	0.316	1.05
118-74-1	Hexachlorobenzene	U	3.16	ug/L	3.16	10.5
87-68-3	Hexachlorobutadiene	U	3.16	ug/L	3.16	10.5
77-47-4	Hexachlorocyclopentadiene	U	3.16	ug/L	3.16	10.5
67-72-1	Hexachloroethane	U	3.16	ug/L	3.16	10.5
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.316	ug/L	0.316	1.05
78-59-1	Isophorone	U	3.68	ug/L	3.68	10.5
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.16	ug/L	3.16	10.5
924-16-3	N-Nitrosodi-n-butylamine	U	3.16	ug/L	3.16	10.5
55-18-5	N-Nitrosodiethylamine	U	3.16	ug/L	3.16	10.5
621-64-7	N-Nitrosodi-n-propylamine	U	3.16	ug/L	3.16	10.5
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.16	ug/L	3.16	10.5
91-20-3	Naphthalene	U	0.316	ug/L	0.316	1.05
98-95-3	Nitrobenzene	U	3.16	ug/L	3.16	10.5
608-93-5	Pentachlorobenzene	U	3.16	ug/L	3.16	10.5
87-86-5	Pentachlorophenol	U	3.16	ug/L	3.16	10.5
85-01-8	Phenanthrene	U	0.316	ug/L	0.316	1.05
108-95-2	Phenol	U	3.16	ug/L	3.16	10.5
129-00-0	Pyrene	U	0.316	ug/L	0.316	1.05
110-86-1	Pyridine	U	3.16	ug/L	3.16	10.5
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.16	ug/L	3.16	10.5
111-91-1	bis(2-Chloroethoxy)methane	U	3.16	ug/L	3.16	10.5
111-44-4	bis(2-Chloroethyl) ether	U	3.16	ug/L	3.16	10.5
117-81-7	bis(2-Ethylhexyl)phthalate	U	0.316	ug/L	0.316	1.05

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

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SDG Number: 2018-2098

Lab Sample ID: 445591005

Date Collected: 03/07/2018 11:24

Date Received: 03/09/2018 08:55

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Client ID: CAAN-18-151491

Inst: MSDA.I

Dilution: 1

Batch ID: 1746893

Run Date: 03/14/2018 17:46

Analyst: JMB3

Inj. Vol: 1 uL

Prep Date: 03/14/2018 08:20

Aliquot: 950 mL

Final Volume: 1 mL

Data File: 031418a.s\Ac1420.D

Column: DB-5ms

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	3.89	ug/L	3.89	10.5
99-09-2	3-Nitroaniline	U	3.16	ug/L	3.16	10.5
	<i>m</i> -Nitroaniline					
95-48-7	o-Cresol	U	3.16	ug/L	3.16	10.5
88-74-4	2-Nitroaniline	U	3.16	ug/L	3.16	10.5
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline	U	3.16	ug/L	3.16	10.5
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	73.1	105	ug/L	69	(32%-124%)
2-Fluorobiphenyl	36.6	52.6	ug/L	70	(32%-112%)
2-Fluorophenol	51.3	105	ug/L	49	(15%-88%)
Nitrobenzene-d5	37.4	52.6	ug/L	71	(36%-115%)
Phenol-d5	31.0	105	ug/L	29	(15%-91%)
p-Terphenyl-d14	43.8	52.6	ug/L	83	(36%-121%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000079-01-6	Trichloroethylene	2.087	4.22	ug/L	98	NJ

# **Quality Control Summary**

Semi-Volatile  
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-2098

Matrix Type: LIQUID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203989121	MB for batch 1746892	48	28	74	73	76	89
1203989122	LCS for batch 1746892	43	26	69	57	80	77
445591003	CAAN-18-151479	43	26	68	63	67	84
1203989123	CAAN-18-151479MS	63	47	76	74	85	88
1203989124	CAAN-18-151479MSD	62	46	76	71	77	89
445591005	CAAN-18-151491	49	29	71	70	69	83

## 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: 2018-2098

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746892

Matrix: WATER

Lab Sample ID 1203989122

Instrument: MSDA.I

Analysis Date: 03/14/2018 15:58

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

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	21.5	43	30-88
110-86-1	LCS Pyridine	50.0	0.0	23.0	46	27-89
62-53-3	LCS Aniline	50.0	0.0	34.8	70	49-112
108-95-2	LCS Phenol	50.0	0.0	13.6	27	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	35.9	72	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	33.7	67	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	28.4	57	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	28.6	57	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	29.6	59	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)ether	50.0	0.0	36.0	72	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	32.2	64	44-102
95-48-7	LCS o-Cresol	50.0	0.0	30.4	61	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	30.8	62	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	37.6	75	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	26.6	53	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	35.1	70	53-115
78-59-1	LCS Isophorone	50.0	0.0	33.3	67	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	36.2	72	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	30.1	60	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	35.1	70	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	36.3	73	53-109
65-85-0	LCS Benzoic acid	100	0.0	28.7	29	21-74



Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-2098

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746892

Matrix: WATER

Lab Sample ID 1203989122

Instrument: MSDA.I

Analysis Date: 03/14/2018 15:58

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

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	43.4	87	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	28.9	58	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	36.9	74	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	32.0	64	42-103
91-20-3	LCS Naphthalene	50.0	0.0	32.0	64	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	33.2	66	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	20.4	41	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	35.9	72	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	37.1	74	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	33.6	67	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	38.0	76	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	46.0	92	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	38.6	77	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	35.6	71	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	36.7	73	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	35.2	70	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	37.0	74	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	38.6	77	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	36.7	73	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	37.3	75	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	38.6	77	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	12.4	25	15-137

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2098

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746892

Matrix: WATER

Lab Sample ID 1203989122

Instrument: MSDA.I

Analysis Date: 03/14/2018 15:58

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

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	35.9	72	52-114
7005-72-3	LCS 4-Chlorophenylphenylether	50.0	0.0	38.2	76	52-121
100-01-6	LCS 4-Nitroaniline	50.0	0.0	39.2	78	44-137
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	38.3	77	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	35.5	71	55-113
122-66-7	LCS Azobenzene	50.0	0.0	36.5	73	53-115
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	37.0	74	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	43.8	88	41-116
85-01-8	LCS Phenanthrene	50.0	0.0	35.4	71	55-110
120-12-7	LCS Anthracene	50.0	0.0	35.6	71	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	40.7	81	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	38.5	77	54-118
129-00-0	LCS Pyrene	50.0	0.0	32.5	65	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	40.9	82	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	46.8	94	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	36.0	72	57-112
218-01-9	LCS Chrysene	50.0	0.0	37.1	74	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	48.5	97	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	35.8	72	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	37.3	75	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	37.0	74	40-118

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 4 of 4

SDG Number: 2018-2098

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1746892

Matrix: WATER

Lab Sample ID 1203989122

Instrument: MSDA.I

Analysis Date: 03/14/2018 15:58

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

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	38.2	76	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	37.7	75	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	36.6	73	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	22.5	45	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	37.0	74	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	33.9	68	44-102
1912-24-9	LCS Atrazine	50.0	0.0	38.8	78	60-131
92-87-5	LCS Benzidine	100	0.0	74.9	75	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	37.0	74	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	31.5	63	39-99

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-2098

Sample Type: Matrix Spike

Client ID: CAAN-18-151479MS

Matrix: W

Lab Sample ID 1203989123

Instrument: MSDA.I

Analysis Date: 03/14/2018 16:52

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

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	109	0.00 U	64.6	59	25-106
110-86-1	MS Pyridine	109	0.00 U	70.3	65	24-93
62-53-3	MS Aniline	109	0.00 U	84.0	77	37-113
108-95-2	MS Phenol	109	0.00 U	52.8	49	23-82
111-44-4	MS bis(2-Chloroethyl) ether	109	0.00 U	82.2	76	39-114
95-57-8	MS 2-Chlorophenol	109	0.00 U	78.5	72	37-108
541-73-1	MS 1,3-Dichlorobenzene	109	0.00 U	68.3	63	27-97
106-46-7	MS 1,4-Dichlorobenzene	109	0.00 U	68.3	63	28-97
95-50-1	MS 1,2-Dichlorobenzene	109	0.00 U	70.5	65	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)ether	109	0.00 U	83.2	77	32-127
100-51-6	MS Benzyl alcohol	109	0.00 U	83.1	76	37-116
95-48-7	MS o-Cresol	109	0.00 U	77.8	72	34-109
65794-96-9	MS m,p-Cresols	109	0.00 U	85.1	78	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	109	0.00 U	87.5	81	42-118
67-72-1	MS Hexachloroethane	109	0.00 U	65.0	60	29-94
98-95-3	MS Nitrobenzene	109	0.00 U	80.7	74	38-123
78-59-1	MS Isophorone	109	0.00 U	77.5	71	43-120
88-75-5	MS 2-Nitrophenol	109	0.00 U	84.2	77	39-115
105-67-9	MS 2,4-Dimethylphenol	109	0.00 U	70.5	65	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	109	0.00 U	81.5	75	42-118
120-83-2	MS 2,4-Dichlorophenol	109	0.00 U	83.8	77	40-111
65-85-0	MS Benzoic acid	217	0.00 U	101	46	17-95

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-2098

Sample Type: Matrix Spike

Client ID: CAAN-18-151479MS

Matrix: W

Lab Sample ID 1203989123

Instrument: MSDA.I

Analysis Date: 03/14/2018 16:52

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS 4-Chloroaniline	109	0.00 U	101	92	44-138
87-68-3	MS Hexachlorobutadiene	109	0.00 U	72.6	67	26-98
59-50-7	MS Parachlorometa cresol 4-Chloro-3-methylphenol	109	0.00 U	85.9	79	41-122
91-57-6	MS 2-Methylnaphthalene	109	0.00 U	74.8	69	29-109
91-20-3	MS Naphthalene	109	0.00 U	74.9	69	31-108
90-12-0	MS 1-Methylnaphthalene	109	0.00 U	77.8	72	33-112
77-47-4	MS Hexachlorocyclopentadiene	109	0.00 U	49.5	46	26-79
88-06-2	MS 2,4,6-Trichlorophenol	109	0.00 U	82.9	76	39-124
95-95-4	MS 2,4,5-Trichlorophenol	109	0.00 U	84.3	78	42-120
91-58-7	MS 2-Chloronaphthalene	109	0.00 U	79.1	73	29-113
88-74-4	MS 2-Nitroaniline o-Nitroaniline	109	0.00 U	86.8	80	41-121
99-09-2	MS 3-Nitroaniline m-Nitroaniline	109	0.00 U	106	97	42-144
131-11-3	MS Dimethylphthalate	109	0.00 U	89.4	82	45-128
606-20-2	MS 2,6-Dinitrotoluene	109	0.00 U	82.6	76	46-124
121-14-2	MS 2,4-Dinitrotoluene	109	0.00 U	85.4	79	45-125
208-96-8	MS Acenaphthylene	109	0.00 U	82.2	76	35-120
83-32-9	MS Acenaphthene	109	0.00 U	86.4	80	35-117
51-28-5	MS 2,4-Dinitrophenol	109	0.00 U	87.2	80	27-122
132-64-9	MS Dibenzofuran	109	0.00 U	85.2	78	38-113
58-90-2	MS 2,3,4,6-Tetrachlorophenol	109	0.00 U	87.1	80	40-128
84-66-2	MS Diethylphthalate	109	0.00 U	89.5	82	43-127
100-02-7	MS 4-Nitrophenol	109	0.00 U	47.7	44	17-85

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2098

Sample Type: Matrix Spike

Client ID: CAAN-18-151479MS

Matrix: W

Lab Sample ID 1203989123

Instrument: MSDA.I

Analysis Date: 03/14/2018 16:52

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS Fluorene	109	0.00 U	83.6	77	39-117
7005-72-3	MS 4-Chlorophenylphenylether	109	0.00 U	89.1	82	39-121
100-01-6	MS 4-Nitroaniline	109	0.00 U	87.7	81	30-133
534-52-1	MS 2-Methyl-4,6-dinitrophenol	109	0.00 U	90.7	83	32-126
122-39-4	MS Diphenylamine	109	0.00 U	85.7	79	37-118
122-66-7	MS Azobenzene	109	0.00 U	87.3	80	38-120
101-55-3	MS 4-Bromophenylphenylether	109	0.00 U	87.9	81	39-121
118-74-1	MS Hexachlorobenzene	109	0.00 U	88.0	81	40-118
87-86-5	MS Pentachlorophenol	109	0.00 U	102	94	35-121
85-01-8	MS Phenanthrene	109	0.00 U	83.5	77	40-115
120-12-7	MS Anthracene	109	0.00 U	83.7	77	38-120
84-74-2	MS Di-n-butylphthalate	109	0.00 U	95.4	88	41-128
206-44-0	MS Fluoranthene	109	0.00 U	87.7	81	41-119
129-00-0	MS Pyrene	109	0.00 U	81.1	75	35-128
85-68-7	MS Butylbenzylphthalate	109	0.00 U	100	92	40-129
117-81-7	MS bis(2-Ethylhexyl)phthalate	109	0.00 U	114	105	38-131
56-55-3	MS Benzo(a)anthracene	109	0.00 U	85.4	79	39-120
218-01-9	MS Chrysene	109	0.00 U	87.2	80	41-124
117-84-0	MS Di-n-octylphthalate	109	0.00 U	114	105	37-134
205-99-2	MS Benzo(b)fluoranthene	109	0.00 U	84.6	78	31-122
207-08-9	MS Benzo(k)fluoranthene	109	0.00 U	86.5	80	33-123
50-32-8	MS Benzo(a)pyrene	109	0.00 U	87.5	80	32-118

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2098

Sample Type: Matrix Spike

Client ID: CAAN-18-151479MS

Matrix: W

Lab Sample ID 1203989123

Instrument: MSDA.I

Analysis Date: 03/14/2018 16:52

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

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	109	0.00 U	93.4	86	27-121
53-70-3	MS Dibenzo(a,h)anthracene	109	0.00 U	91.6	84	30-125
191-24-2	MS Benzo(ghi)perylene	109	0.00 U	90.1	83	24-126
123-91-1	MS 1,4-Dioxane	109	0.00 U	68.0	63	24-110
930-55-2	MS N-Nitrosopyrrolidine	109	0.00 U	89.1	82	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	109	0.00 U	80.9	74	32-101
1912-24-9	MS Atrazine	109	0.00 U	93.0	86	42-129
92-87-5	MS Benzidine	217	0.00 U	159	73	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	109	0.00 U	85.0	78	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	109	0.00 U	75.1	69	26-102

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2098

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-18-151479MSD

Matrix: W

Lab Sample ID 1203989124

Instrument: MSDA.I

Analysis Date: 03/14/2018 17:19

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

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	109	0.00	U 64.2	59	25-106	1	0-30
110-86-1	MSD Pyridine	109	0.00	U 66.0	61	24-93	6	0-30
62-53-3	MSD Aniline	109	0.00	U 83.4	77	37-113	1	0-30
108-95-2	MSD Phenol	109	0.00	U 51.8	48	23-82	2	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	109	0.00	U 80.6	74	39-114	2	0-30
95-57-8	MSD 2-Chlorophenol	109	0.00	U 77.9	72	37-108	1	0-30
541-73-1	MSD 1,3-Dichlorobenzene	109	0.00	U 68.5	63	27-97	0	0-30
106-46-7	MSD 1,4-Dichlorobenzene	109	0.00	U 68.9	63	28-97	1	0-30
95-50-1	MSD 1,2-Dichlorobenzene	109	0.00	U 70.9	65	28-99	1	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)ether	109	0.00	U 82.3	76	32-127	1	0-30
100-51-6	MSD Benzyl alcohol	109	0.00	U 79.3	73	37-116	5	0-30
95-48-7	MSD o-Cresol	109	0.00	U 76.3	70	34-109	2	0-30
65794-96-9	MSD m,p-Cresols	109	0.00	U 83.0	76	36-120	3	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	109	0.00	U 83.6	77	42-118	5	0-30
67-72-1	MSD Hexachloroethane	109	0.00	U 66.3	61	29-94	2	0-30
98-95-3	MSD Nitrobenzene	109	0.00	U 78.9	73	38-123	2	0-30
78-59-1	MSD Isophorone	109	0.00	U 74.1	68	43-120	5	0-30
88-75-5	MSD 2-Nitrophenol	109	0.00	U 82.5	76	39-115	2	0-30
105-67-9	MSD 2,4-Dimethylphenol	109	0.00	U 67.9	62	39-107	4	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	109	0.00	U 79.2	73	42-118	3	0-30
120-83-2	MSD 2,4-Dichlorophenol	109	0.00	U 81.9	75	40-111	2	0-30
65-85-0	MSD Benzoic acid	217	0.00	U 116	53	17-95	14	0-30



Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2098

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-18-151479MSD

Matrix: W

Lab Sample ID 1203989124

Instrument: MSDA.I

Analysis Date: 03/14/2018 17:19

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

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	109	0.00 U	98.0	90	44-138	2	0-30
87-68-3	MSD Hexachlorobutadiene	109	0.00 U	73.1	67	26-98	1	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	109	0.00 U	82.3	76	41-122	4	0-30
91-57-6	MSD 2-Methylnaphthalene	109	0.00 U	73.4	68	29-109	2	0-30
91-20-3	MSD Naphthalene	109	0.00 U	74.5	69	31-108	0	0-30
90-12-0	MSD 1-Methylnaphthalene	109	0.00 U	75.3	69	33-112	3	0-30
77-47-4	MSD Hexachlorocyclopentadiene	109	0.00 U	50.0	46	26-79	1	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	109	0.00 U	80.1	74	39-124	3	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	109	0.00 U	81.7	75	42-120	3	0-30
91-58-7	MSD 2-Chloronaphthalene	109	0.00 U	76.7	71	29-113	3	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	109	0.00 U	83.4	77	41-121	4	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	109	0.00 U	99.2	91	42-144	6	0-30
131-11-3	MSD Dimethylphthalate	109	0.00 U	84.9	78	45-128	5	0-30
606-20-2	MSD 2,6-Dinitrotoluene	109	0.00 U	78.7	72	46-124	5	0-30
121-14-2	MSD 2,4-Dinitrotoluene	109	0.00 U	78.7	72	45-125	8	0-30
208-96-8	MSD Acenaphthylene	109	0.00 U	79.3	73	35-120	4	0-30
83-32-9	MSD Acenaphthene	109	0.00 U	83.2	77	35-117	4	0-30
51-28-5	MSD 2,4-Dinitrophenol	109	0.00 U	84.6	78	27-122	3	0-30
132-64-9	MSD Dibenzofuran	109	0.00 U	81.6	75	38-113	4	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	109	0.00 U	81.2	75	40-128	7	0-30
84-66-2	MSD Diethylphthalate	109	0.00 U	83.3	77	43-127	7	0-30
100-02-7	MSD 4-Nitrophenol	109	0.00 U	43.5	40	17-85	9	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2098

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-18-151479MSD

Matrix: W

Lab Sample ID 1203989124

Instrument: MSDA.I

Analysis Date: 03/14/2018 17:19

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

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	109	0.00 U	79.2	73	39-117	5	0-30
7005-72-3	MSD 4-Chlorophenylphenylether	109	0.00 U	84.6	78	39-121	5	0-30
100-01-6	MSD 4-Nitroaniline <i>p</i> -Nitroaniline	109	0.00 U	79.1	73	30-133	10	0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	109	0.00 U	86.5	80	32-126	5	0-30
122-39-4	MSD Diphenylamine	109	0.00 U	84.6	78	37-118	1	0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	109	0.00 U	86.6	80	38-120	1	0-30
101-55-3	MSD 4-Bromophenylphenylether	109	0.00 U	86.7	80	39-121	1	0-30
118-74-1	MSD Hexachlorobenzene	109	0.00 U	84.9	78	40-118	4	0-30
87-86-5	MSD Pentachlorophenol	109	0.00 U	97.8	90	35-121	5	0-30
85-01-8	MSD Phenanthrene	109	0.00 U	80.7	74	40-115	3	0-30
120-12-7	MSD Anthracene	109	0.00 U	80.0	74	38-120	5	0-30
84-74-2	MSD Di-n-butylphthalate	109	0.00 U	89.7	83	41-128	6	0-30
206-44-0	MSD Fluoranthene	109	0.00 U	80.0	74	41-119	9	0-30
129-00-0	MSD Pyrene	109	0.00 U	82.8	76	35-128	2	0-30
85-68-7	MSD Butylbenzylphthalate	109	0.00 U	101	93	40-129	1	0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	109	0.00 U	113	104	38-131	0	0-30
56-55-3	MSD Benzo(a)anthracene	109	0.00 U	80.9	74	39-120	5	0-30
218-01-9	MSD Chrysene	109	0.00 U	83.6	77	41-124	4	0-30
117-84-0	MSD Di-n-octylphthalate	109	0.00 U	107	98	37-134	6	0-30
205-99-2	MSD Benzo(b)fluoranthene	109	0.00 U	82.5	76	31-122	3	0-30
207-08-9	MSD Benzo(k)fluoranthene	109	0.00 U	85.5	79	33-123	1	0-30
50-32-8	MSD Benzo(a)pyrene	109	0.00 U	82.7	76	32-118	6	0-30

Semi-Volatile  
Quality Control Summary  
Spike Recovery Report

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SDG Number: 2018-2098

Sample Type: Matrix Spike Duplicate

Client ID: CAAN-18-151479MSD

Matrix: W

Lab Sample ID 1203989124

Instrument: MSDA.I

Analysis Date: 03/14/2018 17:19

Dilution: 1

Analyst: JMB3

Prep Batch ID: 1746892

Inj. Vol: 1 uL

Batch ID: 1746893

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	109	0.00 U	82.8	76	27-121	12	0-30
53-70-3	MSD Dibenzo(a,h)anthracene	109	0.00 U	82.7	76	30-125	10	0-30
191-24-2	MSD Benzo(ghi)perylene	109	0.00 U	80.2	74	24-126	12	0-30
123-91-1	MSD 1,4-Dioxane	109	0.00 U	66.6	61	24-110	2	0-30
930-55-2	MSD N-Nitrosopyrrolidine	109	0.00 U	85.2	78	47-119	5	0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	109	0.00 U	79.1	73	32-101	2	0-30
1912-24-9	MSD Atrazine	109	0.00 U	89.0	82	42-129	4	0-30
92-87-5	MSD Benzidine	217	0.00 U	128	59	15-130	22	0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	109	0.00 U	76.2	70	34-124	11	0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	109	0.00 U	74.9	69	26-102	0	0-30

## Method Blank Summary

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SDG Number:	2018-2098	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1746892	Instrument ID:	MSDA.I	Data File:	031418a.s\Ac1415.D
Lab Sample ID:	1203989121	Prep Date:	03/14/2018 08:20	Analyzed:	03/14/18 15:31
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 1746892	1203989122	031418a.s\Ac1416.D	03/14/18	1558
02 CAAN-18-151479	445591003	031418a.s\Ac1417.D	03/14/18	1625
03 CAAN-18-151479MS	1203989123	031418a.s\Ac1418.D	03/14/18	1652
04 CAAN-18-151479MSD	1203989124	031418a.s\Ac1419.D	03/14/18	1719
05 CAAN-18-151491	445591005	031418a.s\Ac1420.D	03/14/18	1746

# Quality Control Data

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

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SDG Number: 2018-2098

Lab Sample ID: 1203989121

Client Sample: QC for batch 1746892

Client ID: MB for batch 1746892

Batch ID: 1746893

Run Date: 03/14/2018 15:31

Prep Date: 03/14/2018 08:20

Data File: 031418a.s\Ac1415.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
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

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SDG Number: 2018-2098

Lab Sample ID: 1203989121

Client Sample: QC for batch 1746892

Client ID: MB for batch 1746892

Batch ID: 1746893

Run Date: 03/14/2018 15:31

Prep Date: 03/14/2018 08:20

Data File: 031418a.s\Ac1415.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	0.300	ug/L	0.300	10.0
218-01-9	Chrysene	U	0.300	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate	U	0.300	ug/L	0.300	10.0
117-84-0	Di-n-octylphthalate	U	0.300	ug/L	0.300	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	0.300	ug/L	0.300	10.0
131-11-3	Dimethylphthalate	U	0.300	ug/L	0.300	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	0.300	ug/L	0.300	1.00

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**SDG Number:** 2018-2098  
**Lab Sample ID:** 1203989121  
**Client Sample:** QC for batch 1746892  
**Client ID:** MB for batch 1746892  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 15:31  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1415.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
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	76.3	100	ug/L	76	(32%-124%)
2-Fluorobiphenyl	36.5	50.0	ug/L	73	(32%-112%)
2-Fluorophenol	48.1	100	ug/L	48	(15%-88%)
Nitrobenzene-d5	36.9	50.0	ug/L	74	(36%-115%)
Phenol-d5	28.5	100	ug/L	28	(15%-91%)
p-Terphenyl-d14	44.5	50.0	ug/L	89	(36%-121%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000079-01-6	Trichloroethylene	2.093	4.21	ug/L	98	NJ



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**SDG Number:** 2018-2098  
**Lab Sample ID:** 1203989122  
**Client Sample:** QC for batch 1746892  
**Client ID:** LCS for batch 1746892  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 15:58  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1416.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		33.9	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		31.5	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		29.6	ug/L	3.00	10.0
122-66-7	Azobenzene		36.5	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		28.4	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		28.6	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		22.5	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		33.2	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		37.3	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		37.1	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		35.9	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		36.3	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		30.1	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		38.6	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		36.7	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		35.6	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		33.6	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		33.7	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		38.3	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		32.0	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		36.2	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		37.0	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		37.0	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		36.9	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		43.4	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		38.2	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		12.4	ug/L	3.00	10.0
83-32-9	Acenaphthene		37.0	ug/L	0.300	1.00
208-96-8	Acenaphthylene		35.2	ug/L	0.300	1.00
62-53-3	Aniline		34.8	ug/L	4.20	10.0
120-12-7	Anthracene		35.6	ug/L	0.300	1.00
1912-24-9	Atrazine		38.8	ug/L	3.00	10.0
92-87-5	Benzidine		74.9	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		36.0	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		37.0	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		35.8	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		36.6	ug/L	0.300	1.00

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**SDG Number:** 2018-2098  
**Lab Sample ID:** 1203989122  
**Client Sample:** QC for batch 1746892  
**Client ID:** LCS for batch 1746892  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 15:58  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1416.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		37.3	ug/L	0.300	1.00
65-85-0	Benzoic acid		28.7	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		32.2	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		40.9	ug/L	0.300	10.0
218-01-9	Chrysene		37.1	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		40.7	ug/L	0.300	10.0
117-84-0	Di-n-octylphthalate		48.5	ug/L	0.300	10.0
53-70-3	Dibenzo(a,h)anthracene		37.7	ug/L	0.300	1.00
132-64-9	Dibenzofuran		36.7	ug/L	3.00	10.0
84-66-2	Diethylphthalate		38.6	ug/L	0.300	10.0
131-11-3	Dimethylphthalate		38.6	ug/L	0.300	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		35.5	ug/L	3.00	10.0
206-44-0	Fluoranthene		38.5	ug/L	0.300	1.00
86-73-7	Fluorene		35.9	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		36.9	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		28.9	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		20.4	ug/L	3.00	10.0
67-72-1	Hexachloroethane		26.6	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		38.2	ug/L	0.300	1.00
78-59-1	Isophorone		33.3	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		21.5	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		37.6	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		37.0	ug/L	3.00	10.0
91-20-3	Naphthalene		32.0	ug/L	0.300	1.00
98-95-3	Nitrobenzene		35.1	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		43.8	ug/L	3.00	10.0
85-01-8	Phenanthrene		35.4	ug/L	0.300	1.00
108-95-2	Phenol		13.6	ug/L	3.00	10.0
129-00-0	Pyrene		32.5	ug/L	0.300	1.00
110-86-1	Pyridine		23.0	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		36.0	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		35.1	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		35.9	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		46.8	ug/L	0.300	1.00

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<b>SDG Number:</b> 2018-2098	<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 1203989122	
<b>Client Sample:</b> QC for batch 1746892	<b>Client:</b> ARSL004
<b>Client ID:</b> LCS for batch 1746892	<b>Method:</b> SW846 3510C/8270D
<b>Batch ID:</b> 1746893	<b>Inst:</b> MSDA.I
<b>Run Date:</b> 03/14/2018 15:58	<b>Analyst:</b> JMB3
<b>Prep Date:</b> 03/14/2018 08:20	<b>Aliquot:</b> 1000 mL
<b>Data File:</b> 031418a.s\Ac1416.D	<b>Column:</b> DB-5ms
	<b>Project:</b> QC
	<b>SOP Ref:</b> GL-OA-E-009
	<b>Dilution:</b> 1
	<b>Inj. Vol:</b> 1 uL
	<b>Final Volume:</b> 1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		30.8	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		46.0	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		30.4	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		38.0	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		39.2	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	79.7	100	ug/L	80	(32%-124%)
2-Fluorobiphenyl	28.7	50.0	ug/L	57	(32%-112%)
2-Fluorophenol	43.0	100	ug/L	43	(15%-88%)
Nitrobenzene-d5	34.6	50.0	ug/L	69	(36%-115%)
Phenol-d5	26.0	100	ug/L	26	(15%-91%)
p-Terphenyl-d14	38.5	50.0	ug/L	77	(36%-121%)

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

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**SDG Number:** 2018-2098  
**Lab Sample ID:** 1203989123  
**Client Sample:** QC for batch 1746892  
**Client ID:** CAAN-18-151479MS  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 16:52  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1418.D

**Date Collected:** 03/07/2018 08:38  
**Date Received:** 03/09/2018 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 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		80.9	ug/L	6.52	21.7
120-82-1	1,2,4-Trichlorobenzene		75.1	ug/L	6.52	21.7
95-50-1	1,2-Dichlorobenzene		70.5	ug/L	6.52	21.7
122-66-7	Azobenzene		87.3	ug/L	6.52	21.7
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		68.3	ug/L	6.52	21.7
106-46-7	1,4-Dichlorobenzene		68.3	ug/L	6.52	21.7
123-91-1	1,4-Dioxane		68.0	ug/L	6.52	21.7
90-12-0	1-Methylnaphthalene		77.8	ug/L	0.652	2.17
58-90-2	2,3,4,6-Tetrachlorophenol		87.1	ug/L	6.52	21.7
95-95-4	2,4,5-Trichlorophenol		84.3	ug/L	6.52	21.7
88-06-2	2,4,6-Trichlorophenol		82.9	ug/L	6.52	21.7
120-83-2	2,4-Dichlorophenol		83.8	ug/L	6.52	21.7
105-67-9	2,4-Dimethylphenol		70.5	ug/L	6.52	21.7
51-28-5	2,4-Dinitrophenol		87.2	ug/L	10.9	43.5
121-14-2	2,4-Dinitrotoluene		85.4	ug/L	6.52	21.7
606-20-2	2,6-Dinitrotoluene		82.6	ug/L	6.52	21.7
91-58-7	2-Chloronaphthalene		79.1	ug/L	0.891	2.17
95-57-8	2-Chlorophenol		78.5	ug/L	6.52	21.7
534-52-1	2-Methyl-4,6-dinitrophenol		90.7	ug/L	6.52	21.7
91-57-6	2-Methylnaphthalene		74.8	ug/L	0.652	2.17
88-75-5	2-Nitrophenol		84.2	ug/L	6.52	21.7
91-94-1	3,3'-Dichlorobenzidine		85.0	ug/L	6.52	21.7
101-55-3	4-Bromophenylphenylether		87.9	ug/L	6.52	21.7
59-50-7	Parachlorometa cresol		85.9	ug/L	6.52	21.7
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		101	ug/L	7.17	21.7
7005-72-3	4-Chlorophenylphenylether		89.1	ug/L	6.52	21.7
100-02-7	4-Nitrophenol		47.7	ug/L	6.52	21.7
83-32-9	Acenaphthene		86.4	ug/L	0.652	2.17
208-96-8	Acenaphthylene		82.2	ug/L	0.652	2.17
62-53-3	Aniline		84.0	ug/L	9.13	21.7
120-12-7	Anthracene		83.7	ug/L	0.652	2.17
1912-24-9	Atrazine		93.0	ug/L	6.52	21.7
92-87-5	Benzidine		159	ug/L	8.48	21.7
56-55-3	Benzo(a)anthracene		85.4	ug/L	0.652	2.17
50-32-8	Benzo(a)pyrene		87.5	ug/L	0.652	2.17
205-99-2	Benzo(b)fluoranthene		84.6	ug/L	0.652	2.17
191-24-2	Benzo(ghi)perylene		90.1	ug/L	0.652	2.17

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**SDG Number:** 2018-2098  
**Lab Sample ID:** 1203989123  
**Client Sample:** QC for batch 1746892  
**Client ID:** CAAN-18-151479MS  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 16:52  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1418.D

**Date Collected:** 03/07/2018 08:38  
**Date Received:** 03/09/2018 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 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		86.5	ug/L	0.652	2.17
65-85-0	Benzoic acid		101	ug/L	13.0	43.5
100-51-6	Benzyl alcohol		83.1	ug/L	6.52	21.7
85-68-7	Butylbenzylphthalate		100	ug/L	0.652	21.7
218-01-9	Chrysene		87.2	ug/L	0.652	2.17
84-74-2	Di-n-butylphthalate		95.4	ug/L	0.652	21.7
117-84-0	Di-n-octylphthalate		114	ug/L	0.652	21.7
53-70-3	Dibenzo(a,h)anthracene		91.6	ug/L	0.652	2.17
132-64-9	Dibenzofuran		85.2	ug/L	6.52	21.7
84-66-2	Diethylphthalate		89.5	ug/L	0.652	21.7
131-11-3	Dimethylphthalate		89.4	ug/L	0.652	21.7
88-85-7	Dinoseb	U	6.52	ug/L	6.52	21.7
122-39-4	Diphenylamine		85.7	ug/L	6.52	21.7
206-44-0	Fluoranthene		87.7	ug/L	0.652	2.17
86-73-7	Fluorene		83.6	ug/L	0.652	2.17
118-74-1	Hexachlorobenzene		88.0	ug/L	6.52	21.7
87-68-3	Hexachlorobutadiene		72.6	ug/L	6.52	21.7
77-47-4	Hexachlorocyclopentadiene		49.5	ug/L	6.52	21.7
67-72-1	Hexachloroethane		65.0	ug/L	6.52	21.7
193-39-5	Indeno(1,2,3-cd)pyrene		93.4	ug/L	0.652	2.17
78-59-1	Isophorone		77.5	ug/L	7.61	21.7
62-75-9	N-Methyl-N-nitrosomethylamine		64.6	ug/L	6.52	21.7
924-16-3	N-Nitrosodi-n-butylamine	U	6.52	ug/L	6.52	21.7
55-18-5	N-Nitrosodiethylamine	U	6.52	ug/L	6.52	21.7
621-64-7	N-Nitrosodi-n-propylamine		87.5	ug/L	6.52	21.7
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		89.1	ug/L	6.52	21.7
91-20-3	Naphthalene		74.9	ug/L	0.652	2.17
98-95-3	Nitrobenzene		80.7	ug/L	6.52	21.7
608-93-5	Pentachlorobenzene	U	6.52	ug/L	6.52	21.7
87-86-5	Pentachlorophenol		102	ug/L	6.52	21.7
85-01-8	Phenanthrene		83.5	ug/L	0.652	2.17
108-95-2	Phenol		52.8	ug/L	6.52	21.7
129-00-0	Pyrene		81.1	ug/L	0.652	2.17
110-86-1	Pyridine		70.3	ug/L	6.52	21.7
108-60-1	bis(2-Chloro-1-methylethyl)ether		83.2	ug/L	6.52	21.7
111-91-1	bis(2-Chloroethoxy)methane		81.5	ug/L	6.52	21.7
111-44-4	bis(2-Chloroethyl) ether		82.2	ug/L	6.52	21.7
117-81-7	bis(2-Ethylhexyl)phthalate		114	ug/L	0.652	2.17

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**SDG Number:** 2018-2098  
**Lab Sample ID:** 1203989123  
**Client Sample:** QC for batch 1746892  
**Client ID:** CAAN-18-151479MS  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 16:52  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1418.D

**Date Collected:** 03/07/2018 08:38  
**Date Received:** 03/09/2018 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 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		85.1	ug/L	8.04	21.7
99-09-2	3-Nitroaniline		106	ug/L	6.52	21.7
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		77.8	ug/L	6.52	21.7
88-74-4	2-Nitroaniline		86.8	ug/L	6.52	21.7
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		87.7	ug/L	6.52	21.7
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	184	217	ug/L	85	(32%-124%)
2-Fluorobiphenyl	79.9	109	ug/L	74	(32%-112%)
2-Fluorophenol	137	217	ug/L	63	(15%-88%)
Nitrobenzene-d5	82.7	109	ug/L	76	(36%-115%)
Phenol-d5	103	217	ug/L	47	(15%-91%)
p-Terphenyl-d14	95.1	109	ug/L	88	(36%-121%)

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**SDG Number:** 2018-2098  
**Lab Sample ID:** 1203989124  
**Client Sample:** QC for batch 1746892  
**Client ID:** CAAN-18-151479MSD  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 17:19  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1419.D

**Date Collected:** 03/07/2018 08:38  
**Date Received:** 03/09/2018 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 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		79.1	ug/L	6.52	21.7
120-82-1	1,2,4-Trichlorobenzene		74.9	ug/L	6.52	21.7
95-50-1	1,2-Dichlorobenzene		70.9	ug/L	6.52	21.7
122-66-7	Azobenzene		86.6	ug/L	6.52	21.7
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		68.5	ug/L	6.52	21.7
106-46-7	1,4-Dichlorobenzene		68.9	ug/L	6.52	21.7
123-91-1	1,4-Dioxane		66.6	ug/L	6.52	21.7
90-12-0	1-Methylnaphthalene		75.3	ug/L	0.652	2.17
58-90-2	2,3,4,6-Tetrachlorophenol		81.2	ug/L	6.52	21.7
95-95-4	2,4,5-Trichlorophenol		81.7	ug/L	6.52	21.7
88-06-2	2,4,6-Trichlorophenol		80.1	ug/L	6.52	21.7
120-83-2	2,4-Dichlorophenol		81.9	ug/L	6.52	21.7
105-67-9	2,4-Dimethylphenol		67.9	ug/L	6.52	21.7
51-28-5	2,4-Dinitrophenol		84.6	ug/L	10.9	43.5
121-14-2	2,4-Dinitrotoluene		78.7	ug/L	6.52	21.7
606-20-2	2,6-Dinitrotoluene		78.7	ug/L	6.52	21.7
91-58-7	2-Chloronaphthalene		76.7	ug/L	0.891	2.17
95-57-8	2-Chlorophenol		77.9	ug/L	6.52	21.7
534-52-1	2-Methyl-4,6-dinitrophenol		86.5	ug/L	6.52	21.7
91-57-6	2-Methylnaphthalene		73.4	ug/L	0.652	2.17
88-75-5	2-Nitrophenol		82.5	ug/L	6.52	21.7
91-94-1	3,3'-Dichlorobenzidine		76.2	ug/L	6.52	21.7
101-55-3	4-Bromophenylphenylether		86.7	ug/L	6.52	21.7
59-50-7	Parachlorometa cresol		82.3	ug/L	6.52	21.7
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		98.0	ug/L	7.17	21.7
7005-72-3	4-Chlorophenylphenylether		84.6	ug/L	6.52	21.7
100-02-7	4-Nitrophenol		43.5	ug/L	6.52	21.7
83-32-9	Acenaphthene		83.2	ug/L	0.652	2.17
208-96-8	Acenaphthylene		79.3	ug/L	0.652	2.17
62-53-3	Aniline		83.4	ug/L	9.13	21.7
120-12-7	Anthracene		80.0	ug/L	0.652	2.17
1912-24-9	Atrazine		89.0	ug/L	6.52	21.7
92-87-5	Benzidine		128	ug/L	8.48	21.7
56-55-3	Benzo(a)anthracene		80.9	ug/L	0.652	2.17
50-32-8	Benzo(a)pyrene		82.7	ug/L	0.652	2.17
205-99-2	Benzo(b)fluoranthene		82.5	ug/L	0.652	2.17
191-24-2	Benzo(ghi)perylene		80.2	ug/L	0.652	2.17

**Semi-Volatile  
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**SDG Number:** 2018-2098  
**Lab Sample ID:** 1203989124  
**Client Sample:** QC for batch 1746892  
**Client ID:** CAAN-18-151479MSD  
**Batch ID:** 1746893  
**Run Date:** 03/14/2018 17:19  
**Prep Date:** 03/14/2018 08:20  
**Data File:** 031418a.s\Ac1419.D

**Date Collected:** 03/07/2018 08:38  
**Date Received:** 03/09/2018 08:55  
**Client:** ARSL004  
**Method:** SW846 3510C/8270D  
**Inst:** MSDA.I  
**Analyst:** JMB3  
**Aliquot:** 460 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		85.5	ug/L	0.652	2.17
65-85-0	Benzoic acid		116	ug/L	13.0	43.5
100-51-6	Benzyl alcohol		79.3	ug/L	6.52	21.7
85-68-7	Butylbenzylphthalate		101	ug/L	0.652	21.7
218-01-9	Chrysene		83.6	ug/L	0.652	2.17
84-74-2	Di-n-butylphthalate		89.7	ug/L	0.652	21.7
117-84-0	Di-n-octylphthalate		107	ug/L	0.652	21.7
53-70-3	Dibenzo(a,h)anthracene		82.7	ug/L	0.652	2.17
132-64-9	Dibenzofuran		81.6	ug/L	6.52	21.7
84-66-2	Diethylphthalate		83.3	ug/L	0.652	21.7
131-11-3	Dimethylphthalate		84.9	ug/L	0.652	21.7
88-85-7	Dinoseb	U	6.52	ug/L	6.52	21.7
122-39-4	Diphenylamine		84.6	ug/L	6.52	21.7
206-44-0	Fluoranthene		80.0	ug/L	0.652	2.17
86-73-7	Fluorene		79.2	ug/L	0.652	2.17
118-74-1	Hexachlorobenzene		84.9	ug/L	6.52	21.7
87-68-3	Hexachlorobutadiene		73.1	ug/L	6.52	21.7
77-47-4	Hexachlorocyclopentadiene		50.0	ug/L	6.52	21.7
67-72-1	Hexachloroethane		66.3	ug/L	6.52	21.7
193-39-5	Indeno(1,2,3-cd)pyrene		82.8	ug/L	0.652	2.17
78-59-1	Isophorone		74.1	ug/L	7.61	21.7
62-75-9	N-Methyl-N-nitrosomethylamine		64.2	ug/L	6.52	21.7
924-16-3	N-Nitrosodi-n-butylamine	U	6.52	ug/L	6.52	21.7
55-18-5	N-Nitrosodiethylamine	U	6.52	ug/L	6.52	21.7
621-64-7	N-Nitrosodi-n-propylamine		83.6	ug/L	6.52	21.7
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		85.2	ug/L	6.52	21.7
91-20-3	Naphthalene		74.5	ug/L	0.652	2.17
98-95-3	Nitrobenzene		78.9	ug/L	6.52	21.7
608-93-5	Pentachlorobenzene	U	6.52	ug/L	6.52	21.7
87-86-5	Pentachlorophenol		97.8	ug/L	6.52	21.7
85-01-8	Phenanthrene		80.7	ug/L	0.652	2.17
108-95-2	Phenol		51.8	ug/L	6.52	21.7
129-00-0	Pyrene		82.8	ug/L	0.652	2.17
110-86-1	Pyridine		66.0	ug/L	6.52	21.7
108-60-1	bis(2-Chloro-1-methylethyl)ether		82.3	ug/L	6.52	21.7
111-91-1	bis(2-Chloroethoxy)methane		79.2	ug/L	6.52	21.7
111-44-4	bis(2-Chloroethyl) ether		80.6	ug/L	6.52	21.7
117-81-7	bis(2-Ethylhexyl)phthalate		113	ug/L	0.652	2.17



**Semi-Volatile  
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<b>SDG Number:</b> 2018-2098	<b>Date Collected:</b> 03/07/2018 08:38	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203989124	<b>Date Received:</b> 03/09/2018 08:55	
<b>Client Sample:</b> QC for batch 1746892	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAAN-18-151479MSD	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Batch ID:</b> 1746893	<b>Inst:</b> MSDA.I	<b>Dilution:</b> 1
<b>Run Date:</b> 03/14/2018 17:19	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 03/14/2018 08:20	<b>Aliquot:</b> 460 mL	<b>Final Volume:</b> 1 mL
<b>Data File:</b> 031418a.s\Ac1419.D	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		83.0	ug/L	8.04	21.7
99-09-2	3-Nitroaniline		99.2	ug/L	6.52	21.7
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		76.3	ug/L	6.52	21.7
88-74-4	2-Nitroaniline		83.4	ug/L	6.52	21.7
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		79.1	ug/L	6.52	21.7
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	168	217	ug/L	77	(32%-124%)
2-Fluorobiphenyl	77.5	109	ug/L	71	(32%-112%)
2-Fluorophenol	136	217	ug/L	62	(15%-88%)
Nitrobenzene-d5	82.1	109	ug/L	76	(36%-115%)
Phenol-d5	101	217	ug/L	46	(15%-91%)
p-Terphenyl-d14	96.5	109	ug/L	89	(36%-121%)

# **Perchlorates by LCMSMS Analysis**

# Case Narrative

**Perchlorates by LCMSMS  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-2098  
Work Order #: 445591**

**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**

<b>Sample ID</b>	<b>Client ID</b>
445591001	445591001 (CAAN-18-151446)
445591003	445591003 (CAAN-18-151479)
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: 2018-2098 GEL Work Order: 445591

#### 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-18-151446Date Received: 09-MAR-18GEL Job No (SDG): 2018-2098GEL Sample ID: 445591001Date 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	0.247	ug/L		1	14-MAR-18 17:47	per0314021a
	Perchlorate Isotope Ratio			2.93			1	14-MAR-18 17:47	per0314021a
14797-73-0	Perchlorate-101	.05	.2	0.262	ug/L		1	14-MAR-18 17:47	per0314021a
	Perchlorate-O(18)			0.426	ug/L		1	14-MAR-18 17:47	per0314021a

^ 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-18-151479Date Received: 09-MAR-18GEL Job No (SDG): 2018-2098GEL Sample ID: 445591003Date 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 17:58	per0314022a
	Perchlorate Isotope Ratio						1	14-MAR-18 17:58	per0314022a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	14-MAR-18 17:58	per0314022a
	Perchlorate-O(18)			0.412	ug/L		1	14-MAR-18 17:58	per0314022a

^ 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):** 2018-2098

**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):** 2018-2098

**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): 2018-2098GEL 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): 2018-2098GEL 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): 2018-2098GEL 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): 2018-2098GEL 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): 2018-2098GEL 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 #: 2018-2098  
Work Order #: 445591**

**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:

<b>Sample ID</b>	<b>Client ID</b>
445591004	CAAN-18-151479
445591006	CAAN-18-151491
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: 2018-2098 GEL Work Order: 445591

#### 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-18-151479

Lab Code: GEL

GEL Job No (SDG) 2018-2098

Matrix: WATER

GEL Sample ID: 445591004

Sample Amount 940 mL

Date Received: 09-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: EXP0315022.wiff

Date Analyzed: 15-MAR-18 22:04

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.0851	U	0.0851	0.266
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.0851	U	0.0851	0.266
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.0851	U	0.0851	0.266
<i>121-82-4</i>	<i>RDX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.0851	U	0.0851	0.266
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.0851	U	0.0851	0.266
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.0851	U	0.0851	0.266
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.0851	U	0.0851	0.532
<i>479-45-8</i>	<i>Tetryl</i>				
606-20-2	2,6-Dinitrotoluene	.0851	U	0.0851	0.266
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
98-95-3	Nitrobenzene	.0851	U	0.0851	0.266
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.0851	U	0.0851	0.266
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.0851	U	0.0851	0.266
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	.0851	U	0.0851	0.266
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
88-72-2	o-Nitrotoluene	.0872	U	0.0872	0.266
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-18-151479

Lab Code: GEL

GEL Job No (SDG) 2018-2098

Matrix: WATER

GEL Sample ID: 445591004

Sample Amount 940 mL

Date Received: 09-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	.106	U	0.106	0.532
<i>78-11-5</i>	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.16	U	0.160	0.532
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	.319	U	0.319	1.06
<i>3058-38-6</i>	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	.319	U	0.319	1.06
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	.319	U	0.319	1.06
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	.532	U	0.532	2.66
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	.532	U	0.532	2.66
<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-18-151491

Lab Code: GEL

GEL Job No (SDG) 2018-2098

Matrix: WATER

GEL Sample ID: 445591006

Sample Amount 950 mL

Date Received: 09-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: EXP0315023.wiff

Date Analyzed: 15-MAR-18 22:39

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.0842	U	0.0842	0.263
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.0842	U	0.0842	0.263
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.0842	U	0.0842	0.263
<i>121-82-4</i>	<i>RDX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.0842	U	0.0842	0.263
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.0842	U	0.0842	0.263
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.0842	U	0.0842	0.263
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.0842	U	0.0842	0.526
<i>479-45-8</i>	<i>Tetryl</i>				
606-20-2	2,6-Dinitrotoluene	.0842	U	0.0842	0.263
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
98-95-3	Nitrobenzene	.0842	U	0.0842	0.263
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.0842	U	0.0842	0.263
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.0842	U	0.0842	0.263
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	.0842	U	0.0842	0.263
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
88-72-2	o-Nitrotoluene	.0863	U	0.0863	0.263
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAAN-18-151491

Lab Code: GEL

GEL Job No (SDG) 2018-2098

Matrix: WATER

GEL Sample ID: 445591006

Sample Amount 950 mL

Date Received: 09-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	.105	U	0.105	0.526
<i>78-11-5</i>	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.158	U	0.158	0.526
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	.316	U	0.316	1.05
<i>3058-38-6</i>	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	.316	U	0.316	1.05
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	.316	U	0.316	1.05
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	.526	U	0.526	2.63
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	.526	U	0.526	2.63
<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):** 2018-2098**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
445591004	CAAN-18-151479	88	55 - 115	
445591006	CAAN-18-151491	97	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)** 2018-2098

**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
tris(o-cresyl) phosphate	5	3.2	64					43 - 104
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

# 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)** 2018-2098

**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
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
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

#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) 2018-2098

Matrix: WATER

GEL Sample ID: 1203987814

Sample Amount 1000 mL

Date Received: 09-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) 2018-2098

Matrix: WATER

GEL Sample ID: 1203987814

Sample Amount 1000 mL

Date Received: 09-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) 2018-2098

Matrix: WATER

GEL Sample ID: 1203987815

Sample Amount 1000 mL

Date Received: 09-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) 2018-2098

Matrix: WATER

GEL Sample ID: 1203987815

Sample Amount 1000 mL

Date Received: 09-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) 2018-2098

Matrix: WATER

GEL Sample ID: 1203987816

Sample Amount 910 mL

Date Received: 09-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) 2018-2098

Matrix: WATER

GEL Sample ID: 1203987816

Sample Amount 910 mL

Date Received: 09-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) 2018-2098

Matrix: WATER

GEL Sample ID: 1203987817

Sample Amount 930 mL

Date Received: 09-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) 2018-2098

Matrix: WATER

GEL Sample ID: 1203987817

Sample Amount 930 mL

Date Received: 09-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): 2018-2098Lab 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): 2018-2098Lab 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)
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
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

4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-2098

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): 2018-2098

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)
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
MNX	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



4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-2098

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): 2018-2098

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)
2,4-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
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0

# Metals Analysis

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**ARS International, LLC (ARSL)**  
**SDG #: 2018-2098**  
**Work Order #: 445591**

**Product:** Determination of Metals by ICP

**Analytical Method:** SW846 3005A/6010C

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

**Analytical Batch:** 1745995

**Product:** Determination of Metals by ICP-MS

**Analytical Method:** SW846 3005A/6020A

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

**Analytical Batch:** 1746000

**Product:** Inorganic Calculations

**Analytical Method:** SM:A2340B

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

**Analytical Batch:** 1751872

**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:** 1746590

**Preparation Method:** SW846 3005A

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

**Preparation Batches:** 1745994 and 1745999

**Preparation Method:** EPA 245.1/245.2 Prep

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

**Preparation Batch:** 1746589

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445591001	CAAN-18-151446
445591003	CAAN-18-151479
445591005	CAAN-18-151491
1203987135	Method Blank (MB) <b>ICP</b>
1203987136	Laboratory Control Sample (LCS)
1203987139	445591001(CAAN-18-151446L) Serial Dilution (SD)
1203987137	445591001(CAAN-18-151446D) Sample Duplicate (DUP)
1203987138	445591001(CAAN-18-151446S) Matrix Spike (MS)
1203987148	Method Blank (MB) <b>ICP-MS</b>
1203987149	Laboratory Control Sample (LCS)
1203987152	445591001(CAAN-18-151446L) Serial Dilution (SD)
1203987150	445591001(CAAN-18-151446D) Sample Duplicate (DUP)
1203987151	445591001(CAAN-18-151446S) Matrix Spike (MS)
1203988464	Method Blank (MB) <b>CVAA</b>
1203988465	Laboratory Control Sample (LCS)

1203988468	445591001(CAAN-18-151446L) Serial Dilution (SD)
1203988466	445591001(CAAN-18-151446D) Sample Duplicate (DUP)
1203988467	445591001(CAAN-18-151446S) Matrix Spike (MS)

Samples 445591001,003 and 005 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**

##### **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: 2018-2098 GEL Work Order: 445591

#### **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



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**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** 2018-2098**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 445591001**BASIS:** As Received**DATE COLLECTED** 07-MAR-18**CLIENT ID:** CAAN-18-151446**LEVEL:** Low**DATE RECEIVED** 09-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	MTM1	03/14/18 11:40	031418W2-4	1746590

**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

SDG No: 2018-2098

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 445591001

BASIS: As Received

DATE COLLECTED 07-MAR-18

CLIENT ID: CAAN-18-151446

LEVEL: Low

DATE RECEIVED 09-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	03/22/18 11:49	032218-1	1745995
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	03/21/18 21:29	180321-2	1746000
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	03/21/18 21:29	180321-2	1746000
7440-39-3	Barium	14.6	ug/L		1	5	5	1	P	HSC	03/22/18 11:49	032218-1	1745995
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	03/22/18 11:49	032218-1	1745995
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	03/22/18 11:49	032218-1	1745995
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/21/18 21:29	180321-2	1746000
7440-70-2	Calcium	10400	ug/L		50	200	200	1	P	HSC	03/22/18 11:49	032218-1	1745995
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	03/21/18 21:29	180321-2	1746000
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	03/22/18 11:49	032218-1	1745995
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	03/22/18 11:49	032218-1	1745995
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	03/22/18 11:49	032218-1	1745995
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	03/21/18 21:29	180321-2	1746000
7439-95-4	Magnesium	3100	ug/L		110	300	300	1	P	HSC	03/22/18 11:49	032218-1	1745995
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	03/22/18 11:49	032218-1	1745995
7439-98-7	Molybdenum	1.26	ug/L		0.2	0.5	0.5	1	MS	BAJ	03/21/18 21:29	180321-2	1746000
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/21/18 21:29	180321-2	1746000
7440-09-7	Potassium	1230	ug/L		50	150	150	1	P	HSC	03/22/18 11:49	032218-1	1745995
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	03/21/18 21:29	180321-2	1746000
7631-86-9	Silica	72000	ug/L		53	213	213	1	P	HSC	03/22/18 11:49	032218-1	1745995
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/21/18 21:29	180321-2	1746000
7440-23-5	Sodium	11200	ug/L		100	300	300	1	P	HSC	03/22/18 11:49	032218-1	1745995
7440-24-6	Strontium	52.2	ug/L		1	5	5	1	P	HSC	03/22/18 11:49	032218-1	1745995
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/21/18 21:29	180321-2	1746000
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	03/22/18 11:49	032218-1	1745995
7440-61-1	Uranium	0.434	ug/L		0.067	0.2	0.2	1	MS	BAJ	03/22/18 03:52	180321-3	1746000
7440-62-2	Vanadium	7.31	ug/L		1	5	5	1	P	HSC	03/22/18 11:49	032218-1	1745995
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	03/22/18 11:49	032218-1	1745995

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**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** 2018-2098**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 445591001**BASIS:** As Received**DATE COLLECTED** 07-MAR-18**CLIENT ID:** CAAN-18-151446**LEVEL:** Low**DATE RECEIVED** 09-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	38.8	mg/L		0.453	1.24	1.24	1		TXT1	03/30/18 10:47		1751872

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1745995	1745994	SW846 3005A	50	mL	50	mL	03/16/18	SXW1
1746000	1745999	SW846 3005A	50	mL	50	mL	03/09/18	JXM8
1746590	1746589	EPA 245.1/245.2 Prep	20	mL	20	mL	03/13/18	AXS5

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

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**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** 2018-2098**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 445591003**BASIS:** As Received**DATE COLLECTED** 07-MAR-18**CLIENT ID:** CAAN-18-151479**LEVEL:** Low**DATE RECEIVED** 09-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	MTM1	03/14/18 11:49	031418W2-4	1746590

**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

SDG No: 2018-2098

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 445591003

BASIS: As Received

DATE COLLECTED 07-MAR-18

CLIENT ID: CAAN-18-151479

LEVEL: Low

DATE RECEIVED 09-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	03/22/18 12:05	032218-1	1745995
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	03/21/18 21:56	180321-2	1746000
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	03/21/18 21:56	180321-2	1746000
7440-39-3	Barium	1.25	ug/L	J	1	5	5	1	P	HSC	03/22/18 12:05	032218-1	1745995
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	03/22/18 12:05	032218-1	1745995
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	03/22/18 12:05	032218-1	1745995
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/21/18 21:56	180321-2	1746000
7440-70-2	Calcium	50	ug/L	U	50	200	200	1	P	HSC	03/22/18 12:05	032218-1	1745995
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	03/21/18 21:56	180321-2	1746000
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	03/22/18 12:05	032218-1	1745995
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	03/22/18 12:05	032218-1	1745995
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	03/22/18 12:05	032218-1	1745995
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	03/21/18 21:56	180321-2	1746000
7439-95-4	Magnesium	110	ug/L	U	110	300	300	1	P	HSC	03/22/18 12:05	032218-1	1745995
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	03/22/18 12:05	032218-1	1745995
7439-98-7	Molybdenum	0.20	ug/L	U	0.2	0.5	0.5	1	MS	BAJ	03/21/18 21:56	180321-2	1746000
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/21/18 21:56	180321-2	1746000
7440-09-7	Potassium	50	ug/L	U	50	150	150	1	P	HSC	03/22/18 12:05	032218-1	1745995
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	03/21/18 21:56	180321-2	1746000
7631-86-9	Silica	53	ug/L	U	53	213	213	1	P	HSC	03/22/18 12:05	032218-1	1745995
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	03/21/18 21:56	180321-2	1746000
7440-23-5	Sodium	100	ug/L	U	100	300	300	1	P	HSC	03/22/18 12:05	032218-1	1745995
7440-24-6	Strontium	1	ug/L	U	1	5	5	1	P	HSC	03/22/18 12:05	032218-1	1745995
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	03/21/18 21:56	180321-2	1746000
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	03/22/18 12:05	032218-1	1745995
7440-61-1	Uranium	0.067	ug/L	U	0.067	0.2	0.2	1	MS	BAJ	03/22/18 04:18	180321-3	1746000
7440-62-2	Vanadium	1	ug/L	U	1	5	5	1	P	HSC	03/22/18 12:05	032218-1	1745995
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	03/22/18 12:05	032218-1	1745995

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**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** 2018-2098**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 445591003**BASIS:** As Received**DATE COLLECTED** 07-MAR-18**CLIENT ID:** CAAN-18-151479**LEVEL:** Low**DATE RECEIVED** 09-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	0.453	mg/L	U	0.453	1.24	1.24	1		TXT1	03/30/18 10:47		1751872

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1745995	1745994	SW846 3005A	50	mL	50	mL	03/16/18	SXW1
1746000	1745999	SW846 3005A	50	mL	50	mL	03/09/18	JXM8
1746590	1746589	EPA 245.1/245.2 Prep	20	mL	20	mL	03/13/18	AXS5

**\*Analytical Methods:**

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

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**METALS**  
**-1-**  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** 2018-2098**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 445591005**BASIS:** As Received**DATE COLLECTED** 07-MAR-18**CLIENT ID:** CAAN-18-151491**LEVEL:** Low**DATE RECEIVED** 09-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	MTM1	03/14/18 11:50	031418W2-4	1746590

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1746590	1746589	EPA 245.1/245.2 Prep	20	mL	20	mL	03/13/18	AXS5

**\*Analytical Methods:**

AV      EPA 245.2 1974

# **Quality Control Summary**



**METALS**  
**-3b-**  
**PREPARATION BLANK SUMMARY**

SDG NO. 2018-2098

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>
1203987135	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	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	3.39	ug/L	+/-10	J	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	-3.54	ug/L	+/-10	J	P	3.3	10
1203987148	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
1203988464	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. 2018-2098 Client ID: CAAN-18-151446S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 445591001 Spike ID: 1203987138

<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	5440		68	U	5000	109		P
Barium	ug/L	75-125	539		14.6		500	105		P
Beryllium	ug/L	75-125	532		1	U	500	106		P
Boron	ug/L	75-125	507		15	U	500	101		P
Calcium	ug/L	75-125	15500		10400		5000	101		P
Cobalt	ug/L	75-125	525		1	U	500	105		P
Copper	ug/L	75-125	538		3	U	500	107		P
Iron	ug/L	75-125	5190		30	U	5000	104		P
Magnesium	ug/L	75-125	8180		3100		5000	102		P
Manganese	ug/L	75-125	529		2	U	500	106		P
Potassium	ug/L	75-125	6490		1230		5000	105		P
Silica	ug/L		81500		72000		10700	88.8	N/A	P
Sodium	ug/L	75-125	16300		11200		5000	101		P
Strontium	ug/L	75-125	602		52.2		500	110		P
Tin	ug/L	75-125	523		2.5	U	500	105		P
Vanadium	ug/L	75-125	538		7.31		500	106		P
Zinc	ug/L	75-125	520		3.3	U	500	104		P

\*Analytical Methods:

P SW846 3005A/6010C

## METALS

-5a-

## Matrix Spike Summary

**SDG NO.** 2018-2098 **Client ID:** CAAN-18-151446S

**Contract:** ESHL00114 **Level:** Low

**Matrix:** WATER **% Solids:**

**Sample ID:** 445591001 **Spike ID:** 1203987151

<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	50.7		1	U	50	101		MS
Arsenic	ug/L	75-125	51		2	U	50	98.6		MS
Cadmium	ug/L	75-125	50.6		0.3	U	50	101		MS
Chromium	ug/L	75-125	50.2		3	U	50	95.1		MS
Lead	ug/L	75-125	48.4		0.5	U	50	96.6		MS
Molybdenum	ug/L	75-125	52.9		1.26		50	103		MS
Nickel	ug/L	75-125	47.8		0.6	U	50	94.6		MS
Selenium	ug/L	75-125	50.8		2	U	50	101		MS
Silver	ug/L	75-125	50.5		0.3	U	50	101		MS
Thallium	ug/L	75-125	45.5		0.6	U	50	90.9		MS
Uranium	ug/L	75-125	46.4		0.434		50	92		MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-5a-

## Matrix Spike Summary

**SDG NO.** 2018-2098 **Client ID:** CAAN-18-151446S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 445591001 **Spike ID:** 1203988467

<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	2.05		0.067	U	2	103		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

**Metals**  
**-6-**  
**Duplicate Sample Summary**

SDG No.: 2018-2098

Lab Code: GEL

Contract: ESHL00114

Client ID: CAAN-18-151446D

Matrix: WATER

Level: Low

Sample ID: 445591001

Duplicate ID: 1203987137

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	14.6		14.4		1.42		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	10400		10300		.809		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	3100		3060		1.24		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1230		1180		4.3		P
Silica	ug/L	+/-20%	72000		71600		.489		P
Sodium	ug/L	+/-20%	11200		11200		.688		P
Strontium	ug/L	+/-20%	52.2		52		.484		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	7.31		7.12		2.61		P
Zinc	ug/L		3.3 U		3.3 U				P

\*Analytical Methods:

P SW846 3005A/6010C

**Metals**  
**-6-**  
**Duplicate Sample Summary**

SDG No.: 2018-2098

Lab Code: GEL

Contract: ESHL00114

Client ID: CAAN-18-151446D

Matrix: WATER

Level: Low

Sample ID: 445591001

Duplicate ID: 1203987150

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	1.26		1.12		11.7		MS
Nickel	ug/L		0.6 U		0.6 U				MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.3 U		0.3 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L	+/- .2	0.434		0.437		.689		MS

\*Analytical Methods:

MS SW846 3005A/6020A

**Metals**  
**–6–**  
**Duplicate Sample Summary**

**SDG No.:** 2018–2098**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAAN–18–151446D**Matrix:** WATER**Level:** Low**Sample ID:** 445591001**Duplicate ID:** 1203988466**Percent Solids for Dup:** N/A

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

\*Analytical Methods:  
AV EPA 245.1/245.2

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2018-2098

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>
1203987136								
	Aluminum	ug/L	5000	5410		108	80-120	P
	Barium	ug/L	500	531		106	80-120	P
	Beryllium	ug/L	500	531		106	80-120	P
	Boron	ug/L	500	538		108	80-120	P
	Calcium	ug/L	5000	5320		106	80-120	P
	Cobalt	ug/L	500	529		106	80-120	P
	Copper	ug/L	500	529		106	80-120	P
	Iron	ug/L	5000	5230		105	80-120	P
	Magnesium	ug/L	5000	5280		106	80-120	P
	Manganese	ug/L	500	534		107	80-120	P
	Potassium	ug/L	5000	5220		104	80-120	P
	Silica	ug/L	10700	11200		105	80-120	P
	Sodium	ug/L	5000	5220		104	80-120	P
	Strontium	ug/L	500	543		109	80-120	P
	Tin	ug/L	500	528		106	80-120	P
	Vanadium	ug/L	500	530		106	80-120	P
	Zinc	ug/L	500	518		104	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C



## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2018-2098

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>
1203987149								
	Antimony	ug/L	50	49.6		99.1	80-120	MS
	Arsenic	ug/L	50	51.2		102	80-120	MS
	Cadmium	ug/L	50	50.7		101	80-120	MS
	Chromium	ug/L	50	48.7		97.4	80-120	MS
	Lead	ug/L	50	47.4		94.9	80-120	MS
	Molybdenum	ug/L	50	51		102	80-120	MS
	Nickel	ug/L	50	51.7		103	80-120	MS
	Selenium	ug/L	50	51.7		103	80-120	MS
	Silver	ug/L	50	51.6		103	80-120	MS
	Thallium	ug/L	50	43.5		87.1	80-120	MS
	Uranium	ug/L	50	45.8		91.5	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2018-2098

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>
1203988465	Mercury	ug/L	2	2.1		105	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

-9-

## Serial Dilution Sample Summary

SDG NO. 2018-2098

Client ID: CAAN-18-151446L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 445591001

Serial Dilution ID: 1203987139

<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	14.6		16.2	J	11.084			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	10400		10700		3.064		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3100		3270		5.628			P
Manganese	2	U	10	U				P
Potassium	1230		1370		11.105			P
Silica	72000		73300		1.886		10	P
Sodium	11200		11700		4.019		10	P
Strontium	52.2		54.7		4.64		10	P
Tin	2.5	U	12.5	U				P
Vanadium	7.31		9.25	J	26.534			P
Zinc	3.3	U	16.5	U				P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-9-

## Serial Dilution Sample Summary

**SDG NO.** 2018-2098 **Client ID:** CAAN-18-151446L

**Contract:** ESHL00114

**Matrix:** LIQUID **Level:** Low

**Sample ID:** 445591001 **Serial Dilution ID:** 1203987152

<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	1.26		1.36	J	7.882			MS
Nickel	.6	U	3	U				MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.434		.49	J	12.903			MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-9-

## Serial Dilution Sample Summary

**SDG NO.** 2018-2098 **Client ID:** CAAN-18-151446L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 445591001 **Serial Dilution ID:** 1203988468

<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 #: 2018-2098  
Work Order #: 445591**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1746313

**Method:** SW 9060 Total Organic Carbon

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
445591003	CAAN-18-151479
445591005	CAAN-18-151491
1203988642	Method Blank (MB)
1203988643	Laboratory Control Sample (LCS)
1203988644	445726002(CAWA-18-151437) Sample Duplicate (DUP)
1203988647	445726002(CAWA-18-151437) 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 445726002 (CAWA-18-151437) 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:** 1746224 **Method:** WSP-CN(T)

**Prep Batch :** 1746223 **Method:** EPA 335.4

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
445591003	CAAN-18-151479
445591005	CAAN-18-151491
1203987609	Method Blank (MB)
1203987610	Laboratory Control Sample (LCS)
1203987611	Laboratory Control Sample Duplicate (LCSD)
1203987613	445595001(NonSDG) Sample Duplicate (DUP)
1203987614	445591003(CAAN-18-151479) Sample Duplicate (DUP)
1203987617	445595001(NonSDG) Matrix Spike (MS)
1203987618	445591003(CAAN-18-151479) 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.

**LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD between the LCS and LCSD met the acceptance limits.

**Quality Control (QC) Designation**

Samples 445591003 (CAAN-18-151479) and 445595001 (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:

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### **Method/Analysis Information**

**Product:** Ion Chromatography

**Analytical Batch:** 1746518

**Method:** WSP-ANIONS

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
445591001	CAAN-18-151446
445591003	CAAN-18-151479
1203988266	Method Blank (MB)
1203988267	Laboratory Control Sample (LCS)
1203988268	445591001(CAAN-18-151446) Sample Duplicate (DUP)
1203988269	445591001(CAAN-18-151446) 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-5000 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 445591001 (CAAN-18-151446) was selected for QC analysis.

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

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

#### **Duplicate Relative Percent Difference (RPD) Statement**

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

### **Technical Information**

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

#### **Holding Times**

All samples in this SDG met the specified holding time.

#### **Sample Dilutions**

The samples in this SDG did not require dilutions.

#### **Sample Re-analysis**

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

### **Miscellaneous Information**

#### **Manual Integrations**

Samples 1203988267 (LCS), 1203988268 (CAAN-18-151446DUP), 1203988269 (CAAN-18-151446PS), 445591001 (CAAN-18-151446) and 445591003 (CAAN-18-151479) 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:** 1746244 and 1746883 **Method:** NH3  
**Prep Batch :** 1746243 and 1746882 **Method:** EPA 350.1 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
445591001	CAAN-18-151446
445591003	CAAN-18-151479
1203987671	Method Blank (MB)
1203989093	Method Blank (MB)
1203987672	Laboratory Control Sample (LCS)
1203989094	Laboratory Control Sample (LCS)
1203987673	445591001(CAAN-18-151446) Sample Duplicate (DUP)
1203989095	445726001(CAWA-18-151436) Sample Duplicate (DUP)
1203987674	445591001(CAAN-18-151446) Matrix Spike (MS)
1203989096	445726001(CAWA-18-151436) 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 MBs analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Quality Control (QC) Designation**

Samples 445591001 (CAAN-18-151446) and 445726001 (CAWA-18-151436) 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**

Sample1203987671 (MB) was re-analyzed due to instrument failure. The results from the reanalysis are reported. Sample was reprepmed and re-analyzed to verify the result. The results from the reanalysis are reported. 445591003 (CAAN-18-151479).

**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**

<b>Product:</b>	<b>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1746248	<b>Method:</b>	TKN
<b>Prep Batch :</b>	1746247	<b>Method:</b>	EPA 351.2 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
445591003	CAAN-18-151479
445591005	CAAN-18-151491
1203987679	Method Blank (MB)
1203987680	Laboratory Control Sample (LCS)
1203987681	445591003(CAAN-18-151479) Sample Duplicate (DUP)
1203987682	445591003(CAAN-18-151479) 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**

Sample 445591003 (CAAN-18-151479) was selected for QC analysis.

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

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

**Duplicate Relative Percent Difference (RPD) Statement**

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

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### **Method/Analysis Information**

**Product:** Nitrate Nitrite by Cadmium Reduction

**Analytical Batch:** 1746242

**Method:** NO3NO2

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
445591001	CAAN-18-151446
445591003	CAAN-18-151479
1203987665	Method Blank (MB)
1203987666	Laboratory Control Sample (LCS)
1203987668	445591001(CAAN-18-151446) Sample Duplicate (DUP)
1203987670	445591001(CAAN-18-151446) 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**

Sample 445591001 (CAAN-18-151446) was selected for QC analysis.

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

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

**Duplicate Relative Percent Difference (RPD) Statement**

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information****Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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



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### **Method/Analysis Information**

<b>Product:</b>	<b>Total Phosphorus</b>		
<b>Analytical Batch:</b>	1744746	<b>Method:</b>	PO4
<b>Prep Batch :</b>	1744745	<b>Method:</b>	EPA 365.4 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
445591001	CAAN-18-151446
445591003	CAAN-18-151479
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:

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### **Method/Analysis Information**

**Product:** Solids and Total Dissolved

**Analytical Batch:** 1746580

**Method:** TDS

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
445591001	CAAN-18-151446
445591003	CAAN-18-151479
1203988416	Method Blank (MB)
1203988417	Laboratory Control Sample (LCS)
1203988421	445591001(CAAN-18-151446) 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 445591001 (CAAN-18-151446) 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:

<b>Sample ID</b>	<b>Client ID</b>
445591001	CAAN-18-151446
445591003	CAAN-18-151479
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:

<b>Sample ID</b>	<b>Client ID</b>
445591001	CAAN-18-151446
445591003	CAAN-18-151479
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
445591001 (CAAN-18-151446)	pH	Received 09-MAR-18, out of holding 07-MAR-18
445591003 (CAAN-18-151479)	pH	Received 09-MAR-18, out of holding 07-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:

<b>Sample ID</b>	<b>Client ID</b>
445591001	CAAN-18-151446
445591003	CAAN-18-151479
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: 2018-2098 GEL Work Order: 445591


#### **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:** 27 MAR 2018

**Title:** Analyst I

# Sample Data Summary

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: March 27, 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: 2018-2098

Client Sample ID: CAAN-18-151446  
Sample ID: 445591001  
Matrix: W  
Collect Date: 07-MAR-18 11:24  
Receive Date: 09-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	JXH5	03/12/18	1722	1746518	1
Chloride		1.58	0.067	0.200	mg/L		1					
Fluoride		0.179	0.033	0.100	mg/L		1					
Sulfate		1.57	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0574	0.017	0.050	mg/L	1.00	1	KLP1	03/13/18	1348	1746244	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.316	0.017	0.050	mg/L		1	AXH3	03/13/18	0506	1746242	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.0465	0.020	0.050	mg/L	1.00	1	KLP1	03/13/18	1553	1744746	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		97.1	3.40	14.3	mg/L			KLP1	03/14/18	1456	1746580	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	1757	1745500	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		119	1.00	1.00	umhos/cm		1	HXC1	03/12/18	1249	1746355	7
PH "As Received"												
pH at Temp 18.9C	H	8.12	0.010	0.100	SU		1	RXB5	03/10/18	1755	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	03/13/18	0643	1746243
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 27, 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: 2018-2098

Client Sample ID: CAAN-18-151446  
Sample ID: 445591001

Project: ESHL00114  
Client ID: ARSL004

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

### Notes:

#### Column headers are defined as follows:

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



# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: March 27, 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: 2018-2098

Client Sample ID: CAAN-18-151479  
Sample ID: 445591003  
Matrix: W  
Collect Date: 07-MAR-18 08:38  
Receive Date: 09-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	03/15/18	1833	1746313	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	03/13/18	0811	1746224	2
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	JXH5	03/12/18	1855	1746518	3
Chloride	J	0.079	0.067	0.200	mg/L		1					
Fluoride	U	ND	0.033	0.100	mg/L		1					
Sulfate	U	ND	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	U	ND	0.017	0.050	mg/L	1.00	1	KLP1	03/20/18	1316	1746883	4
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite	U	ND	0.017	0.050	mg/L		1	AXH3	03/13/18	0510	1746242	5
PO4 "As Received"												
Phosphorus, Total as P	J	0.0362	0.020	0.050	mg/L	1.00	1	KLP1	03/13/18	1554	1744746	6
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	03/16/18	1532	1746248	7
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids	U	ND	3.40	14.3	mg/L			KLP1	03/14/18	1456	1746580	8
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3	U	ND	1.45	4.00	mg/L			RXB5	03/10/18	1800	1745500	9
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		1.04	1.00	1.00	umhos/cm		1	HXC1	03/12/18	1252	1746355	10
PH "As Received"												
pH at Temp 19.6C	H	5.82	0.010	0.100	SU		1	RXB5	03/10/18	1758	1745501	11

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
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# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: March 27, 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: 2018-2098

Client Sample ID: CAAN-18-151479  
Sample ID: 445591003

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
EPA 335.4	EPA 335.4	Total Cyanide		AXH3	03/13/18		0748		1746223			
EPA 350.1 Prep	EPA 350.1	Ammonia Nitrogen Prep		KLP1	03/20/18		1237		1746882			
EPA 351.2 Prep	EPA 351.2	Total Kjeldahl Nitrogen Prep		KLP1	03/16/18		1200		1746247			
EPA 365.4 Prep	EPA 365.4	Phosphorus, Total in liquid PR		AXH3	03/13/18		0900		1744745			

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW-846:9060	
2	EPA 335.4 1993	
3	EPA:300.0	
4	EPA:350.1	
5	EPA:353.2	
6	EPA 365.4 1974	
7	EPA:351.2	
8	EPA:160.1	
9	EPA:310.1	
10	EPA:120.1	
11	EPA 150.1 1982	

### Notes:

Column headers are defined as follows:

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

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: March 27, 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: 2018-2098

Client Sample ID: CAAN-18-151491  
Sample ID: 445591005  
Matrix: W  
Collect Date: 07-MAR-18 11:24  
Receive Date: 09-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	03/15/18	1931	1746313	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	03/13/18	0814	1746224	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl		0.893	0.033	0.100	mg/L	1.00	1	KLP1	03/16/18	1534	1746248	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	03/13/18	0748	1746223
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	03/16/18	1200	1746247

The following Analytical Methods were performed:

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

### Notes:

Column headers are defined as follows:

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

# **Quality Control Summary**

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: March 27, 2018

Page 1 of 7

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

Contact: Ms. Nita Patel

Workorder: 445591

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1746313										
QC1203988644	445726002	DUP									
Total Organic Carbon Average	J	0.967	J	0.970	mg/L	0.31	^	(+/-1.00)	TSM	03/16/18	02:23
QC1203988643	LCS										
Total Organic Carbon Average	10.0			9.67	mg/L			96.7 (80%-120%)		03/15/18	13:48
QC1203988642	MB										
Total Organic Carbon Average			U	ND	mg/L					03/15/18	13:38
QC1203988647	445726002	PS									
Total Organic Carbon Average	10.0	J	0.967	11.2	mg/L			103 (75%-125%)		03/16/18	03:03
<b>Flow Injection Analysis</b>											
Batch	1746224										
QC1203987613	445595001	DUP									
Cyanide, Total	U	ND	U	ND	ug/L	N/A			AXH3	03/13/18	08:25
QC1203987614	445591003	DUP									
Cyanide, Total	U	ND	U	ND	ug/L	N/A				03/13/18	08:12
QC1203987610	LCS										
Cyanide, Total	50.0			51.0	ug/L			102 (90%-110%)		03/13/18	08:07
QC1203987611	LCSD										
Cyanide, Total	50.0			51.6	ug/L	1.17	103	(0%-20%)		03/13/18	08:08
QC1203987609	MB										
Cyanide, Total			U	ND	ug/L					03/13/18	08:06
QC1203987617	445595001	MS									
Cyanide, Total	100	U	ND	108	ug/L			108 (90%-110%)		03/13/18	08:26

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 445591

Page 2 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Flow Injection Analysis</b>											
Batch	1746224										
QC1203987618	445591003	MS									
Cyanide, Total	100	U	ND	106	ug/L		106	(90%-110%)	AXH3	03/13/18	08:13
<b>Ion Chromatography</b>											
Batch	1746518										
QC1203988268	445591001	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		JXH5	03/12/18	17:53
Chloride			1.58		1.57	mg/L	0.789	(0%-20%)			
Fluoride			0.179		0.216	mg/L	18.7 ^	(+/-0.100)			
Sulfate			1.57		1.57	mg/L	0.203 ^	(+/-0.400)			
QC1203988267	LCS										
Bromide	1.25			1.23	mg/L		98.1	(80%-120%)		03/12/18	16:52
Chloride	5.00			4.71	mg/L		94.2	(80%-120%)			
Fluoride	2.50			2.43	mg/L		97.3	(80%-120%)			
Sulfate	10.0			9.74	mg/L		97.4	(80%-120%)			
QC1203988266	MB										
Bromide			U	ND	mg/L					03/12/18	16:21
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 445591

Page 3 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1746518										
QC1203988269	445591001	PS									
Bromide	1.25	U	ND	1.29	mg/L		100	(75%-125%)	JXH5	03/12/18	18:24
Chloride	5.00		1.58	6.51	mg/L		98.7	(75%-125%)			
Fluoride	2.50		0.179	2.73	mg/L		102	(75%-125%)			
Sulfate	10.0		1.57	11.6	mg/L		100	(75%-125%)			
<b>Nutrient Analysis</b>											
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	1746242										
QC1203987668	445591001	DUP									
Nitrogen, Nitrate/Nitrite			0.316	0.321	mg/L	1.57		(0%-20%)	AXH3	03/13/18	05:08

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## QC Summary

Workorder: 445591

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1746242										
QC1203987666	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.04	mg/L		104	(90%-110%)	AXH3	03/13/18	04:50
QC1203987665	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					03/13/18	04:49
QC1203987670	445591001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.316		1.36	mg/L		104	(90%-110%)		03/13/18	05:09
Batch	1746244										
QC1203987673	445591001	DUP									
Nitrogen, Ammonia		0.0574		0.0624	mg/L	8.35	^	(+/-0.050)	KLP1	03/13/18	13:49
QC1203987672	LCS										
Nitrogen, Ammonia	1.00			1.05	mg/L		105	(90%-110%)		03/13/18	13:42
QC1203987671	MB										
Nitrogen, Ammonia			U	ND	mg/L					03/13/18	13:54
QC1203987674	445591001	MS									
Nitrogen, Ammonia	1.00	0.0574		1.10	mg/L		104	(90%-110%)		03/13/18	13:55
Batch	1746248										
QC1203987681	445591003	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	03/16/18	15:32
QC1203987680	LCS										
Nitrogen, Total Kjeldahl	1.00			1.01	mg/L		101	(90%-110%)		03/16/18	15:31
QC1203987679	MB										
Nitrogen, Total Kjeldahl			J	0.0477	mg/L					03/16/18	15:30
QC1203987682	445591003	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	1.02	mg/L		102	(90%-110%)		03/16/18	15:33



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## QC Summary

Workorder: 445591

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1746883										
QC1203989095	445726001	DUP									
Nitrogen, Ammonia		U	ND	U	ND	mg/L	N/A		KLP1	03/20/18	13:18
QC1203989094	LCS										
Nitrogen, Ammonia	1.00				1.03	mg/L	103	(90%-110%)		03/20/18	13:16
QC1203989093	MB										
Nitrogen, Ammonia			U	ND	mg/L					03/20/18	13:15
QC1203989096	445726001	MS									
Nitrogen, Ammonia	1.00	U	ND		0.986	mg/L	97.8	(90%-110%)		03/20/18	13:19
<b>Solids Analysis</b>											
Batch	1746580										
QC1203988421	445591001	DUP									
Total Dissolved Solids			97.1		104	mg/L	1.38	(0%-5%)	KLP1	03/14/18	14:56
QC1203988417	LCS										
Total Dissolved Solids	300				290	mg/L	96.7	(95%-105%)		03/14/18	14:56
QC1203988416	MB										
Total Dissolved Solids			U	ND	mg/L					03/14/18	14:56
<b>Titration and Ion Analysis</b>											
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

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## QC Summary

Workorder: 445591

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1745501										
QC1203986137	445053002	DUP									
pH		H	6.76	H	6.68	SU	1.19	(0%-5%)	RXB5	03/10/18	16:50
QC1203986136	LCS										
pH	7.00				6.99	SU		99.9	(99%-101%)		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

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 445591

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
h	Preparation or preservation holding time was exceeded										

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

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

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

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

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

# **Radiological Analysis**

# Case Narrative

**Radiochemistry  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2018-2098  
Work Order #: 445591**

**Product:** Alphaspec Am241 Liquid

**Analytical Method:** HASL-300:AM-241

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

**Analytical Batch:** 1746071

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445591003	CAAN-18-151479
445591005	CAAN-18-151491
1203987275	Method Blank (MB)
1203987276	445591003(CAAN-18-151479) Sample Duplicate (DUP)
1203987277	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 1203987275 (MB) and 1203987277 (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
1203987275 (MB)	Americium-241	Blank result > 1.65 CSU

**Technical Information**

**Recounts**

Sample 1203987275 (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:** 1746072

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445591003	CAAN-18-151479
445591005	CAAN-18-151491
1203987278	Method Blank (MB)
1203987279	445591003(CAAN-18-151479) Sample Duplicate (DUP)
1203987280	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 1203987278 (MB) and 1203987280 (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:** 1746073

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445591003	CAAN-18-151479
445591005	CAAN-18-151491
1203987281	Method Blank (MB)
1203987282	445591003(CAAN-18-151479) Sample Duplicate (DUP)
1203987283	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 1203987281 (MB) and 1203987283 (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
1203987281 (MB)	Uranium-233/234, Uranium-235/236 and Uranium-238	Blank result > 1.65 CSU

#### **Blank Decision Level**

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

Sample	Analyte	Value
1203987281 (MB)	Uranium-235/236	Blank result > DL

#### **Product: Gammaspec**

**Analytical Method:** EPA:901.1

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

**Analytical Batch:** 1746229

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445591003	CAAN-18-151479
445591005	CAAN-18-151491
1203987627	Method Blank (MB)
1203987628	445591003(CAAN-18-151479) Sample Duplicate (DUP)
1203987629	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).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445591003	CAAN-18-151479
445591005	CAAN-18-151491
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.

<b>Sample</b>	<b>Analyte</b>	<b>Value</b>
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 445591003 (CAAN-18-151479) was recounted due to high MDC. 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).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
445591003	CAAN-18-151479
445591005	CAAN-18-151491
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.

<b>Sample</b>	<b>Analyte</b>	<b>Value</b>
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.

## **GEL LABORATORIES LLC**

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### **Qualifier Definition Report for**

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

Client SDG: 2018-2098 GEL Work Order: 445591

**The Qualifiers in this report are defined as follows:**

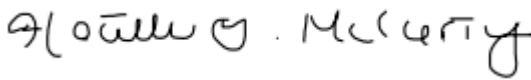
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

**Review/Validation**

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

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

**Signature:**



**Name:** Heather McCarty

**Date:** 30 MAR 2018

**Title:** Analyst II

# **Sample Data Summary**

# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Report Date: March 30, 2018

Client Sample ID: CAAN-18-151479  
Sample ID: 445591003  
Matrix: W  
Collect Date: 07-MAR-18  
Receive Date: 09-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	-0.00186	+/-0.010	0.0348	0.0149	+/-0.010	0.050	pCi/L			MXS2	03/15/18	1256	1746071	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	0.00796	+/-0.00629	0.0422	0.0184	+/-0.0063	0.050	pCi/L			MXS2	03/15/18	1256	1746072	2
Plutonium-239/240	U	0.00597	+/-0.00597	0.0455	0.0201	+/-0.00597	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234	U	0.0484	+/-0.0131	0.0798	0.037	+/-0.0134	1.00	pCi/L			MXS2	03/15/18	1235	1746073	3
Uranium-235/236	U	0.0216	+/-0.0101	0.0378	0.0153	+/-0.0102	1.00	pCi/L							
Uranium-238	U	0.00874	+/-0.00757	0.0488	0.0214	+/-0.00758	0.500	pCi/L							

### Rad Gamma Spec Analysis

*Gammasespec "As Received"*

Cesium-137	U	0.860	+/-0.995	3.63	1.67	+/-1.02	8.00	pCi/L			BSW1	03/12/18	0809	1746229	4
Cobalt-60	U	1.85	+/-0.965	4.06	1.81	+/-1.06	8.00	pCi/L							
Neptunium-237	U	2.19	+/-1.72	6.42	3.03	+/-1.79		pCi/L							
Potassium-40	U	0.696	+/-21.4	35.6	15.6	+/-21.4		pCi/L							
Sodium-22	U	-0.257	+/-1.08	3.37	1.47	+/-1.08		pCi/L							

### Rad Gas Flow Proportional Counting

*GFPC, Sr90, liquid "As Received"*

Strontium-90	U	0.0514	+/-0.0973	0.353	0.153	+/-0.0973	0.500	pCi/L			KSD1	03/19/18	0907	1746698	5
<i>WSP-GrossA/B "As Received"</i>															
Beta	U	0.911	+/-0.668	2.25	0.974	+/-0.672	3.00	pCi/L			AXH4	03/23/18	1230	1746730	6
Alpha	U	-0.626	+/-0.224	1.87	0.665	+/-0.225	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"	1746071	87.1	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1746072	83.3	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1746073	82.4	(50%-105%)

# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAAN-18-151479

Sample ID: 445591003

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	79.1	(50%-105%)				

### Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Client Sample ID: CAAN-18-151491

Sample ID: 445591005

Matrix: W

Collect Date: 07-MAR-18

Receive Date: 09-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.
<b>Rad Alpha Spec Analysis</b>															
<i>Alphaspec Am241 Liquid "As Received"</i>															
Americium-241	U	0.00	+/-0.0103	0.041	0.0175	+/-0.0103	0.050	pCi/L			MXS2	03/15/18	1256	1746071	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	0.00634	+/-0.00969	0.0448	0.0196	+/-0.00969	0.050	pCi/L			MXS2	03/15/18	1256	1746072	2
Plutonium-239/240	U	7.05E-10	+/-0.00518	0.0484	0.0213	+/-0.00518	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		0.316	+/-0.0263	0.0741	0.0343	+/-0.0304	1.00	pCi/L			MXS2	03/15/18	1235	1746073	3
Uranium-235/236	U	0.0175	+/-0.0109	0.0351	0.0142	+/-0.011	1.00	pCi/L							
Uranium-238		0.144	+/-0.0189	0.0453	0.0199	+/-0.0201	0.500	pCi/L							
<b>Rad Gamma Spec Analysis</b>															
<i>Gammaspes "As Received"</i>															
Cesium-137	U	1.74	+/-0.989	3.01	1.39	+/-1.07	8.00	pCi/L			BSW1	03/12/18	0814	1746229	4
Cobalt-60	U	-0.22	+/-0.947	3.29	1.47	+/-0.948	8.00	pCi/L							
Neptunium-237	U	-1.04	+/-1.73	6.13	2.91	+/-1.74		pCi/L							
Potassium-40	U	-23	+/-11.9	40.2	18.4	+/-13.1		pCi/L							
Sodium-22	U	-0.182	+/-0.853	2.99	1.33	+/-0.854		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>															
<i>GFPC, Sr90, liquid "As Received"</i>															
Strontium-90	U	-0.199	+/-0.114	0.499	0.216	+/-0.114	0.500	pCi/L			KSD1	03/17/18	1338	1746698	5
<i>WSP-GrossA/B "As Received"</i>															
Beta	U	0.724	+/-0.725	2.51	1.10	+/-0.728	3.00	pCi/L			AXH4	03/23/18	1230	1746730	6
Alpha	U	0.711	+/-0.627	2.27	0.764	+/-0.630	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"	1746071	89.4	(50%-105%)
Plutonium-242 Tracer		ISOPU "As Received"	1746072	87.8	(50%-105%)
Uranium-232 Tracer		IsoU "As Received"	1746073	88.2	(50%-105%)
Strontium Carrier		GFPC, Sr90, liquid "As Received"	1746698	83.7	(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-18-151491

Sample ID: 445591005

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**

# GEL LABORATORIES LLC

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## QC Summary

Report Date: March 30, 2018

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

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 445591

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1746071										
QC1203987276	445591003	DUP									
Americium-241	U	-0.00186	U	0.0168	pCi/L	0.556		(0-1)	MXS2	03/15/18	12:56
	Uncert:	+/-0.010		+/-0.00674							
	TPU:	+/-0.010		+/-0.00677							
**Americium-243 Tracer	2.62	2.28		2.57	pCi/L		98.1	(50%-105%)			
	Uncert:	+/-0.070		+/-0.0703							
	TPU:	+/-0.132		+/-0.133							
QC1203987277	LCS										
Americium-241	1.97			1.80	pCi/L		91.5	(80%-120%)	MXS2	03/15/18	12:56
	Uncert:			+/-0.062							
	TPU:			+/-0.103							
**Americium-243 Tracer	2.10			1.80	pCi/L		85.7	(50%-105%)			
	Uncert:			+/-0.0644							
	TPU:			+/-0.115							
QC1203987275	MB										
Americium-241			U	0.012	pCi/L				MXS2	03/19/18	10:21
	Uncert:			+/-0.00514							
	TPU:			+/-0.00516							
**Americium-243 Tracer	2.10			1.75	pCi/L		83.5	(50%-105%)			
	Uncert:			+/-0.0596							
	TPU:			+/-0.110							
Batch	1746072										
QC1203987279	445591003	DUP									
Plutonium-238	U	0.00796	U	0.0108	pCi/L	0.105		(0-1)	MXS2	03/15/18	12:56
	Uncert:	+/-0.00629		+/-0.00716							
	TPU:	+/-0.0063		+/-0.00717							
Plutonium-239/240	U	0.00597	U	0.0129	pCi/L	0.288		(0-1)			
	Uncert:	+/-0.00597		+/-0.0061							
	TPU:	+/-0.00597		+/-0.00613							
**Plutonium-242 Tracer	2.47	2.06		1.88	pCi/L		76.2	(50%-105%)			
	Uncert:	+/-0.0704		+/-0.0734							
	TPU:	+/-0.121		+/-0.125							
QC1203987280	LCS										
Plutonium-238			U	0.00817	pCi/L			(80%-120%)	MXS2	03/15/18	12:56
	Uncert:			+/-0.00817							
	TPU:			+/-0.00818							
Plutonium-239/240	1.98			1.94	pCi/L		98	(80%-120%)			
	Uncert:			+/-0.0632							
	TPU:			+/-0.104							
**Plutonium-242 Tracer	1.98			1.68	pCi/L		85.1	(50%-105%)			
	Uncert:			+/-0.0637							
	TPU:			+/-0.106							

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## QC Summary

Workorder: 445591

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1746072										
QC1203987278	MB										
Plutonium-238			U	-0.00896	pCi/L				MXS2	03/15/18	12:56
				Uncert:							
				TPU:							
Plutonium-239/240			U	0.00672	pCi/L						
				Uncert:							
				TPU:							
**Plutonium-242 Tracer	1.98			1.41	pCi/L		71.1	(50%-105%)			
				Uncert:							
				TPU:							
Batch	1746073										
QC1203987282	445591003	DUP									
Uranium-234		U	0.0484	U	0.0253	pCi/L	0.387	(0-1)	MXS2	03/15/18	12:35
				Uncert:							
				TPU:							
Uranium-235/236		U	0.0216	U	0.0357	pCi/L	0.299	(0-1)			
				Uncert:							
				TPU:							
Uranium-238		U	0.00874	U	-0.0169	pCi/L	0.61	(0-1)			
				Uncert:							
				TPU:							
**Uranium-232 Tracer	2.61		2.15		2.10	pCi/L		80.4	(50%-105%)		
				Uncert:							
				TPU:							
QC1203987283	LCS										
Uranium-234					2.66	pCi/L			MXS2	03/15/18	12:35
				Uncert:							
				TPU:							
Uranium-235/236					0.163	pCi/L					
				Uncert:							
				TPU:							
Uranium-238	2.70				2.79	pCi/L		103	(80%-120%)		
				Uncert:							
				TPU:							
**Uranium-232 Tracer	2.09				1.83	pCi/L		87.7	(50%-105%)		
				Uncert:							
				TPU:							
QC1203987281	MB										
Uranium-234			U	0.0283	pCi/L				MXS2	03/15/18	12:35
				Uncert:							
				TPU:							
Uranium-235/236			U	0.013	pCi/L						
				Uncert:							
				TPU:							
Uranium-238			U	0.014	pCi/L						
				Uncert:							
				TPU:							

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## QC Summary

Workorder: 445591

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1746073										
**Uranium-232 Tracer	2.09			1.74	pCi/L		83.5	(50%-105%)			
	Uncert:			+/-0.0625							
	TPU:			+/-0.118							
<b>Rad Gamma Spec</b>											
Batch	1746229										
QC1203987628	445591003	DUP									
Cesium-137	U	0.860	U	0.283	pCi/L	0.145		(0-1)	BSW1	03/12/18	15:27
	Uncert:	+/-0.995		+/-0.978							
	TPU:	+/-1.02		+/-0.981							
Cobalt-60	U	1.85	U	1.42	pCi/L	0.0948		(0-1)			
	Uncert:	+/-0.965		+/-1.15							
	TPU:	+/-1.06		+/-1.20							
Neptunium-237	U	2.19	U	0.921	pCi/L	0.154		(0-1)			
	Uncert:	+/-1.72		+/-2.33							
	TPU:	+/-1.79		+/-2.34							
Potassium-40	U	0.696	U	-27.6	pCi/L	0.364		(0-1)			
	Uncert:	+/-21.4		+/-16.3							
	TPU:	+/-21.4		+/-17.5							
Sodium-22	U	-0.257	U	-1.1	pCi/L	0.185		(0-1)			
	Uncert:	+/-1.08		+/-1.16							
	TPU:	+/-1.08		+/-1.19							
QC1203987629	LCS										
Americium-241	34300			35800	pCi/L		104	(80%-120%)	BSW1	03/12/18	11:51
	Uncert:			+/-914							
	TPU:			+/-2030							
Cesium-137	12900			13200	pCi/L		102	(80%-120%)			
	Uncert:			+/-182							
	TPU:			+/-620							
Cobalt-60	10800			11400	pCi/L		105	(80%-120%)			
	Uncert:			+/-191							
	TPU:			+/-607							
Neptunium-237			U	7.35	pCi/L						
	Uncert:			+/-59.4							
	TPU:			+/-59.4							
Potassium-40			U	8.38	pCi/L						
	Uncert:			+/-120							
	TPU:			+/-120							
Sodium-22			U	4.78	pCi/L						
	Uncert:			+/-17.1							
	TPU:			+/-17.1							
QC1203987627	MB										
Cesium-137			U	-0.759	pCi/L				BSW1	03/12/18	08:16
	Uncert:			+/-0.762							
	TPU:			+/-0.782							
Cobalt-60			U	0.766	pCi/L						
	Uncert:			+/-0.878							

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## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1746229										
Neptunium-237	TPU:			+/-0.896							
			U	-1.58	pCi/L						
	Uncert:			+/-1.60							
Potassium-40	TPU:			+/-1.64							
			U	-3.3	pCi/L						
	Uncert:			+/-12.0							
Sodium-22	TPU:			+/-12.0							
			U	-1.18	pCi/L						
	Uncert:			+/-0.770							
	TPU:			+/-0.819							
<b>Rad Gas Flow</b>											
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: 445591

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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	11:38
			Uncert:	+/-0.224							
			TPU:	+/-0.225							
Beta	1570	U	0.911	1680	pCi/L		107	(75%-125%)		03/23/18	12:30
			Uncert:	+/-0.668							
			TPU:	+/-0.672							
QC1203988750	445591003	MSD									
Alpha	403	U	-0.626	408	pCi/L	0.0625	101	(0-1)	AXH4	03/26/18	11:38
			Uncert:	+/-0.224							
			TPU:	+/-0.225							
Beta	1570	U	0.911	1640	pCi/L	0.0687	105	(0-1)		03/23/18	12:30
			Uncert:	+/-0.668							
			TPU:	+/-0.672							

### 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: 445591

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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.