

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:

LANL SMO Los Alamos NM								Martin Spring Chain of Custody/Analysis Request						COC/Lab Request #: 2018-1823 Page 1 of 1																																	
Client Contact:			Lab Agreement #:			Site Name: Los Alamos National Laboratory																																									
			Project Number:			<div style="float:right; width: 20%;">Rad Screening Info:</div> <div style="clear:both;"></div> <div style="float:right;">Lab Reporting Limit Type: Method Detection Limit</div>																																									
			Analysis Turnaround Time:																																												
			24 Hour - <input type="checkbox"/> Other - <input checked="" type="checkbox"/>																																												
			7 Days - <input type="checkbox"/>																																												
			14 Days - <input type="checkbox"/>																																												
			21 Days - <input type="checkbox"/>																																												
			28 Days - <input type="checkbox"/>																																												
Field Sample ID			Sample Date	Sample Time	Sample Matrix	MSPG-Hg	WSP-8260B-VOA	WSP-8270C-SVOA	WSP-8330B-NMED HEXMOD	WSP-All Metals	WSP-CN(T)	WSP-GENINORG+PerChlorate	WSP-GrossAB	WSP-LL-H-3	WSP-N15/O18-NO3	WSP-NH3+NO3/NO2+PO4	WSP-RAD	WSP-TKN+TOC																													
CAWA-18-11	Feb 23 2018	10:15	W					1		1			2	1																																	
CAWA-18-12	Feb 23 2018	10:15	W	1	2	2	3		1		1	1				1	1																														
CAWA-18-94	Feb 23 2018	10:15	W																																												
Special Instructions:																																															
Relinquished by: Tanya VanderVort								Print Name: Tanya VanderVort								Date/Time: 2-23-18 1230								Received by: Sherwood Sherri Sherwood								Print Name: Sherri Sherwood								Date/Time: 2/23/18 10:50							
Relinquished by:								Print Name:								Date/Time:								Received by:								Print Name:								Date/Time:							
Relinquished by:								Print Name:								Date/Time:								Received by:								Print Name:								Date/Time:							

Sampling Plan ID/Name: 11669 Martin SpringCOC: 2018-1829

TEST – Explosives		YES	NO
Samples collected from a WFO area? (TAs -08, 09, 11, 14, 15, 16, 22, 36, 37, 39, 40, and 49)		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Field Test for Explosives Results		YES	NO
HE SPOT test result positive. If YES - Do not transport.		<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

TEST – Field Screen			YES	NO
The sample has field screening measurements of alpha activity and beta activity?			<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sample Activity (dpm/100cm ²)	Shipment Activity (dpm*g/100cm ²)	Sampled Location	YES	NO
Alpha detectable	AND Alpha ≥ 160,000	AT TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Alpha ≥ 125	AND Alpha ≥ 1,250,000	AT other locations	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Beta ≥ 1,500	AND Beta ≥ 15,000,000	AT any location	<input type="checkbox"/>	<input checked="" type="checkbox"/>
The sample Alpha ≥ 16,000,000 dpm*g/100cm ² or Beta ≥ 160,000,000 dpm*g/100cm ² . If YES – Do not ship.			<input type="checkbox"/>	<input checked="" type="checkbox"/>
On the external surface of the sample container, alpha activity ≥ 24 dpm/cm ² , beta activity ≥ 240 dpm/cm ² , or surface activity ≥ 0.5 mR/hr. If YES – Do not ship.			<input type="checkbox"/>	<input checked="" type="checkbox"/>
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package – Limited Quantity of Material – UN2910, based on field screening measurements of alpha and beta activity.			<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
• Am-241 ≥ 27 pCi/g	AND Am-241 ≥ 270,000 pCi Total	<input type="checkbox"/>	<input checked="" type="checkbox"/>
• Cs-137 ≥ 270 pCi/g	AND Cs-137 ≥ 270,000 pCi Total	<input type="checkbox"/>	<input checked="" type="checkbox"/>
• Pu-238 ≥ 27 pCi/g	AND Pu-238 ≥ 270,000 pCi Total	<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 checked="" type="checkbox"/>
• Th-228 ≥ 27 pCi/g	AND Th-228 ≥ 270,000 pCi Total	<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 checked="" type="checkbox"/>
• U-238 ≥ 270 pCi/g	AND U-238 ≥ unlimited	<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 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 type="checkbox"/>	<input checked="" type="checkbox"/>
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled Radioactive Material, Excepted Package – Limited Quantity of Material – UN2910, based on prior analytical measurements of radioactive isotopes.		<input type="checkbox"/>	<input checked="" type="checkbox"/>

TEST – AK		YES	NO
The shippers documented knowledge of the sample positively identifies appropriate labeling.		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Documented Field Team Member Statement		YES	NO
The sample is tentatively identified as DOT Hazard Class 7 (Radioactive). The shipment is labeled <i>Radioactive Material, Excepted Package – Limited Quantity of Material – UN2910</i> , and the sample is submitted to ARS or RP for hazard classification analysis.		<input 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 By:	Date/Time
(Printed Name) <u>Tanya Vandervis</u>	<u>2-23-18</u>
(Signature) <u>Tanya Vandervis</u>	<u>12:30</u>

Hazard Assessment Reviewed By:	Date/Time
(Printed Name) <u>Shawn Sherwood</u>	<u>2/23/18</u>
(Signature) <u>Shawn Sherwood</u>	<u>12:30</u>

ER-SOP-10094, R1, Attachment

DATA VALIDATION REPORT

Chain Of Custody No. 2018-1829

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
444683	EPA:120.1	1				
444683	EPA:150.1	1				
444683	EPA:160.1	1				
444683	EPA:170.0	2		1		
444683	EPA:245.2	2				
444683	EPA:300.0	1				
444683	EPA:310.1	1				
444683	EPA:335.4	1				
444683	EPA:350.1	1				
444683	EPA:351.2	1				
444683	EPA:353.2	1				
444683	EPA:365.4	1				
444683	EPA:900	1				
444683	EPA:901.1	1				
444683	EPA:905.0	1				
444683	HASL-300:AM-241	1				
444683	HASL-300:ISOPU	1				
444683	HASL-300:ISOU	1				
444683	SM:A2340B	1				
444683	SW-846:6010C	1				
444683	SW-846:6020	1				
444683	SW-846:6850	1				
444683	SW-846:8260B	1		1		
444683	SW-846:8270D	1				
444683	SW-846:8330B	1				
444683	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
444683	EPA:120.1	1744083	1744083	1										1			1				
444683	EPA:150.1	1743846	1743846	1										1			1				
444683	EPA:160.1	1742838	1742838	1					1					1			1				
444683	EPA:170.0	NA	NA	2		1															
444683	EPA:245.2	1742827	1742826	2					1	1				1			1				
444683	EPA:300.0	1744256	1744256	1					1					1			1				
444683	EPA:310.1	1743845	1743845	1						1				1			1				
444683	EPA:335.4	1741722	1741721	1					1	1				1			1				
444683	EPA:350.1	1743060	1743059	1					1	1				1			1				
444683	EPA:351.2	1744737	1744736	1					1	2				1			2				
444683	EPA:353.2	1743056	1743056	1					1					1			1				
444683	EPA:365.4	1742100	1742099	1					1	1				1			1				
444683	EPA:900	1744109	1744109	1					1	1	1			1			1				
444683	EPA:901.1	1742784	1742784	1					1					1			1				
444683	EPA:905.0	1744105	1744105	1					1	1				1			1				
444683	HASL-300:AM-241	1742617	1742617	1					1					1			1				
444683	HASL-300:ISOPU	1742618	1742618	1					1					1			1				
444683	HASL-300:ISOU	1742619	1742619	1					1					1			1				
444683	SM:A2340B	1749058	1749058	1																	
444683	SW-846:6010C	1742691	1742690	1					1	1				1			1				
444683	SW-846:6020	1742668	1742665	1					1	1				1			1				
444683	SW-846:6850	1742510	1742509	1					1	1	1			1							
444683	SW-846:8260B	1744716	1744716	1		1			2					4							
444683	SW-846:8270D	1742655	1742654	1					1	1	1			1							
444683	SW-846:8330B	1743540	1743538	1					1	1	1			1							
444683	SW-846:9060	1741854	1741854	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	CAWA-18-11	1203983134	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAWA-18-11	444683001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203983133	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-18-11	444683001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-18-31	1203982522	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203982521	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-18-11	1203980361	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-18-11	444683001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203980360	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203980359	MB	1	0	0	0
EPA:170.0	VOC	CAWA-18-11	444683001	REG	1	0	0	0
EPA:170.0	VOC	CAWA-18-12	444683002	REG	1	0	0	0
EPA:170.0	VOC	CAWA-18-94	444683004	FTB	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-11	444683001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-12	444683002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-31	1203980315	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-31	1203980316	MS	0	0	1	0
EPA:245.2	INORGANIC	LCS	1203980314	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203980313	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-18-11	444683001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203983584	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203983583	MB	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	WST43-18-151800	1203983585	DUP	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-11	444683001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-31	1203982518	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-31	1203982520	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203982517	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAWA-18-12	1203980185	DUP	1	0	0	0
EPA:335.4	INORGANIC	CAWA-18-12	1203980187	MS	0	0	1	0
EPA:335.4	INORGANIC	CAWA-18-12	444683002	REG	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203977744	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203977743	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-18-11	444683001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-18-31	1203980850	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-18-31	1203980852	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203980849	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203980848	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-12	1203984478	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-12	1203984479	MS	0	0	1	0

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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:351.2	GENERAL CHEMISTRY	CAWA-18-12	444683002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203984477	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203984476	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	NP001-18-151827	1203986260	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	NP001-18-151827	1203986262	MS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-18-11	1203980844	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-18-11	444683001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203980843	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203980842	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-18-11	444683001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-18-31	1203978689	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-18-31	1203978690	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203978540	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203978539	MB	1	0	0	0
EPA:900	RAD	CAWA-18-12	444683002	REG	2	0	0	0
EPA:900	RAD	LCS	1203983195	LCS	0	0	2	0
EPA:900	RAD	MB	1203983191	MB	2	0	0	0
EPA:900	RAD	WST43-18-151800	1203983192	DUP	2	0	0	0
EPA:900	RAD	WST43-18-151800	1203983193	MS	0	0	2	0
EPA:900	RAD	WST43-18-151800	1203983194	MSD	0	0	2	0
EPA:901.1	RAD	CAWA-18-12	1203980190	DUP	5	0	0	0
EPA:901.1	RAD	CAWA-18-12	444683002	REG	5	0	0	0
EPA:901.1	RAD	LCS	1203980191	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203980189	MB	5	0	0	0
EPA:905.0	RAD	CAWA-18-12	444683002	REG	1	0	0	0
EPA:905.0	RAD	LCS	1203983177	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203983174	MB	1	0	0	0
EPA:905.0	RAD	WSTMO-18-151501	1203983175	DUP	1	0	0	0
EPA:905.0	RAD	WSTMO-18-151501	1203983176	MS	0	0	1	0
HASL-300:AM-241	RAD	CAWA-18-12	1203979779	DUP	1	0	0	0
HASL-300:AM-241	RAD	CAWA-18-12	444683002	REG	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203979780	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203979778	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAWA-18-12	1203979782	DUP	2	0	0	0
HASL-300:ISOPU	RAD	CAWA-18-12	444683002	REG	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203979783	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203979781	MB	2	0	0	0
HASL-300:ISOU	RAD	CAWA-18-12	1203979785	DUP	3	0	0	0
HASL-300:ISOU	RAD	CAWA-18-12	444683002	REG	3	0	0	0

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DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
HASL-300:ISOU	RAD	LCS	1203979786	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203979784	MB	3	0	0	0
SM:A2340B	INORGANIC	CAWA-18-11	444683001	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAWA-18-11	1203979953	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAWA-18-11	1203979954	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAWA-18-11	444683001	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203979952	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203979951	MB	17	0	0	0
SW-846:6020	INORGANIC	CAWA-18-11	1203979894	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAWA-18-11	1203979895	MS	0	0	11	0
SW-846:6020	INORGANIC	CAWA-18-11	444683001	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203979893	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203979892	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-18-11	444683001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-18-27	1203979481	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-18-27	1203979482	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203979480	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203979479	MB	1	0	0	0
SW-846:8260B	VOC	CAWA-18-12	444683002	REG	80	3	0	0
SW-846:8260B	VOC	CAWA-18-94	444683004	FTB	80	3	0	0
SW-846:8260B	VOC	LCS	1203984435	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203984436	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203985581	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203985582	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203984432	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203985580	MB	80	3	0	0
SW-846:8270D	SVOC	CAWA-18-12	1203979860	MS	0	6	76	0
SW-846:8270D	SVOC	CAWA-18-12	1203979861	MSD	0	6	76	0
SW-846:8270D	SVOC	CAWA-18-12	444683002	REG	80	6	0	0
SW-846:8270D	SVOC	LCS	1203979859	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203979858	MB	80	6	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-18-12	1203981844	MS	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	CAWA-18-12	1203981845	MSD	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	CAWA-18-12	444683003	REG	23	1	0	0
SW-846:8330B	LCMS/MS HIGH	LCS	1203981843	LCS	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	MB	1203981842	MB	23	1	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-18-28	1203980265	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-18-12	444683002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203980263	LCS	0	0	1	0

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DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:9060	GENERAL CHEMISTRY	MB	1203980262	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203980359	METHOD BLANK	EPA:160.1	W	Total Dissolved Solids	4.29	U	mg/L	14.3

No.

6. Any surrogate recoveries outside the control limits?

No.

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

DATA VALIDATION REPORT

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CAWA-18-12	1203979860	1203979861	SW-846:8270D	Benzidine	1742654	03-01-2018	W	56	80	130	15	10	35	30

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

LCS Lab Sample	LCSD Lab	Analytical Method	Parameter Name	Lab Lot ID	Analysis	Sample Matrix	LCS Spike Recovery	LCSD Spike Recovery	Upper Limit	Lower Limit	Upper Rejection Limit	Lower Rejection Limit	RPD	RPD Limit
1203979780		HASL-300:AM-241	Americium-243	1742617	03-01-2018	W	109		105	50		10		
1203985581		SW-846:8260B	Hexachlorobutadiene	1744716	03-07-2018	W	66		136	72		10		

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

Field Sample ID	Lab Sample ID	LD Lab Sample ID	Analytical Method	Parameter Name	Sample Matrix	Lab Result	LD Lab Result	Lab Units	Detect Flag	LD Detect Flag	RPD	RPD Limit
CAWA-18-12	444683002	1203979785	HASL-300:ISOU	Uranium-234	W	1.29	0.907	pCi/L	Y	Y	35.1	20

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

DATA VALIDATION REPORT

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
Martin Spring	2018-1829	CAWA-18-12	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00202	pCi/L	0.00202	pCi/L	0.0341	0.00451	W	02/23/2018		1742617	VAL	Y
Martin Spring	2018-1829	CAWA-18-12	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	0.683	pCi/L	0.683	pCi/L	3.57	0.907	W	02/23/2018		1742784	VAL	Y
Martin Spring	2018-1829	CAWA-18-12	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	0.349	pCi/L	0.349	pCi/L	4.95	1.28	W	02/23/2018		1742784	VAL	Y
Martin Spring	2018-1829	CAWA-18-12	REG	INIT	VOC	SW-846:8260B	Hexachlorobutadiene	U	UJ	V12a	N	0.300	ug/L	0.300	ug/L			W	02/23/2018		1744716	VAL	Y
Martin Spring	2018-1829	CAWA-18-12	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	0.431	pCi/L	0.431	pCi/L	6.83	1.81	W	02/23/2018		1742784	VAL	Y
Martin Spring	2018-1829	CAWA-18-12	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.00906	pCi/L	0.00906	pCi/L	0.0315	0.00544	W	02/23/2018		1742618	VAL	Y
Martin Spring	2018-1829	CAWA-18-12	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.00725	pCi/L	0.00725	pCi/L	0.0254	0.0081	W	02/23/2018		1742618	VAL	Y
Martin Spring	2018-1829	CAWA-18-12	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	2.02	pCi/L	2.02	pCi/L	37.1	23.7	W	02/23/2018		1742784	VAL	Y
Martin Spring	2018-1829	CAWA-18-12	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-1.5	pCi/L	-1.5	pCi/L	2.67	0.857	W	02/23/2018		1742784	VAL	Y
Martin Spring	2018-1829	CAWA-18-12	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.349	pCi/L	-0.349	pCi/L	0.468	0.130	W	02/23/2018		1744105	VAL	Y
Martin Spring	2018-1829	CAWA-18-12	REG	INIT	RAD	HASL-300:ISOU	Uranium-234		J	R10	Y	1.29	pCi/L	1.29	pCi/L	0.444	0.126	W	02/23/2018		1742619	VAL	Y
Martin Spring	2018-1829	CAWA-18-12	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.126	pCi/L	0.126	pCi/L	0.252	0.0471	W	02/23/2018		1742619	VAL	Y
Martin Spring	2018-1829	CAWA-18-94	FTB	INIT	VOC	SW-846:8260B	Hexachlorobutadiene	U	UJ	V12a	N	0.300	ug/L	0.300	ug/L			W	02/23/2018		1744716	VAL	Y

Reason Code

Description

J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualify. The analyte is detected in the sample.
R10	Associated duplicate sample has DER or RER> the analytical laboratory's acceptance limits.
R5	Analyte is not detected because the amount reported is less than the MDC.
U_LAB	The analytical laboratory qualified the analyte as not detected.
V12a	The LCS percent recovery was < the LAL but >10%. Follow the external laboratory limits located within the associated data package.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-18-11	Martin Spring	REG	EPA:120.1	0	1
CAWA-18-11	Martin Spring	REG	EPA:150.1	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
CAWA-18-11	Martin Spring	REG	EPA:160.1	0	1
CAWA-18-11	Martin Spring	REG	EPA:170.0	0	1
CAWA-18-11	Martin Spring	REG	EPA:245.2	0	1
CAWA-18-11	Martin Spring	REG	EPA:300.0	0	4
CAWA-18-11	Martin Spring	REG	EPA:310.1	0	2
CAWA-18-11	Martin Spring	REG	EPA:350.1	0	1
CAWA-18-11	Martin Spring	REG	EPA:353.2	0	1
CAWA-18-11	Martin Spring	REG	EPA:365.4	0	1
CAWA-18-11	Martin Spring	REG	SM:A2340B	0	1
CAWA-18-11	Martin Spring	REG	SW-846:6010C	0	17
CAWA-18-11	Martin Spring	REG	SW-846:6020	0	11
CAWA-18-11	Martin Spring	REG	SW-846:6850	0	1
CAWA-18-12	Martin Spring	REG	EPA:170.0	0	1
CAWA-18-12	Martin Spring	REG	EPA:245.2	0	1
CAWA-18-12	Martin Spring	REG	EPA:335.4	0	1
CAWA-18-12	Martin Spring	REG	EPA:351.2	0	1
CAWA-18-12	Martin Spring	REG	EPA:900	0	2
CAWA-18-12	Martin Spring	REG	EPA:901.1	0	5
CAWA-18-12	Martin Spring	REG	EPA:905.0	0	1
CAWA-18-12	Martin Spring	REG	HASL-300:AM-241	0	1
CAWA-18-12	Martin Spring	REG	HASL-300:ISOPU	0	2
CAWA-18-12	Martin Spring	REG	HASL-300:ISOU	0	3
CAWA-18-12	Martin Spring	REG	SW-846:8260B	0	80
CAWA-18-12	Martin Spring	REG	SW-846:8270D	0	80
CAWA-18-12	Martin Spring	REG	SW-846:8330B	0	23
CAWA-18-12	Martin Spring	REG	SW-846:9060	0	1
CAWA-18-94	Martin Spring	FTB	EPA:170.0	0	1
CAWA-18-94	Martin Spring	FTB	SW-846:8260B	0	80

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.

March 22, 2018

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

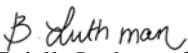
Re: LANL- WQH Water Samples
Work Order: 444683
SDG: 2018-1829

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on February 27, 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: 2018-1829
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 444683
SDG: 2018-1829

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 444683
SDG # : 2018-1829**

March 22, 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 February 27, 2018 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperatures were checked, documented, and within specifications. Shipping container temperature was within specification (0 - 6C). There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
444683001	CAWA-18-11
444683002	CAWA-18-12
444683003	CAWA-18-12
444683004	CAWA-18-94

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 22 March 2018

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122017-25
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Chain of Custody and Supporting Documentation

SAMPLE RECEIPT & REVIEW FORM

Client: <u>LANL/ESHL</u>		SDG/AR/COC/Work Order: <u>444683</u>	
Received By: <u>AA</u>		Date Received: <u>2/27/18</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 5521</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____
COC/Samples marked or classified as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
Is package, COC, and/or Samples marked HAZ?		<input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____

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

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials TMC Date 2/28/18 Page 1 of 1

GL-CHL-SR-001 Rev 5

Do Not Lift Using This Tag

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

SHIP DATE: 26FEB18
ACTWGT: 54.0 LB MAN
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545
UNITED STATES US

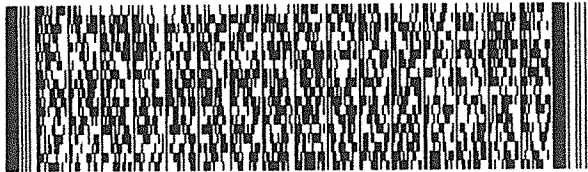
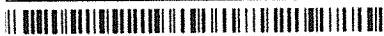
BILL SENDER

0 VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRGW04BAGWEO



FedEx
Express



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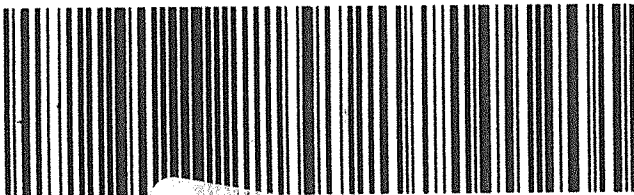
TRK# 5908 1783 5521
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PRIORITY OVERNIGHT

X7 RBWA

29407
SC-US CHS

Part # 156140V-436 2012 2507 15 888



Rt

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 #: 2018-1829
Work Order #: 444683**

Method/Analysis Information

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

Analytical Method: SW-846:8260B

Analytical Batch
Number: 1744716

Sample Analysis

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

Sample ID	Client ID
444683002	CAWA-18-12
444683004	CAWA-18-94
1203984432	Method Blank (MB)
1203984435	Laboratory Control Sample (LCS)
1203984436	Laboratory Control Sample (LCS)
1203984437	444617006(CAWA-18-67) Post Spike (PS)
1203984438	444617006(CAWA-18-67) Post Spike (PS)
1203984439	444617006(CAWA-18-67) Post Spike Duplicate (PSD)
1203984440	444617006(CAWA-18-67) Post Spike Duplicate (PSD)
1203985580	Method Blank (MB)
1203985581	Laboratory Control Sample (LCS)
1203985582	Laboratory Control Sample (LCS)

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

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

SOP Reference

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

Calibration Information

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

industry shortage.

Initial Calibration

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

Continuing Calibration Verification Requirements

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

Quality Control (QC) Information

Blank (MB) Statement

The blanks analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS/and or LCSD (See Below) recoveries were not all within the acceptance limits. The unacceptable recoveries were less than 5% of the requested analyte list. This satisfies the client criteria. The results are reported.

Sample	Analyte	Value
1203985581 (LCS)	Hexachlorobutadiene	66* (72%-136%)

QC Sample Designation

Sample 444617006 (CAWA-18-67) was designated for spike analysis.

Matrix Spike/Matrix Spike Duplicate Recovery Statement

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the required acceptance limits.

Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information

Holding Time Specifications

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

Sample Preservation and Integrity

All samples met the sample preservation and integrity requirements.

Sample Dilutions/Methanol Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Manual Integrations

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

TIC Comment

Tentatively identified compounds (TIC) may be requested for samples 444683002 (CAWA-18-12) and 444683004 (CAWA-18-94) in this delivery group/work order. Please note that non-requested calibrated analytes detected in a client sample may be reported on the Form 1/Certificate of Analysis as TICs. TIC data, if requested, were included on the Sample Data Summary (Form 1) and included with the sample raw data.

Additional Comments

Additional comments were not required for this SDG.

Residual Chlorine

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

Electronic Package Comment

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

System Configuration

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

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

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: 2018-1829 GEL Work Order: 444683

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: Erin Haubert

Date: 26 MAR 2018

Title: Data Validator

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-1829

Lab Sample ID: 444683002

Date Collected: 02/23/2018 10:15

Date Received: 02/27/2018 09:15

Matrix: W

Client ID: CAWA-18-12

Batch ID: 1744716

Run Date: 03/08/2018 02:06

Prep Date: 03/08/2018 02:06

Data File: 030718V9\9I334.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-1829

Lab Sample ID: 444683002

Date Collected: 02/23/2018 10:15

Date Received: 02/27/2018 09:15

Matrix: W

Client ID: CAWA-18-12

Batch ID: 1744716

Run Date: 03/08/2018 02:06

Prep Date: 03/08/2018 02:06

Data File: 030718V9\9I334.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

Page 3 of 3

SDG Number: 2018-1829

Lab Sample ID: 444683002

Date Collected: 02/23/2018 10:15

Date Received: 02/27/2018 09:15

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1744716

Inst: VOA9.I

Dilution: 1

Run Date: 03/08/2018 02:06

Analyst: RXY1

Purge Vol: 5 mL

Prep Date: 03/08/2018 02:06

Column: DB-624

Data File: 030718V9\9I334.D

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.7	50.0	ug/L 103	(71%-134%)
Bromofluorobenzene	50.6	50.0	ug/L 101	(70%-131%)
Toluene-d8	50.6	50.0	ug/L 101	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	14.651	29.8	ug/L	0	J
	unknown siloxane	16.62	5.67	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-1829

Lab Sample ID: 444683004

Date Collected: 02/23/2018 10:15

Date Received: 02/27/2018 09:15

Matrix: W

Client ID: CAWA-18-94

Batch ID: 1744716

Run Date: 03/07/2018 20:27

Prep Date: 03/07/2018 20:27

Data File: 030718V9\9I322.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

Page 2 of 3

SDG Number: 2018-1829

Lab Sample ID: 444683004

Date Collected: 02/23/2018 10:15

Date Received: 02/27/2018 09:15

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1744716

Inst: VOA9.I

Dilution: 1

Run Date: 03/07/2018 20:27

Analyst: RXY1

Purge Vol: 5 mL

Prep Date: 03/07/2018 20:27

Data File: 030718V9\9I322.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: 2018-1829

Lab Sample ID: 444683004

Date Collected: 02/23/2018 10:15

Date Received: 02/27/2018 09:15

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAWA-18-94

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1744716

Inst: VOA9.I

Dilution: 1

Run Date: 03/07/2018 20:27

Analyst: RXY1

Purge Vol: 5 mL

Prep Date: 03/07/2018 20:27

Column: DB-624

Data File: 030718V9\9I322.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	54.2	50.0	ug/L 108	(71%-134%)
Bromofluorobenzene	50.3	50.0	ug/L 101	(70%-131%)
Toluene-d8	51.9	50.0	ug/L 104	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown siloxane	12.291	5.27	ug/L	0	J
	unknown siloxane	14.651	13.4	ug/L	0	J

Quality Control Summary

Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-1829**Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203984435	LCS for batch 1744716	105	103	100
1203984436	LCS for batch 1744716	101	106	104
1203984432	MB for batch 1744716	101	105	101
444683004	CAWA-18-94	108	104	101
1203985581	LCS for batch 1744716	97	99	99
1203985582	LCS for batch 1744716	100	103	97
1203985580	MB for batch 1744716	99	103	100
444683002	CAWA-18-12	103	101	101
1203984437	CAWA-18-67PS	100	103	103
1203984439	CAWA-18-67PSD	103	107	104
1203984438	CAWA-18-67PS	97	102	97
1203984440	CAWA-18-67PSD	98	103	101

Surrogate**Acceptance Limits**

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

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1744716

Matrix: WATER

Lab Sample ID 1203984435

Instrument: VOA9.I

Analysis Date: 03/07/2018 11:15

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	104	104	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1160	93	61-125
67-64-1	LCS Acetone	250	0.0	307	123	48-157
74-88-4	LCS Iodomethane	250	0.0	239	96	72-128
75-15-0	LCS Carbon disulfide	250	0.0	240	96	69-138
108-05-4	LCS Vinyl acetate	250	0.0	249	99	67-125
78-93-3	LCS 2-Butanone	250	0.0	285	114	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	255	102	66-124
591-78-6	LCS 2-Hexanone	250	0.0	293	117	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	53.3	107	40-160
74-87-3	LCS Chloromethane	50.0	0.0	56.9	114	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	61.2	122	65-137
74-83-9	LCS Bromomethane	50.0	0.0	51.4	103	63-137
75-00-3	LCS Chloroethane	50.0	0.0	50.8	102	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	50.7	101	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	52.1	104	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	50.0	100	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	47.0	94	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	51.9	104	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	50.3	101	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	50.1	100	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	49.8	100	75-123

Volatile
Quality Control Summary
Spike Recovery Report

SDG Number: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1744716

Matrix: WATER

Lab Sample ID 1203984435

Instrument: VOA9.I

Analysis Date: 03/07/2018 11:15

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	52.6	105	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	51.0	102	76-125
67-66-3	LCS Chloroform	50.0	0.0	49.2	98	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	51.0	102	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	48.5	97	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	53.1	106	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	48.5	97	74-122
71-43-2	LCS Benzene	50.0	0.0	48.4	97	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	50.5	101	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	49.2	98	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	50.8	102	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	53.6	107	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	54.2	108	78-131
108-88-3	LCS Toluene	50.0	0.0	48.3	97	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	56.0	112	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	51.4	103	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	48.8	98	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	50.0	100	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	51.8	104	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	53.1	106	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	49.7	99	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	49.3	99	73-125

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1744716

Matrix: WATER

Lab Sample ID 1203984435

Instrument: VOA9.I

Analysis Date: 03/07/2018 11:15

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS o-Xylene	50.0	0.0	50.4	101	74-126
100-42-5	LCS Styrene	50.0	0.0	53.4	107	72-130
75-25-2	LCS Bromoform	50.0	0.0	60.8	122	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	48.1	96	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	51.4	103	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	51.6	103	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	49.0	98	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	47.8	96	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	49.1	98	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	49.1	98	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	48.1	96	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	49.8	100	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	48.7	97	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	48.2	96	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	49.3	99	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	47.7	95	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	48.0	96	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	47.6	95	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	50.9	102	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	51.7	103	72-136
91-20-3	LCS Naphthalene	50.0	0.0	55.2	110	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	54.0	108	70-130

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1744716

Matrix: WATER

Lab Sample ID 1203984435

Instrument: VOA9.I

Analysis Date: 03/07/2018 11:15

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	52.8	106	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	53.5	107	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	48.0	96	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5360	107	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1744716

Matrix: WATER

Lab Sample ID 1203984436

Instrument: VOA9.I

Analysis Date: 03/07/2018 12:13

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	260	104	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	243	97	61-148
107-05-1	LCS	Allyl chloride	250	0.0	233	93	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	256	102	65-122
107-12-0	LCS	Propionitrile	250	0.0	249	100	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	248	99	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	251	100	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	245	98	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2550	102	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	51.0	102	66-147

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-1829

Sample Type: Post Spike

Client ID: CAWA-18-67PS

Matrix: W

Lab Sample ID 1203984437

Instrument: VOA9.I

Analysis Date: 03/08/2018 02:43

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	97.6	98	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1050	84	56-131
67-64-1	PS Acetone	250	0.00 U	144	58	25-155
74-88-4	PS Iodomethane	250	0.00 U	228	91	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	226	90	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	209	84	48-133
78-93-3	PS 2-Butanone	250	0.00 U	181	73	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	216	87	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	194	78	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	49.5	99	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	59.6	119	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	59.8	120	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	50.1	100	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	50.5	101	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	49.0	98	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	50.3	101	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	46.4	93	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	45.0	90	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	47.9	96	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	46.9	94	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	47.6	95	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	47.2	94	69-127

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-1829

Sample Type: Post Spike

Client ID: CAWA-18-67PS

Matrix: W

Lab Sample ID 1203984437

Instrument: VOA9.I

Analysis Date: 03/08/2018 02:43

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	44.6	89	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	48.2	96	71-130
67-66-3	PS Chloroform	50.0	0.00 U	46.6	93	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	47.6	95	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	44.1	88	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	49.1	98	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	46.6	93	69-130
71-43-2	PS Benzene	50.0	0.00 U	46.3	93	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	46.9	94	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	47.6	95	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	47.9	96	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	52.1	104	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	50.4	101	70-134
108-88-3	PS Toluene	50.0	0.00 U	45.9	92	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	51.4	103	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	48.3	97	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	47.4	95	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	46.5	93	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	49.3	99	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	50.6	101	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	47.3	95	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	46.7	93	61-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 8

SDG Number: 2018-1829

Sample Type: Post Spike

Client ID: CAWA-18-67PS

Matrix: W

Lab Sample ID 1203984437

Instrument: VOA9.I

Analysis Date: 03/08/2018 02:43

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	48.0	96	62-131
100-42-5	PS Styrene	50.0	0.00 U	50.5	101	59-135
75-25-2	PS Bromoform	50.0	0.00 U	59.4	119	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	48.6	97	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	50.3	101	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	50.0	100	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	49.3	99	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	47.4	95	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	49.4	99	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	49.4	99	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	47.2	94	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	50.1	100	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	48.9	98	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	48.7	97	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	48.9	98	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	46.6	93	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	46.7	93	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	45.9	92	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	45.5	91	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	49.7	99	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	48.9	98	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	47.3	95	52-135

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-1829

Sample Type: Post Spike

Client ID: CAWA-18-67PS

Matrix: W

Lab Sample ID 1203984437

Instrument: VOA9.I

Analysis Date: 03/08/2018 02:43

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	46.5	93	50-133
630-20-6	PS	1,1,1,2-Tetrachloroethane	50.0	0.00	U	52.4	105	71-133
95-50-1	PS	1,2-Dichlorobenzene	50.0	0.00	U	47.7	95	60-125
71-36-3	PS	n-Butyl alcohol	5000	0.00	U	4640	93	60-140

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-1829

Sample Type: Post Spike Duplicate

Client ID: CAWA-18-67PSD

Matrix: W

Lab Sample ID 1203984439

Instrument: VOA9.I

Analysis Date: 03/08/2018 03:04

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	108	108	59-132	10	0-20
75-05-8	PSD Acetonitrile	1250	0.00 U	1150	92	56-131	9	0-20
67-64-1	PSD Acetone	250	0.00 U	158	63	25-155	9	0-20
74-88-4	PSD Iodomethane	250	0.00 U	250	100	66-133	9	0-20
75-15-0	PSD Carbon disulfide	250	0.00 U	242	97	61-141	7	0-20
108-05-4	PSD Vinyl acetate	250	0.00 U	230	92	48-133	10	0-20
78-93-3	PSD 2-Butanone	250	0.00 U	202	81	25-143	11	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00 U	246	98	61-127	13	0-20
591-78-6	PSD 2-Hexanone	250	0.00 U	217	87	33-138	11	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00 U	54.3	109	33-164	9	0-20
74-87-3	PSD Chloromethane	50.0	0.00 U	65.2	130	53-139	9	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00 U	65.4	131	58-140	9	0-20
74-83-9	PSD Bromomethane	50.0	0.00 U	54.6	109	59-146	9	0-20
75-00-3	PSD Chloroethane	50.0	0.00 U	54.6	109	65-129	8	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00 U	53.4	107	65-141	9	0-20
60-29-7	PSD Ethyl ether	50.0	0.00 U	56.0	112	69-127	11	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00 U	49.8	100	59-130	7	0-20
75-09-2	PSD Methylene chloride	50.0	0.00 U	49.6	99	62-123	10	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00 U	53.4	107	69-132	11	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00 U	51.2	102	65-127	9	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00 U	52.7	105	67-127	10	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00 U	51.9	104	69-127	9	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-1829

Sample Type: Post Spike Duplicate

Client ID: CAWA-18-67PSD

Matrix: W

Lab Sample ID 1203984439

Instrument: VOA9.I

Analysis Date: 03/08/2018 03:04

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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 48.9	98	66-137	9	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00	U 54.1	108	71-130	12	0-20
67-66-3	PSD Chloroform	50.0	0.00	U 51.8	104	71-129	10	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00	U 52.0	104	69-139	9	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00	U 48.6	97	67-130	10	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00	U 53.4	107	66-143	8	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00	U 51.5	103	69-130	10	0-20
71-43-2	PSD Benzene	50.0	0.00	U 50.9	102	66-125	10	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00	U 51.5	103	65-131	9	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00	U 52.4	105	67-127	9	0-20
74-95-3	PSD Dibromomethane	50.0	0.00	U 53.2	106	72-129	11	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00	U 57.6	115	70-138	10	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00	U 55.9	112	70-134	10	0-20
108-88-3	PSD Toluene	50.0	0.00	U 51.2	102	60-126	11	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00	U 57.6	115	69-135	11	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00	U 54.6	109	66-125	12	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00	U 52.3	105	67-124	10	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00	U 51.4	103	60-130	10	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00	U 56.0	112	68-143	13	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00	U 56.1	112	71-127	10	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00	U 52.8	106	64-124	11	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00	U 51.2	102	61-130	9	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 7 of 8

SDG Number: 2018-1829

Sample Type: Post Spike Duplicate

Client ID: CAWA-18-67PSD

Matrix: W

Lab Sample ID 1203984439

Instrument: VOA9.I

Analysis Date: 03/08/2018 03:04

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	53.6	107	62-131	11	0-20
100-42-5	PSD Styrene	50.0	0.00 U	55.9	112	59-135	10	0-20
75-25-2	PSD Bromoform	50.0	0.00 U	66.3	133	64-138	11	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00 U	52.9	106	55-133	8	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00 U	55.0	110	62-129	9	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00 U	54.3	109	70-124	8	0-20
108-86-1	PSD Bromobenzene	50.0	0.00 U	54.0	108	62-124	9	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00 U	50.7	101	50-133	7	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00 U	53.4	107	53-135	8	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00 U	53.8	108	56-128	8	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00 U	51.4	103	53-130	9	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00 U	55.5	111	55-135	10	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00 U	52.9	106	53-132	8	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00 U	52.8	106	50-138	8	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00 U	53.2	106	49-138	9	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00 U	51.4	103	56-126	10	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00 U	51.3	103	55-125	9	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00 U	50.0	100	43-142	9	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00 U	52.2	104	62-141	14	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00 U	56.4	113	40-147	13	0-20
91-20-3	PSD Naphthalene	50.0	0.00 U	57.8	116	62-134	17	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00 U	56.5	113	52-135	18	0-20

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-1829

Sample Type: Post Spike Duplicate

Client ID: CAWA-18-67PSD

Matrix: W

Lab Sample ID 1203984439

Instrument: VOA9.I

Analysis Date: 03/08/2018 03:04

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	54.2	108	50-133	15	0-20
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00 U	59.6	119	71-133	13	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00 U	52.7	105	60-125	10	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00 U	5180	104	60-140	11	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 2

SDG Number: 2018-1829

Sample Type: Post Spike

Client ID: CAWA-18-67PS

Matrix: W

Lab Sample ID 1203984438

Instrument: VOA9.I

Analysis Date: 03/08/2018 03:33

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	232	93	49-141
76-13-1	PS Trichlorotrifluoroethane	250	0.00 U	244	98	57-149
107-05-1	PS Allyl chloride	250	0.00 U	233	93	54-128
107-13-1	PS Acrylonitrile	250	0.00 U	244	98	59-129
107-12-0	PS Propionitrile	250	0.00 U	233	93	58-131
126-98-7	PS Methacrylonitrile	250	0.00 U	238	95	59-134
80-62-6	PS Methyl methacrylate	250	0.00 U	251	101	62-135
97-63-2	PS Ethyl methacrylate	250	0.00 U	240	96	60-136
78-83-1	PS Isobutyl alcohol	2500	0.00 U	2360	94	60-143
126-99-8	PS 2-Chloro-1,3-butadiene	50.0	0.00 U	50.3	101	63-146

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-1829

Sample Type: Post Spike Duplicate

Client ID: CAWA-18-67PSD

Matrix: W

Lab Sample ID 1203984440

Instrument: VOA9.I

Analysis Date: 03/08/2018 04:02

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
107-02-8	PSD Acrolein	250	0.00 U	249	100	49-141	7	0-20
76-13-1	PSD Trichlorotrifluoroethane	250	0.00 U	252	101	57-149	3	0-20
107-05-1	PSD Allyl chloride	250	0.00 U	238	95	54-128	2	0-20
107-13-1	PSD Acrylonitrile	250	0.00 U	257	103	59-129	5	0-20
107-12-0	PSD Propionitrile	250	0.00 U	250	100	58-131	7	0-20
126-98-7	PSD Methacrylonitrile	250	0.00 U	251	100	59-134	5	0-20
80-62-6	PSD Methyl methacrylate	250	0.00 U	266	106	62-135	6	0-20
97-63-2	PSD Ethyl methacrylate	250	0.00 U	250	100	60-136	4	0-20
78-83-1	PSD Isobutyl alcohol	2500	0.00 U	2520	101	60-143	7	0-20
126-99-8	PSD 2-Chloro-1,3-butadiene	50.0	0.00 U	51.6	103	63-146	3	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 4

SDG Number: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1744716

Matrix: WATER

Lab Sample ID 1203985581

Instrument: VOA9.I

Analysis Date: 03/07/2018 23:45

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	80.7	81	71-127
75-05-8	LCS Acetonitrile	1250	0.0	979	78	61-125
67-64-1	LCS Acetone	250	0.0	158	63	48-157
74-88-4	LCS Iodomethane	250	0.0	197	79	72-128
75-15-0	LCS Carbon disulfide	250	0.0	192	77	69-138
108-05-4	LCS Vinyl acetate	250	0.0	227	91	67-125
78-93-3	LCS 2-Butanone	250	0.0	177	71	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	201	81	66-124
591-78-6	LCS 2-Hexanone	250	0.0	179	72	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	46.3	93	40-160
74-87-3	LCS Chloromethane	50.0	0.0	58.4	117	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	58.8	118	65-137
74-83-9	LCS Bromomethane	50.0	0.0	48.8	98	63-137
75-00-3	LCS Chloroethane	50.0	0.0	47.3	95	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	47.4	95	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	50.9	102	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	38.8	78	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	39.6	79	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	42.4	85	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	40.6	81	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	41.7	83	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	41.8	84	75-123

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1744716

Matrix: WATER

Lab Sample ID 1203985581

Instrument: VOA9.I

Analysis Date: 03/07/2018 23:45

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	39.3	79	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	43.4	87	76-125
67-66-3	LCS Chloroform	50.0	0.0	41.5	83	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	40.1	80	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	37.0	74	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	40.3	81	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	41.8	84	74-122
71-43-2	LCS Benzene	50.0	0.0	40.1	80	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	39.5	79	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	42.0	84	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	42.2	84	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	45.2	90	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	44.3	89	78-131
108-88-3	LCS Toluene	50.0	0.0	39.9	80	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	46.2	92	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	43.5	87	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	42.1	84	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	36.8	74	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	43.1	86	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	44.6	89	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	40.6	81	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	38.8	78	73-125

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1744716

Matrix: WATER

Lab Sample ID 1203985581

Instrument: VOA9.I

Analysis Date: 03/07/2018 23:45

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	40.6	81	74-126
100-42-5	LCS Styrene	50.0	0.0	43.2	86	72-130
75-25-2	LCS Bromoform	50.0	0.0	52.3	105	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	39.3	79	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	44.9	90	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	45.1	90	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	42.7	85	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	37.4	75	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	39.3	79	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	40.5	81	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	39.6	79	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	38.0	76	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	39.5	79	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	36.3	73	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	36.6	73	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	39.2	78	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	39.8	80	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	33.8	68	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	42.5	85	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	33.2	66 *	72-136
91-20-3	LCS Naphthalene	50.0	0.0	46.3	93	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	42.5	85	70-130

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1744716

Matrix: WATER

Lab Sample ID 1203985581

Instrument: VOA9.I

Analysis Date: 03/07/2018 23:45

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	39.4	79	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	45.6	91	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	40.9	82	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	4220	84	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1744716

Matrix: WATER

Lab Sample ID 1203985582

Instrument: VOA9.I

Analysis Date: 03/08/2018 00:41

Dilution: 1

Analyst: RXY1

Purge Vol: 5 mL

Batch ID: 1744716

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	236	94	60-140
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	211	84	61-148
107-05-1	LCS Allyl chloride	250	0.0	214	85	59-125
107-13-1	LCS Acrylonitrile	250	0.0	234	93	65-122
107-12-0	LCS Propionitrile	250	0.0	227	91	64-124
126-98-7	LCS Methacrylonitrile	250	0.0	226	90	64-126
80-62-6	LCS Methyl methacrylate	250	0.0	232	93	69-127
97-63-2	LCS Ethyl methacrylate	250	0.0	225	90	66-130
78-83-1	LCS Isobutyl alcohol	2500	0.0	2330	93	65-135
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	44.7	89	66-147

Method Blank Summary

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SDG Number:	2018-1829	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1744716	Instrument ID:	VOA9.I	Data File:	030718V9\9I306B3.D
Lab Sample ID:	1203984432	Prep Date:	03/07/2018 12:42	Analyzed:	03/07/18 12:42
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 1744716	1203984435	030718V9\9I303L3.D	03/07/18	1115
02 LCS for batch 1744716	1203984436	030718V9\9I305L3.D	03/07/18	1213
03 CAWA-18-94	444683004	030718V9\9I322.D	03/07/18	2027

Method Blank Summary

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SDG Number:	2018-1829	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1744716	Instrument ID:	VOA9.I	Data File:	030718V9\9I332B.D
Lab Sample ID:	1203985580	Prep Date:	03/08/2018 01:09	Analyzed:	03/08/18 01:09
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
05 LCS for batch 1744716	1203985581	030718V9\9I329L.D	03/07/18	2345
06 LCS for batch 1744716	1203985582	030718V9\9I331L.D	03/08/18	0041
07 CAWA-18-12	444683002	030718V9\9I334.D	03/08/18	0206
08 CAWA-18-67PS	1203984437	030718V9\9I335.D	03/08/18	0243
09 CAWA-18-67PSD	1203984439	030718V9\9I336.D	03/08/18	0304
10 CAWA-18-67PS	1203984438	030718V9\9I337.D	03/08/18	0333
11 CAWA-18-67PSD	1203984440	030718V9\9I338.D	03/08/18	0402

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-1829

Lab Sample ID: 1203984432

Client Sample: QC for batch 1744716

Client ID: MB for batch 1744716

Batch ID: 1744716

Run Date: 03/07/2018 12:42

Prep Date: 03/07/2018 12:42

Data File: 030718V9\9I306B3.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-1829
Lab Sample ID: 1203984432
Client Sample: QC for batch 1744716
Client ID: MB for batch 1744716
Batch ID: 1744716
Run Date: 03/07/2018 12:42
Prep Date: 03/07/2018 12:42
Data File: 030718V9\9I306B3.D

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

Column: DB-624

Matrix: WATER

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

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

Volatile
Certificate of Analysis
Sample Summary

Page 3 of 3

SDG Number: 2018-1829

Lab Sample ID: 1203984432

Client Sample: QC for batch 1744716

Client ID: MB for batch 1744716

Batch ID: 1744716

Run Date: 03/07/2018 12:42

Prep Date: 03/07/2018 12:42

Data File: 030718V9\9I306B3.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.5	50.0	ug/L 101	(71%-134%)
Bromofluorobenzene	50.3	50.0	ug/L 101	(70%-131%)
Toluene-d8	52.3	50.0	ug/L 105	(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: 2018-1829

Lab Sample ID: 1203984435

Client Sample: QC for batch 1744716

Client ID: LCS for batch 1744716

Batch ID: 1744716

Run Date: 03/07/2018 11:15

Prep Date: 03/07/2018 11:15

Data File: 030718V9\9I303L3.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		53.5	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		51.0	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		51.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		51.4	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		50.1	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		50.0	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		48.5	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		54.0	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		51.6	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		52.8	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		48.7	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		50.9	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		53.1	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		48.0	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		49.2	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		49.1	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		47.7	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		48.8	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		48.0	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		52.6	ug/L	0.300	1.00
78-93-3	2-Butanone		285	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		49.1	ug/L	0.300	1.00
591-78-6	2-Hexanone		293	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		48.1	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		49.3	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		255	ug/L	1.50	5.00
67-64-1	Acetone		307	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		48.4	ug/L	0.300	1.00
108-86-1	Bromobenzene		49.0	ug/L	0.300	1.00
74-97-5	Bromochloromethane		51.0	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		53.6	ug/L	0.300	1.00
75-25-2	Bromoform		60.8	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-1829
Lab Sample ID: 1203984435
Client Sample: QC for batch 1744716
Client ID: LCS for batch 1744716
Batch ID: 1744716
Run Date: 03/07/2018 11:15
Prep Date: 03/07/2018 11:15
Data File: 030718V9\9I303L3.D

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

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		51.4	ug/L	0.300	1.00
75-15-0	Carbon disulfide		240	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		53.1	ug/L	0.300	1.00
108-90-7	Chlorobenzene		49.7	ug/L	0.300	1.00
75-00-3	Chloroethane		50.8	ug/L	0.300	1.00
67-66-3	Chloroform		49.2	ug/L	0.300	1.00
74-87-3	Chloromethane		56.9	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		51.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		50.8	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		53.3	ug/L	0.300	1.00
60-29-7	Ethyl ether		52.1	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		49.3	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		51.7	ug/L	0.300	1.00
74-88-4	Iodomethane		239	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		48.1	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		47.0	ug/L	1.00	10.0
91-20-3	Naphthalene		55.2	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		53.4	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		50.0	ug/L	0.300	1.00
108-88-3	Toluene		48.3	ug/L	0.300	1.00
79-01-6	Trichloroethylene		50.5	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		50.7	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		249	ug/L	1.50	5.00
75-01-4	Vinyl chloride		61.2	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		49.8	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		54.2	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		104	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5360	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		47.6	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		47.8	ug/L	0.300	1.00
95-47-6	o-Xylene		50.4	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		48.2	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-1829
Lab Sample ID: 1203984435
Client Sample: QC for batch 1744716
Client ID: LCS for batch 1744716
Batch ID: 1744716
Run Date: 03/07/2018 11:15
Prep Date: 03/07/2018 11:15
Data File: 030718V9\9I303L3.D

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

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		51.9	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		49.8	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		50.3	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		56.0	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.5	50.0	ug/L	105	(71%-134%)
Bromofluorobenzene	50.2	50.0	ug/L	100	(70%-131%)
Toluene-d8	51.6	50.0	ug/L	103	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-1829

Lab Sample ID: 1203984436

Client Sample: QC for batch 1744716

Client ID: LCS for batch 1744716

Batch ID: 1744716

Run Date: 03/07/2018 12:13

Prep Date: 03/07/2018 12:13

Data File: 030718V9\9I305L3.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
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		51.0	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		260	ug/L	1.50	5.00
107-13-1	Acrylonitrile		256	ug/L	1.50	5.00
107-05-1	Allyl chloride		233	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: 2018-1829

Lab Sample ID: 1203984436

Client Sample: QC for batch 1744716

Client ID: LCS for batch 1744716

Batch ID: 1744716

Run Date: 03/07/2018 12:13

Prep Date: 03/07/2018 12:13

Data File: 030718V9\9I305L3.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		245	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		2550	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		248	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		249	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		243	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:	2018-1829	Matrix:	WATER
Lab Sample ID:	1203984436		
Client Sample:	QC for batch 1744716	Client:	ARSL004
Client ID:	LCS for batch 1744716	Method:	SW-846:8260B
Batch ID:	1744716	Inst:	VOA9.I
Run Date:	03/07/2018 12:13	Analyst:	RXY1
Prep Date:	03/07/2018 12:13	Purge Vol:	5 mL
Data File:	030718V9\9I305L3.D	Column:	DB-624

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.3	50.0	ug/L 101	(71%-134%)
Bromofluorobenzene	51.9	50.0	ug/L 104	(70%-131%)
Toluene-d8	52.8	50.0	ug/L 106	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-1829
Lab Sample ID: 1203984437
Client Sample: QC for batch 1744716
Client ID: CAWA-18-67PS
Batch ID: 1744716
Run Date: 03/08/2018 02:43
Prep Date: 03/08/2018 02:43
Data File: 030718V9\9I335.D

Date Collected: 02/22/2018 13:43
Date Received: 02/24/2018 09:25
Client: ARSL004
Method: SW-846:8260B
Inst: VOA9.I
Analyst: RXY1

Column: DB-624

Matrix: W

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		52.4	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		47.6	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		50.3	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		48.3	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		47.6	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		46.4	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		44.1	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		47.3	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		50.0	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		46.5	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		48.9	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		45.5	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		50.6	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		47.7	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		46.6	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		47.6	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		49.4	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		46.6	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		47.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		46.7	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		44.6	ug/L	0.300	1.00
78-93-3	2-Butanone		181	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		49.4	ug/L	0.300	1.00
591-78-6	2-Hexanone		194	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		47.2	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		48.9	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		216	ug/L	1.50	5.00
67-64-1	Acetone		144	ug/L	1.50	10.0
75-05-8	Acetonitrile		1050	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		46.3	ug/L	0.300	1.00
108-86-1	Bromobenzene		49.3	ug/L	0.300	1.00
74-97-5	Bromochloromethane		48.2	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		52.1	ug/L	0.300	1.00
75-25-2	Bromoform		59.4	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-1829	Date Collected: 02/22/2018 13:43	Matrix: W
Lab Sample ID: 1203984437	Date Received: 02/24/2018 09:25	
Client Sample: QC for batch 1744716	Client: ARSL004	Project: QC
Client ID: CAWA-18-67PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1744716	Inst: VOA9.I	Dilution: 1
Run Date: 03/08/2018 02:43	Analyst: RXY1	Purge Vol: 5 mL
Prep Date: 03/08/2018 02:43		
Data File: 030718V9\9I335.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		50.1	ug/L	0.300	1.00
75-15-0	Carbon disulfide		226	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		49.1	ug/L	0.300	1.00
108-90-7	Chlorobenzene		47.3	ug/L	0.300	1.00
75-00-3	Chloroethane		50.5	ug/L	0.300	1.00
67-66-3	Chloroform		46.6	ug/L	0.300	1.00
74-87-3	Chloromethane		59.6	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		49.3	ug/L	0.300	1.00
74-95-3	Dibromomethane		47.9	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		49.5	ug/L	0.300	1.00
60-29-7	Ethyl ether		50.3	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		46.7	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		49.7	ug/L	0.300	1.00
74-88-4	Iodomethane		228	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		48.6	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		48.9	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		50.5	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		46.5	ug/L	0.300	1.00
108-88-3	Toluene		45.9	ug/L	0.300	1.00
79-01-6	Trichloroethylene		46.9	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		49.0	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		209	ug/L	1.50	5.00
75-01-4	Vinyl chloride		59.8	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		47.2	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		50.4	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		97.6	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4640	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		45.9	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		47.4	ug/L	0.300	1.00
95-47-6	o-Xylene		48.0	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		48.7	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2018-1829	Date Collected:	02/22/2018 13:43	Matrix:	W
Lab Sample ID:	1203984437	Date Received:	02/24/2018 09:25		
Client Sample:	QC for batch 1744716	Client:	ARSL004	Project:	QC
Client ID:	CAWA-18-67PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1744716	Inst:	VOA9.I	Dilution:	1
Run Date:	03/08/2018 02:43	Analyst:	RXY1	Purge Vol:	5 mL
Prep Date:	03/08/2018 02:43				
Data File:	030718V9\9I335.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		47.9	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		50.1	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		46.9	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		51.4	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	49.9	50.0	ug/L	100	(71%-134%)
Bromofluorobenzene	51.3	50.0	ug/L	103	(70%-131%)
Toluene-d8	51.4	50.0	ug/L	103	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-1829
Lab Sample ID: 1203984438
Client Sample: QC for batch 1744716
Client ID: CAWA-18-67PS
Batch ID: 1744716
Run Date: 03/08/2018 03:33
Prep Date: 03/08/2018 03:33
Data File: 030718V9\9I337.D

Date Collected: 02/22/2018 13:43
Date Received: 02/24/2018 09:25
Client: ARSL004
Method: SW-846:8260B
Inst: VOA9.I
Analyst: RXY1

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		50.3	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		232	ug/L	1.50	5.00
107-13-1	Acrylonitrile		244	ug/L	1.50	5.00
107-05-1	Allyl chloride		233	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: 2018-1829
Lab Sample ID: 1203984438
Client Sample: QC for batch 1744716
Client ID: CAWA-18-67PS
Batch ID: 1744716
Run Date: 03/08/2018 03:33
Prep Date: 03/08/2018 03:33
Data File: 030718V9\9I337.D

Date Collected: 02/22/2018 13:43
Date Received: 02/24/2018 09:25
Client: ARSL004
Method: SW-846:8260B
Inst: VOA9.I
Analyst: RXY1

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		240	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		2360	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		238	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		233	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		244	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:	2018-1829	Date Collected:	02/22/2018 13:43	Matrix:	W
Lab Sample ID:	1203984438	Date Received:	02/24/2018 09:25		
Client Sample:	QC for batch 1744716	Client:	ARSL004	Project:	QC
Client ID:	CAWA-18-67PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1744716	Inst:	VOA9.I	Dilution:	1
Run Date:	03/08/2018 03:33	Analyst:	RXY1	Purge Vol:	5 mL
Prep Date:	03/08/2018 03:33				
Data File:	030718V9\9I337.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	48.7	50.0	ug/L 97	(71%-134%)
Bromofluorobenzene	48.7	50.0	ug/L 97	(70%-131%)
Toluene-d8	50.8	50.0	ug/L 102	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-1829
Lab Sample ID: 1203984439
Client Sample: QC for batch 1744716
Client ID: CAWA-18-67PSD
Batch ID: 1744716
Run Date: 03/08/2018 03:04
Prep Date: 03/08/2018 03:04
Data File: 030718V9\9I336.D

Date Collected: 02/22/2018 13:43
Date Received: 02/24/2018 09:25
Client: ARSL004
Method: SW-846:8260B
Inst: VOA9.I
Analyst: RXY1

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		59.6	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		52.0	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		55.0	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		54.6	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		52.7	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		49.8	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		48.6	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		56.5	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		54.3	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		54.2	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		52.9	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		52.2	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		56.1	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		52.7	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		51.5	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		52.4	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		53.4	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		51.4	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		52.3	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		51.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		48.9	ug/L	0.300	1.00
78-93-3	2-Butanone		202	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		53.8	ug/L	0.300	1.00
591-78-6	2-Hexanone		217	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		51.4	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		53.2	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		246	ug/L	1.50	5.00
67-64-1	Acetone		158	ug/L	1.50	10.0
75-05-8	Acetonitrile		1150	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		50.9	ug/L	0.300	1.00
108-86-1	Bromobenzene		54.0	ug/L	0.300	1.00
74-97-5	Bromochloromethane		54.1	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		57.6	ug/L	0.300	1.00
75-25-2	Bromoform		66.3	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-1829	Date Collected: 02/22/2018 13:43	Matrix: W
Lab Sample ID: 1203984439	Date Received: 02/24/2018 09:25	
Client Sample: QC for batch 1744716	Client: ARSL004	Project: QC
Client ID: CAWA-18-67PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1744716	Inst: VOA9.I	Dilution: 1
Run Date: 03/08/2018 03:04	Analyst: RXY1	Purge Vol: 5 mL
Prep Date: 03/08/2018 03:04		
Data File: 030718V9\9I336.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		54.6	ug/L	0.300	1.00
75-15-0	Carbon disulfide		242	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		53.4	ug/L	0.300	1.00
108-90-7	Chlorobenzene		52.8	ug/L	0.300	1.00
75-00-3	Chloroethane		54.6	ug/L	0.300	1.00
67-66-3	Chloroform		51.8	ug/L	0.300	1.00
74-87-3	Chloromethane		65.2	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		56.0	ug/L	0.300	1.00
74-95-3	Dibromomethane		53.2	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		54.3	ug/L	0.300	1.00
60-29-7	Ethyl ether		56.0	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		51.2	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		56.4	ug/L	0.300	1.00
74-88-4	Iodomethane		250	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		52.9	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		49.6	ug/L	1.00	10.0
91-20-3	Naphthalene		57.8	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		55.9	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		51.4	ug/L	0.300	1.00
108-88-3	Toluene		51.2	ug/L	0.300	1.00
79-01-6	Trichloroethylene		51.5	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		53.4	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		230	ug/L	1.50	5.00
75-01-4	Vinyl chloride		65.4	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		51.9	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		55.9	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		108	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5180	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		50.0	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		50.7	ug/L	0.300	1.00
95-47-6	o-Xylene		53.6	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		52.8	ug/L	0.300	1.00

**Volatile
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Sample Summary**

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SDG Number:	2018-1829	Date Collected:	02/22/2018 13:43	Matrix:	W
Lab Sample ID:	1203984439	Date Received:	02/24/2018 09:25		
Client Sample:	QC for batch 1744716	Client:	ARSL004	Project:	QC
Client ID:	CAWA-18-67PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1744716	Inst:	VOA9.I	Dilution:	1
Run Date:	03/08/2018 03:04	Analyst:	RXY1	Purge Vol:	5 mL
Prep Date:	03/08/2018 03:04				
Data File:	030718V9\9I336.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		53.4	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		55.5	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		51.2	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		57.6	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.3	50.0	ug/L	103	(71%-134%)
Bromofluorobenzene	52.0	50.0	ug/L	104	(70%-131%)
Toluene-d8	53.3	50.0	ug/L	107	(74%-124%)

Volatile
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Sample Summary

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SDG Number: 2018-1829
Lab Sample ID: 1203984440
Client Sample: QC for batch 1744716
Client ID: CAWA-18-67PSD
Batch ID: 1744716
Run Date: 03/08/2018 04:02
Prep Date: 03/08/2018 04:02
Data File: 030718V9\9I338.D

Date Collected: 02/22/2018 13:43
Date Received: 02/24/2018 09:25
Client: ARSL004
Method: SW-846:8260B
Inst: VOA9.I
Analyst: RXY1

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		51.6	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		249	ug/L	1.50	5.00
107-13-1	Acrylonitrile		257	ug/L	1.50	5.00
107-05-1	Allyl chloride		238	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
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Sample Summary

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SDG Number: 2018-1829
Lab Sample ID: 1203984440
Client Sample: QC for batch 1744716
Client ID: CAWA-18-67PSD
Batch ID: 1744716
Run Date: 03/08/2018 04:02
Prep Date: 03/08/2018 04:02
Data File: 030718V9\9I338.D

Date Collected: 02/22/2018 13:43
Date Received: 02/24/2018 09:25
Client: ARSL004
Method: SW-846:8260B
Inst: VOA9.I
Analyst: RXY1

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		250	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		2520	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		251	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		266	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		250	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		252	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:	2018-1829	Date Collected:	02/22/2018 13:43	Matrix:	W
Lab Sample ID:	1203984440	Date Received:	02/24/2018 09:25		
Client Sample:	QC for batch 1744716	Client:	ARSL004	Project:	QC
Client ID:	CAWA-18-67PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1744716	Inst:	VOA9.I	Dilution:	1
Run Date:	03/08/2018 04:02	Analyst:	RXY1	Purge Vol:	5 mL
Prep Date:	03/08/2018 04:02				
Data File:	030718V9\9I338.D	Column:	DB-624		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	49.1	50.0	ug/L	98	(71%-134%)
Bromofluorobenzene	50.5	50.0	ug/L	101	(70%-131%)
Toluene-d8	51.7	50.0	ug/L	103	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-1829

Lab Sample ID: 1203985580

Client Sample: QC for batch 1744716

Client ID: MB for batch 1744716

Batch ID: 1744716

Run Date: 03/08/2018 01:09

Prep Date: 03/08/2018 01:09

Data File: 030718V9\9I332B.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2018-1829
Lab Sample ID: 1203985580
Client Sample: QC for batch 1744716
Client ID: MB for batch 1744716
Batch ID: 1744716
Run Date: 03/08/2018 01:09
Prep Date: 03/08/2018 01:09
Data File: 030718V9\9I332B.D

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

Column: DB-624

Matrix: WATER

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

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

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-1829

Lab Sample ID: 1203985580

Client Sample: QC for batch 1744716

Client ID: MB for batch 1744716

Batch ID: 1744716

Run Date: 03/08/2018 01:09

Prep Date: 03/08/2018 01:09

Data File: 030718V9\9I332B.D

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

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
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	49.7	50.0	ug/L 99	(71%-134%)
Bromofluorobenzene	50.1	50.0	ug/L 100	(70%-131%)
Toluene-d8	51.4	50.0	ug/L 103	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-1829

Lab Sample ID: 1203985581

Client Sample: QC for batch 1744716

Client ID: LCS for batch 1744716

Batch ID: 1744716

Run Date: 03/07/2018 23:45

Prep Date: 03/07/2018 23:45

Data File: 030718V9\9I329L.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		45.6	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		40.1	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		43.5	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		41.7	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		38.8	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		37.0	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		42.5	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		45.1	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		39.4	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		39.5	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		42.5	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		44.6	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		40.9	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		41.8	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		42.0	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		39.3	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		39.2	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		42.1	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		39.8	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		39.3	ug/L	0.300	1.00
78-93-3	2-Butanone		177	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		40.5	ug/L	0.300	1.00
591-78-6	2-Hexanone		179	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		39.6	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		36.6	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		201	ug/L	1.50	5.00
67-64-1	Acetone		158	ug/L	1.50	10.0
75-05-8	Acetonitrile		979	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		40.1	ug/L	0.300	1.00
108-86-1	Bromobenzene		42.7	ug/L	0.300	1.00
74-97-5	Bromochloromethane		43.4	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		45.2	ug/L	0.300	1.00
75-25-2	Bromoform		52.3	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-1829

Lab Sample ID: 1203985581

Client Sample: QC for batch 1744716

Client ID: LCS for batch 1744716

Batch ID: 1744716

Run Date: 03/07/2018 23:45

Prep Date: 03/07/2018 23:45

Data File: 030718V9\9I329L.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		48.8	ug/L	0.300	1.00
75-15-0	Carbon disulfide		192	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		40.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		40.6	ug/L	0.300	1.00
75-00-3	Chloroethane		47.3	ug/L	0.300	1.00
67-66-3	Chloroform		41.5	ug/L	0.300	1.00
74-87-3	Chloromethane		58.4	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		43.1	ug/L	0.300	1.00
74-95-3	Dibromomethane		42.2	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		46.3	ug/L	0.300	1.00
60-29-7	Ethyl ether		50.9	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		38.8	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		33.2	ug/L	0.300	1.00
74-88-4	Iodomethane		197	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		39.3	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		39.6	ug/L	1.00	10.0
91-20-3	Naphthalene		46.3	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		43.2	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		36.8	ug/L	0.300	1.00
108-88-3	Toluene		39.9	ug/L	0.300	1.00
79-01-6	Trichloroethylene		39.5	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		47.4	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		227	ug/L	1.50	5.00
75-01-4	Vinyl chloride		58.8	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		41.8	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		44.3	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		80.7	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4220	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		33.8	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		37.4	ug/L	0.300	1.00
95-47-6	o-Xylene		40.6	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		36.3	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	2018-1829	Matrix:	WATER
Lab Sample ID:	1203985581		
Client Sample:	QC for batch 1744716	Client:	ARSL004
Client ID:	LCS for batch 1744716	Method:	SW-846:8260B
Batch ID:	1744716	Inst:	VOA9.I
Run Date:	03/07/2018 23:45	Analyst:	RXY1
Prep Date:	03/07/2018 23:45		
Data File:	030718V9\9I329L.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		42.4	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		38.0	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		40.6	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		46.2	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	48.5	50.0	ug/L	97	(71%-134%)
Bromofluorobenzene	49.4	50.0	ug/L	99	(70%-131%)
Toluene-d8	49.7	50.0	ug/L	99	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2018-1829

Lab Sample ID: 1203985582

Client Sample: QC for batch 1744716

Client ID: LCS for batch 1744716

Batch ID: 1744716

Run Date: 03/08/2018 00:41

Prep Date: 03/08/2018 00:41

Data File: 030718V9\9I331L.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA9.I

Analyst: RXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		44.7	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		236	ug/L	1.50	5.00
107-13-1	Acrylonitrile		234	ug/L	1.50	5.00
107-05-1	Allyl chloride		214	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: 2018-1829
Lab Sample ID: 1203985582
Client Sample: QC for batch 1744716
Client ID: LCS for batch 1744716
Batch ID: 1744716
Run Date: 03/08/2018 00:41
Prep Date: 03/08/2018 00:41
Data File: 030718V9\9I331L.D

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

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		225	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		2330	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		226	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		232	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		227	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		211	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2018-1829
Lab Sample ID: 1203985582
Client Sample: QC for batch 1744716
Client ID: LCS for batch 1744716
Batch ID: 1744716
Run Date: 03/08/2018 00:41
Prep Date: 03/08/2018 00:41
Data File: 030718V9\9I331L.D

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

Column: DB-624

Matrix: WATER

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	50.2	50.0	ug/L 100	(71%-134%)
Bromofluorobenzene	48.4	50.0	ug/L 97	(70%-131%)
Toluene-d8	51.7	50.0	ug/L 103	(74%-124%)

Semi-Volatile Analysis

Case Narrative

**GC/MS Semivolatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-1829
Work Order #: 444683**

Method/Analysis Information

Procedure:	Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry
Analytical Method:	SW846 3510C/8270D
Prep Method:	SW846 3510C
Analytical Batch Number:	1742655
Prep Batch Number:	1742654

Sample Analysis

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

Sample ID	Client ID
444683002	CAWA-18-12
1203979858	Method Blank (MB)
1203979859	Laboratory Control Sample (LCS)
1203979860	444683002(CAWA-18-12) Matrix Spike (MS)
1203979861	444683002(CAWA-18-12) Matrix Spike Duplicate (MSD)

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

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-009 REV# 40.

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

Calibration Information

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

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

Initial Calibration

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

CCV Requirements

All Calibration Verification Standards (CCV) did not meet the acceptance criteria as outlined in Method 8270D for sample 1203979861 (CAWA-18-12MSD). However, the method allows for a designated number of outliers dependent on the requested analyte list. This SDG satisfied the 8270D outlier acceptance criteria. If required, a CRDL was analyzed after the CCVs to demonstrate that there is adequate sensitivity to detect the failed compounds at the applicable lower quantitation limit.

Quality Control (QC) Information

Method Blank (MB) Statement

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

Surrogate Recoveries

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

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 444683002 (CAWA-18-12) was selected for analysis as the matrix spike and matrix spike duplicate.

Spike Recovery Statement

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

MS/MSD Relative Percent Difference (RPD) Statement

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

Sample	Analyte	Value
1203979860MS and 1203979861MSD (CAWA-18-12)	Benzidine	RPD 35* (0%-30%)

Internal Standard (ISTD) Acceptance

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

Technical Information:

Holding Time Specifications

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

Preparation/Analytical Method Verification

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

Sample Dilutions

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

Sample Re-extraction/Re-analysis

The initial analysis for sample 1203979861 (CAWA-18-12MSD) was outside of the DFTPP TUNE window. The sample was re-analyzed within a new DFTPP TUNE window. The data results are reported from the re-analysis.

Miscellaneous Information:

Manual Integrations

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

TIC Comment

Tentatively identified compounds (TIC) were requested for sample 444683002 (CAWA-18-12) in this SDG in this batch.

Additional Comments

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

Electronic Package Comment

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

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

System Configuration

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description
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MSD3.I	Agilent 7890A/5975C GC/MS w/ 7683 Autosampler	HP7890A/HP5975C	DB-5MS	25m x 0.2mm, 0.33um (5% Phenylmethylpolysiloxane)
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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: 2018-1829 GEL Work Order: 444683

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: 21 MAR 2018

Title: Data Validator

Sample Data Summary

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

Page 1 of 3

SDG Number: 2018-1829

Lab Sample ID: 444683002

Date Collected: 02/23/2018 10:15

Date Received: 02/27/2018 09:15

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSD3.I

Dilution: 1

Batch ID: 1742655

Analyst: JLD1

Inj. Vol: 1 uL

Run Date: 03/01/2018 05:51

Aliquot: 900 mL

Final Volume: 1 mL

Prep Date: 02/28/2018 09:02

Column: DB-5ms

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

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

Page 2 of 3

SDG Number: 2018-1829

Lab Sample ID: 444683002

Date Collected: 02/23/2018 10:15

Date Received: 02/27/2018 09:15

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW846 3510C/8270D

SOP Ref: GL-OA-E-009

Inst: MSD3.I

Dilution: 1

Batch ID: 1742655

Analyst: JLD1

Inj. Vol: 1 uL

Run Date: 03/01/2018 05:51

Aliquot: 900 mL

Final Volume: 1 mL

Prep Date: 02/28/2018 09:02

Column: DB-5ms

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

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

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SDG Number: 2018-1829
Lab Sample ID: 444683002

Client ID: CAWA-18-12
Batch ID: 1742655
Run Date: 03/01/2018 05:51
Prep Date: 02/28/2018 09:02
Data File: s022818a.s\s3b2837.D

Date Collected: 02/23/2018 10:15
Date Received: 02/27/2018 09:15
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD3.I
Analyst: JLD1
Aliquot: 900 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	4.11	ug/L	4.11	11.1
99-09-2	3-Nitroaniline	U	3.33	ug/L	3.33	11.1
95-48-7	<i>m</i> -Nitroaniline o-Cresol	U	3.33	ug/L	3.33	11.1
88-74-4	2-Nitroaniline	U	3.33	ug/L	3.33	11.1
100-01-6	<i>o</i> -Nitroaniline 4-Nitroaniline <i>p</i> -Nitroaniline	U	3.33	ug/L	3.33	11.1

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
2,4,6-Tribromophenol	71.4	111	ug/L	64 (32%-124%)
2-Fluorobiphenyl	28.6	55.6	ug/L	51 (32%-112%)
2-Fluorophenol	38.6	111	ug/L	35 (15%-88%)
Nitrobenzene-d5	30.2	55.6	ug/L	54 (36%-115%)
Phenol-d5	24.4	111	ug/L	22 (15%-91%)
p-Terphenyl-d14	35.9	55.6	ug/L	65 (36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	2.05	4.61	ug/L	0	J

Quality Control Summary

Semi-Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2018-1829

Matrix Type: LIQUID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203979858	MB for batch 1742654	56	39	83	77	82	97
1203979859	LCS for batch 1742654	73	62	95	84	104	81
444683002	CAWA-18-12	35	22	54	51	64	65
1203979860	CAWA-18-12MS	66	53	74	69	81	65
1203979861	CAWA-18-12MSD	58	46	72	70	89	70

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: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1742654

Matrix: WATER

Lab Sample ID 1203979859

Instrument: MSD3.I

Analysis Date: 02/28/2018 21:57

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1742654

Inj. Vol: 1 uL

Batch ID: 1742655

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	34.8	70	30-88
110-86-1	LCS Pyridine	50.0	0.0	37.6	75	27-89
62-53-3	LCS Aniline	50.0	0.0	50.0	100	49-112
108-95-2	LCS Phenol	50.0	0.0	30.4	61	16-82
111-44-4	LCS bis(2-Chloroethyl) ether	50.0	0.0	50.4	101	51-111
95-57-8	LCS 2-Chlorophenol	50.0	0.0	47.0	94	49-105
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	41.1	82	37-95
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	40.9	82	38-96
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	41.9	84	39-97
108-60-1	LCS bis(2-Chloro-1-methylethyl)ether	50.0	0.0	53.0	106	44-123
100-51-6	LCS Benzyl alcohol	50.0	0.0	46.0	92	44-102
95-48-7	LCS o-Cresol	50.0	0.0	44.3	89	41-101
65794-96-9	LCS m,p-Cresols	50.0	0.0	49.8	100	43-102
621-64-7	LCS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	50.0	0.0	56.4	113	54-115
67-72-1	LCS Hexachloroethane	50.0	0.0	39.5	79	36-96
98-95-3	LCS Nitrobenzene	50.0	0.0	46.4	93	53-115
78-59-1	LCS Isophorone	50.0	0.0	45.1	90	56-117
88-75-5	LCS 2-Nitrophenol	50.0	0.0	46.6	93	51-113
105-67-9	LCS 2,4-Dimethylphenol	50.0	0.0	39.9	80	51-104
111-91-1	LCS bis(2-Chloroethoxy)methane	50.0	0.0	46.8	94	55-114
120-83-2	LCS 2,4-Dichlorophenol	50.0	0.0	47.1	94	53-109
65-85-0	LCS Benzoic acid	100	0.0	58.2	58	21-74

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1742654

Matrix: WATER

Lab Sample ID 1203979859

Instrument: MSD3.I

Analysis Date: 02/28/2018 21:57

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1742654

Inj. Vol: 1 uL

Batch ID: 1742655

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	62.0	124	65-136
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	38.6	77	35-98
59-50-7	LCS Parachlorometa cresol 4-Chloro-3-methylphenol	50.0	0.0	48.8	98	55-115
91-57-6	LCS 2-Methylnaphthalene	50.0	0.0	40.7	81	42-103
91-20-3	LCS Naphthalene	50.0	0.0	42.0	84	44-102
90-12-0	LCS 1-Methylnaphthalene	50.0	0.0	42.7	85	45-108
77-47-4	LCS Hexachlorocyclopentadiene	50.0	0.0	26.4	53	34-89
88-06-2	LCS 2,4,6-Trichlorophenol	50.0	0.0	43.0	86	55-120
95-95-4	LCS 2,4,5-Trichlorophenol	50.0	0.0	42.0	84	55-116
91-58-7	LCS 2-Chloronaphthalene	50.0	0.0	38.4	77	44-107
88-74-4	LCS 2-Nitroaniline o-Nitroaniline	50.0	0.0	47.0	94	53-121
99-09-2	LCS 3-Nitroaniline m-Nitroaniline	50.0	0.0	56.2	112	61-139
131-11-3	LCS Dimethylphthalate	50.0	0.0	46.9	94	60-122
606-20-2	LCS 2,6-Dinitrotoluene	50.0	0.0	43.5	87	59-122
121-14-2	LCS 2,4-Dinitrotoluene	50.0	0.0	45.4	91	57-124
208-96-8	LCS Acenaphthylene	50.0	0.0	41.5	83	50-113
83-32-9	LCS Acenaphthene	50.0	0.0	44.2	88	49-112
51-28-5	LCS 2,4-Dinitrophenol	50.0	0.0	45.0	90	34-122
132-64-9	LCS Dibenzofuran	50.0	0.0	43.5	87	50-111
58-90-2	LCS 2,3,4,6-Tetrachlorophenol	50.0	0.0	44.6	89	54-122
84-66-2	LCS Diethylphthalate	50.0	0.0	49.7	99	57-122
100-02-7	LCS 4-Nitrophenol	50.0	0.0	25.8	52	15-137

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1742654

Matrix: WATER

Lab Sample ID 1203979859

Instrument: MSD3.I

Analysis Date: 02/28/2018 21:57

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1742654

Inj. Vol: 1 uL

Batch ID: 1742655

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	44.6	89	52-114
7005-72-3	LCS 4-Chlorophenylphenylether	50.0	0.0	46.0	92	52-121
100-01-6	LCS 4-Nitroaniline	50.0	0.0	50.6	101	44-137
	<i>p</i> -Nitroaniline					
534-52-1	LCS 2-Methyl-4,6-dinitrophenol	50.0	0.0	43.1	86	45-124
122-39-4	LCS Diphenylamine	50.0	0.0	42.1	84	55-113
122-66-7	LCS Azobenzene	50.0	0.0	42.0	84	53-115
	<i>1,2-Diphenylhydrazine</i>					
101-55-3	LCS 4-Bromophenylphenylether	50.0	0.0	41.6	83	54-116
118-74-1	LCS Hexachlorobenzene	50.0	0.0	42.4	85	54-115
87-86-5	LCS Pentachlorophenol	50.0	0.0	53.1	106	41-116
85-01-8	LCS Phenanthrene	50.0	0.0	43.5	87	55-110
120-12-7	LCS Anthracene	50.0	0.0	44.0	88	56-112
84-74-2	LCS Di-n-butylphthalate	50.0	0.0	52.8	106	57-123
206-44-0	LCS Fluoranthene	50.0	0.0	51.1	102	54-118
129-00-0	LCS Pyrene	50.0	0.0	34.9	70	49-121
85-68-7	LCS Butylbenzylphthalate	50.0	0.0	43.2	86	52-125
117-81-7	LCS bis(2-Ethylhexyl)phthalate	50.0	0.0	48.0	96	52-125
56-55-3	LCS Benzo(a)anthracene	50.0	0.0	43.1	86	57-112
218-01-9	LCS Chrysene	50.0	0.0	44.0	88	58-117
117-84-0	LCS Di-n-octylphthalate	50.0	0.0	47.4	95	50-129
205-99-2	LCS Benzo(b)fluoranthene	50.0	0.0	42.0	84	41-118
207-08-9	LCS Benzo(k)fluoranthene	50.0	0.0	42.7	85	42-121
50-32-8	LCS Benzo(a)pyrene	50.0	0.0	43.4	87	40-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-1829

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1742654

Matrix: WATER

Lab Sample ID 1203979859

Instrument: MSD3.I

Analysis Date: 02/28/2018 21:57

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1742654

Inj. Vol: 1 uL

Batch ID: 1742655

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	43.3	87	34-125
53-70-3	LCS Dibenzo(a,h)anthracene	50.0	0.0	44.8	90	38-129
191-24-2	LCS Benzo(ghi)perylene	50.0	0.0	40.9	82	33-131
123-91-1	LCS 1,4-Dioxane	50.0	0.0	36.0	72	38-78
930-55-2	LCS N-Nitrosopyrrolidine	50.0	0.0	54.4	109	54-113
95-94-3	LCS 1,2,4,5-Tetrachlorobenzene	50.0	0.0	39.3	79	44-102
1912-24-9	LCS Atrazine	50.0	0.0	37.2	74	60-131
92-87-5	LCS Benzidine	100	0.0	79.1	79	20-144
91-94-1	LCS 3,3'-Dichlorobenzidine	50.0	0.0	51.7	103	43-127
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	40.4	81	39-99

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2018-1829

Sample Type: Matrix Spike

Client ID: CAWA-18-12MS

Matrix: W

Lab Sample ID 1203979860

Instrument: MSD3.I

Analysis Date: 03/01/2018 06:20

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1742654

Inj. Vol: 1 uL

Batch ID: 1742655

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	111	0.00 U	73.1	66	25-106
110-86-1	MS Pyridine	111	0.00 U	70.3	63	24-93
62-53-3	MS Aniline	111	0.00 U	93.4	84	37-113
108-95-2	MS Phenol	111	0.00 U	59.3	53	23-82
111-44-4	MS bis(2-Chloroethyl) ether	111	0.00 U	91.5	82	39-114
95-57-8	MS 2-Chlorophenol	111	0.00 U	88.7	80	37-108
541-73-1	MS 1,3-Dichlorobenzene	111	0.00 U	67.5	61	27-97
106-46-7	MS 1,4-Dichlorobenzene	111	0.00 U	68.3	61	28-97
95-50-1	MS 1,2-Dichlorobenzene	111	0.00 U	71.0	64	28-99
108-60-1	MS bis(2-Chloro-1-methylethyl)ether	111	0.00 U	96.8	87	32-127
100-51-6	MS Benzyl alcohol	111	0.00 U	91.5	82	37-116
95-48-7	MS o-Cresol	111	0.00 U	88.2	79	34-109
65794-96-9	MS m,p-Cresols	111	0.00 U	102	92	36-120
621-64-7	MS N-Nitrosodi--n-propylamine <i>N-Nitrosodipropylamine</i>	111	0.00 U	104	94	42-118
67-72-1	MS Hexachloroethane	111	0.00 U	62.8	57	29-94
98-95-3	MS Nitrobenzene	111	0.00 U	79.6	72	38-123
78-59-1	MS Isophorone	111	0.00 U	76.3	69	43-120
88-75-5	MS 2-Nitrophenol	111	0.00 U	81.2	73	39-115
105-67-9	MS 2,4-Dimethylphenol	111	0.00 U	73.2	66	39-107
111-91-1	MS bis(2-Chloroethoxy)methane	111	0.00 U	79.2	71	42-118
120-83-2	MS 2,4-Dichlorophenol	111	0.00 U	83.2	75	40-111
65-85-0	MS Benzoic acid	222	0.00 U	116	52	17-95

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2018-1829

Sample Type: Matrix Spike

Client ID: CAWA-18-12MS

Matrix: W

Lab Sample ID 1203979860

Instrument: MSD3.I

Analysis Date: 03/01/2018 06:20

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1742654

Inj. Vol: 1 uL

Batch ID: 1742655

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	MS 4-Chloroaniline	111	0.00 U	108	97	44-138
87-68-3	MS Hexachlorobutadiene	111	0.00 U	57.4	52	26-98
59-50-7	MS Parachlorometa cresol 4-Chloro-3-methylphenol	111	0.00 U	86.3	78	41-122
91-57-6	MS 2-Methylnaphthalene	111	0.00 U	68.1	61	29-109
91-20-3	MS Naphthalene	111	0.00 U	71.0	64	31-108
90-12-0	MS 1-Methylnaphthalene	111	0.00 U	71.5	64	33-112
77-47-4	MS Hexachlorocyclopentadiene	111	0.00 U	41.0	37	26-79
88-06-2	MS 2,4,6-Trichlorophenol	111	0.00 U	77.4	70	39-124
95-95-4	MS 2,4,5-Trichlorophenol	111	0.00 U	76.8	69	42-120
91-58-7	MS 2-Chloronaphthalene	111	0.00 U	65.2	59	29-113
88-74-4	MS 2-Nitroaniline o-Nitroaniline	111	0.00 U	82.8	75	41-121
99-09-2	MS 3-Nitroaniline m-Nitroaniline	111	0.00 U	100	90	42-144
131-11-3	MS Dimethylphthalate	111	0.00 U	83.8	75	45-128
606-20-2	MS 2,6-Dinitrotoluene	111	0.00 U	77.2	69	46-124
121-14-2	MS 2,4-Dinitrotoluene	111	0.00 U	79.8	72	45-125
208-96-8	MS Acenaphthylene	111	0.00 U	71.7	65	35-120
83-32-9	MS Acenaphthene	111	0.00 U	75.6	68	35-117
51-28-5	MS 2,4-Dinitrophenol	111	0.00 U	80.0	72	27-122
132-64-9	MS Dibenzofuran	111	0.00 U	75.6	68	38-113
58-90-2	MS 2,3,4,6-Tetrachlorophenol	111	0.00 U	79.1	71	40-128
84-66-2	MS Diethylphthalate	111	0.00 U	88.3	80	43-127
100-02-7	MS 4-Nitrophenol	111	0.00 U	50.9	46	17-85

Semi-Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 8

SDG Number: 2018-1829

Sample Type: Matrix Spike

Client ID: CAWA-18-12MS

Matrix: W

Lab Sample ID 1203979860

Instrument: MSD3.I

Analysis Date: 03/01/2018 06:20

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1742654

Inj. Vol: 1 uL

Batch ID: 1742655

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
86-73-7	MS Fluorene	111	0.00 U	77.2	69	39-117
7005-72-3	MS 4-Chlorophenylphenylether	111	0.00 U	77.8	70	39-121
100-01-6	MS 4-Nitroaniline	111	0.00 U	86.6	78	30-133
534-52-1	MS 2-Methyl-4,6-dinitrophenol	111	0.00 U	73.4	66	32-126
122-39-4	MS Diphenylamine	111	0.00 U	73.6	66	37-118
122-66-7	MS Azobenzene	111	0.00 U	72.4	65	38-120
101-55-3	MS 4-Bromophenylphenylether	111	0.00 U	70.8	64	39-121
118-74-1	MS Hexachlorobenzene	111	0.00 U	73.4	66	40-118
87-86-5	MS Pentachlorophenol	111	0.00 U	87.7	79	35-121
85-01-8	MS Phenanthrene	111	0.00 U	76.7	69	40-115
120-12-7	MS Anthracene	111	0.00 U	76.3	69	38-120
84-74-2	MS Di-n-butylphthalate	111	0.00 U	93.7	84	41-128
206-44-0	MS Fluoranthene	111	0.00 U	89.4	81	41-119
129-00-0	MS Pyrene	111	0.00 U	62.6	56	35-128
85-68-7	MS Butylbenzylphthalate	111	0.00 U	77.8	70	40-129
117-81-7	MS bis(2-Ethylhexyl)phthalate	111	0.00 U	84.3	76	38-131
56-55-3	MS Benzo(a)anthracene	111	0.00 U	76.8	69	39-120
218-01-9	MS Chrysene	111	0.00 U	78.1	70	41-124
117-84-0	MS Di-n-octylphthalate	111	0.00 U	82.6	74	37-134
205-99-2	MS Benzo(b)fluoranthene	111	0.00 U	79.4	71	31-122
207-08-9	MS Benzo(k)fluoranthene	111	0.00 U	80.6	73	33-123
50-32-8	MS Benzo(a)pyrene	111	0.00 U	79.9	72	32-118

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-1829

Sample Type: Matrix Spike

Client ID: CAWA-18-12MS

Matrix: W

Lab Sample ID 1203979860

Instrument: MSD3.I

Analysis Date: 03/01/2018 06:20

Dilution: 1

Analyst: JLD1

Prep Batch ID:1742654

Inj. Vol: 1 uL

Batch ID: 1742655

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
193-39-5	MS Indeno(1,2,3-cd)pyrene	111	0.00 U	67.8	61	27-121
53-70-3	MS Dibenzo(a,h)anthracene	111	0.00 U	67.9	61	30-125
191-24-2	MS Benzo(ghi)perylene	111	0.00 U	61.4	55	24-126
123-91-1	MS 1,4-Dioxane	111	0.00 U	69.0	62	24-110
930-55-2	MS N-Nitrosopyrrolidine	111	0.00 U	105	94	47-119
95-94-3	MS 1,2,4,5-Tetrachlorobenzene	111	0.00 U	66.0	59	32-101
1912-24-9	MS Atrazine	111	0.00 U	85.9	77	42-129
92-87-5	MS Benzidine	222	0.00 U	125	56	15-130
91-94-1	MS 3,3'-Dichlorobenzidine	111	0.00 U	92.6	83	34-124
120-82-1	MS 1,2,4-Trichlorobenzene	111	0.00 U	64.1	58	26-102

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-1829

Sample Type: Matrix Spike Duplicate

Client ID: CAWA-18-12MSD

Matrix: W

Lab Sample ID 1203979861

Instrument: MSD3.I

Analysis Date: 03/01/2018 19:04

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1742654

Inj. Vol: 1 uL

Batch ID: 1742655

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	111	0.00	U	58.4	53	25-106	22	0-30
110-86-1	MSD Pyridine	111	0.00	U	66.4	60	24-93	6	0-30
62-53-3	MSD Aniline	111	0.00	U	85.5	77	37-113	9	0-30
108-95-2	MSD Phenol	111	0.00	U	51.0	46	23-82	15	0-30
111-44-4	MSD bis(2-Chloroethyl) ether	111	0.00	U	79.3	71	39-114	14	0-30
95-57-8	MSD 2-Chlorophenol	111	0.00	U	78.0	70	37-108	13	0-30
541-73-1	MSD 1,3-Dichlorobenzene	111	0.00	U	57.4	52	27-97	16	0-30
106-46-7	MSD 1,4-Dichlorobenzene	111	0.00	U	58.3	52	28-97	16	0-30
95-50-1	MSD 1,2-Dichlorobenzene	111	0.00	U	60.1	54	28-99	17	0-30
108-60-1	MSD bis(2-Chloro-1-methylethyl)ether	111	0.00	U	83.5	75	32-127	15	0-30
100-51-6	MSD Benzyl alcohol	111	0.00	U	79.6	72	37-116	14	0-30
95-48-7	MSD o-Cresol	111	0.00	U	77.8	70	34-109	13	0-30
65794-96-9	MSD m,p-Cresols	111	0.00	U	90.5	81	36-120	12	0-30
621-64-7	MSD N-Nitrosodi--n-propylamine N-Nitrosodipropylamine	111	0.00	U	91.0	82	42-118	14	0-30
67-72-1	MSD Hexachloroethane	111	0.00	U	53.3	48	29-94	16	0-30
98-95-3	MSD Nitrobenzene	111	0.00	U	77.1	69	38-123	3	0-30
78-59-1	MSD Isophorone	111	0.00	U	74.5	67	43-120	2	0-30
88-75-5	MSD 2-Nitrophenol	111	0.00	U	80.6	73	39-115	1	0-30
105-67-9	MSD 2,4-Dimethylphenol	111	0.00	U	70.2	63	39-107	4	0-30
111-91-1	MSD bis(2-Chloroethoxy)methane	111	0.00	U	78.7	71	42-118	1	0-30
120-83-2	MSD 2,4-Dichlorophenol	111	0.00	U	82.2	74	40-111	1	0-30
65-85-0	MSD Benzoic acid	222	0.00	U	114	52	17-95	2	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-1829

Sample Type: Matrix Spike Duplicate

Client ID: CAWA-18-12MSD

Matrix: W

Lab Sample ID 1203979861

Instrument: MSD3.I

Analysis Date: 03/01/2018 19:04

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1742654

Inj. Vol: 1 uL

Batch ID: 1742655

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
106-47-8	MSD 4-Chloroaniline	111	0.00	U 112	101	44-138	3	0-30
87-68-3	MSD Hexachlorobutadiene	111	0.00	U 54.4	49	26-98	6	0-30
59-50-7	MSD Parachlorometa cresol 4-Chloro-3-methylphenol	111	0.00	U 86.8	78	41-122	1	0-30
91-57-6	MSD 2-Methylnaphthalene	111	0.00	U 65.4	59	29-109	4	0-30
91-20-3	MSD Naphthalene	111	0.00	U 67.8	61	31-108	5	0-30
90-12-0	MSD 1-Methylnaphthalene	111	0.00	U 68.8	62	33-112	4	0-30
77-47-4	MSD Hexachlorocyclopentadiene	111	0.00	U 41.9	38	26-79	2	0-30
88-06-2	MSD 2,4,6-Trichlorophenol	111	0.00	U 80.8	73	39-124	4	0-30
95-95-4	MSD 2,4,5-Trichlorophenol	111	0.00	U 79.9	72	42-120	4	0-30
91-58-7	MSD 2-Chloronaphthalene	111	0.00	U 65.9	59	29-113	1	0-30
88-74-4	MSD 2-Nitroaniline o-Nitroaniline	111	0.00	U 86.6	78	41-121	4	0-30
99-09-2	MSD 3-Nitroaniline m-Nitroaniline	111	0.00	U 109	98	42-144	8	0-30
131-11-3	MSD Dimethylphthalate	111	0.00	U 90.1	81	45-128	7	0-30
606-20-2	MSD 2,6-Dinitrotoluene	111	0.00	U 81.6	73	46-124	6	0-30
121-14-2	MSD 2,4-Dinitrotoluene	111	0.00	U 85.9	77	45-125	7	0-30
208-96-8	MSD Acenaphthylene	111	0.00	U 73.4	66	35-120	2	0-30
83-32-9	MSD Acenaphthene	111	0.00	U 76.2	69	35-117	1	0-30
51-28-5	MSD 2,4-Dinitrophenol	111	0.00	U 96.4	87	27-122	19	0-30
132-64-9	MSD Dibenzofuran	111	0.00	U 77.0	69	38-113	2	0-30
58-90-2	MSD 2,3,4,6-Tetrachlorophenol	111	0.00	U 85.2	77	40-128	7	0-30
84-66-2	MSD Diethylphthalate	111	0.00	U 94.7	85	43-127	7	0-30
100-02-7	MSD 4-Nitrophenol	111	0.00	U 52.0	47	17-85	2	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-1829

Sample Type: Matrix Spike Duplicate

Client ID: CAWA-18-12MSD

Matrix: W

Lab Sample ID 1203979861

Instrument: MSD3.I

Analysis Date: 03/01/2018 19:04

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1742654

Inj. Vol: 1 uL

Batch ID: 1742655

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
86-73-7	MSD Fluorene	111	0.00 U	79.4	71	39-117	3	0-30
7005-72-3	MSD 4-Chlorophenylphenylether	111	0.00 U	79.8	72	39-121	3	0-30
100-01-6	MSD 4-Nitroaniline <i>p</i> -Nitroaniline	111	0.00 U	97.2	87	30-133	12	0-30
534-52-1	MSD 2-Methyl-4,6-dinitrophenol	111	0.00 U	85.0	77	32-126	15	0-30
122-39-4	MSD Diphenylamine	111	0.00 U	76.0	68	37-118	3	0-30
122-66-7	MSD Azobenzene <i>1,2-Diphenylhydrazine</i>	111	0.00 U	71.7	65	38-120	1	0-30
101-55-3	MSD 4-Bromophenylphenylether	111	0.00 U	72.0	65	39-121	2	0-30
118-74-1	MSD Hexachlorobenzene	111	0.00 U	76.1	69	40-118	4	0-30
87-86-5	MSD Pentachlorophenol	111	0.00 U	101	91	35-121	14	0-30
85-01-8	MSD Phenanthrene	111	0.00 U	80.7	73	40-115	5	0-30
120-12-7	MSD Anthracene	111	0.00 U	82.0	74	38-120	7	0-30
84-74-2	MSD Di-n-butylphthalate	111	0.00 U	103	93	41-128	10	0-30
206-44-0	MSD Fluoranthene	111	0.00 U	101	91	41-119	12	0-30
129-00-0	MSD Pyrene	111	0.00 U	68.0	61	35-128	8	0-30
85-68-7	MSD Butylbenzylphthalate	111	0.00 U	81.6	73	40-129	5	0-30
117-81-7	MSD bis(2-Ethylhexyl)phthalate	111	0.00 U	90.4	81	38-131	7	0-30
56-55-3	MSD Benzo(a)anthracene	111	0.00 U	81.0	73	39-120	5	0-30
218-01-9	MSD Chrysene	111	0.00 U	82.6	74	41-124	6	0-30
117-84-0	MSD Di-n-octylphthalate	111	0.00 U	86.7	78	37-134	5	0-30
205-99-2	MSD Benzo(b)fluoranthene	111	0.00 U	78.5	71	31-122	1	0-30
207-08-9	MSD Benzo(k)fluoranthene	111	0.00 U	79.5	72	33-123	1	0-30
50-32-8	MSD Benzo(a)pyrene	111	0.00 U	82.2	74	32-118	3	0-30

Semi-Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2018-1829

Sample Type: Matrix Spike Duplicate

Client ID: CAWA-18-12MSD

Matrix: W

Lab Sample ID 1203979861

Instrument: MSD3.I

Analysis Date: 03/01/2018 19:04

Dilution: 1

Analyst: JLD1

Prep Batch ID: 1742654

Inj. Vol: 1 uL

Batch ID: 1742655

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	U	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
193-39-5	MSD Indeno(1,2,3-cd)pyrene	111	0.00	U	81.4	73	27-121	18	0-30
53-70-3	MSD Dibenzo(a,h)anthracene	111	0.00	U	85.1	77	30-125	23	0-30
191-24-2	MSD Benzo(ghi)perylene	111	0.00	U	77.6	70	24-126	23	0-30
123-91-1	MSD 1,4-Dioxane	111	0.00	U	66.4	60	24-110	4	0-30
930-55-2	MSD N-Nitrosopyrrolidine	111	0.00	U	93.2	84	47-119	12	0-30
95-94-3	MSD 1,2,4,5-Tetrachlorobenzene	111	0.00	U	65.9	59	32-101	0	0-30
1912-24-9	MSD Atrazine	111	0.00	U	91.3	82	42-129	6	0-30
92-87-5	MSD Benzidine	222	0.00	U	178	80	15-130	35 *	0-30
91-94-1	MSD 3,3'-Dichlorobenzidine	111	0.00	U	101	91	34-124	9	0-30
120-82-1	MSD 1,2,4-Trichlorobenzene	111	0.00	U	61.1	55	26-102	5	0-30

Method Blank Summary

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SDG Number:	2018-1829	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1742654	Instrument ID:	MSD3.I	Data File:	s022818a.s\s3b2820.D
Lab Sample ID:	1203979858	Prep Date:	02/28/2018 09:02	Analyzed:	02/28/18 21:27
Column:	DB-5ms				

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

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 1742654	1203979859	s022818a.s\s3b2821.D	02/28/18	2157
02 CAWA-18-12	444683002	s022818a.s\s3b2837.D	03/01/18	0551
03 CAWA-18-12MS	1203979860	s022818a.s\s3b2838.D	03/01/18	0620
04 CAWA-18-12MSD	1203979861	s030118.s\s3c0114.D	03/01/18	1904

Quality Control Data

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

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SDG Number: 2018-1829

Lab Sample ID: 1203979858

Client Sample: QC for batch 1742654

Client ID: MB for batch 1742654

Batch ID: 1742655

Run Date: 02/28/2018 21:27

Prep Date: 02/28/2018 09:02

Data File: s022818a.s\3b2820.D

Matrix: WATER

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD3.I

Analyst: JLD1

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

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

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SDG Number: 2018-1829

Lab Sample ID: 1203979858

Client Sample: QC for batch 1742654

Client ID: MB for batch 1742654

Batch ID: 1742655

Run Date: 02/28/2018 21:27

Prep Date: 02/28/2018 09:02

Data File: s022818a.s\s3b2820.D

Matrix: WATER

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD3.I

Analyst: JLD1

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
207-08-9	Benzo(k)fluoranthene	U	0.300	ug/L	0.300	1.00
65-85-0	Benzoic acid	U	6.00	ug/L	6.00	20.0
100-51-6	Benzyl alcohol	U	3.00	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate	U	3.00	ug/L	3.00	10.0
218-01-9	Chrysene	U	0.300	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate	U	3.00	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate	U	3.00	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene	U	0.300	ug/L	0.300	1.00
132-64-9	Dibenzofuran	U	3.00	ug/L	3.00	10.0
84-66-2	Diethylphthalate	U	3.00	ug/L	3.00	10.0
131-11-3	Dimethylphthalate	U	3.00	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine	U	3.00	ug/L	3.00	10.0
206-44-0	Fluoranthene	U	0.300	ug/L	0.300	1.00
86-73-7	Fluorene	U	0.300	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene	U	3.00	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene	U	3.00	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene	U	3.00	ug/L	3.00	10.0
67-72-1	Hexachloroethane	U	3.00	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.300	ug/L	0.300	1.00
78-59-1	Isophorone	U	3.50	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.00	ug/L	3.00	10.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.00	ug/L	3.00	10.0
55-18-5	N-Nitrosodiethylamine	U	3.00	ug/L	3.00	10.0
621-64-7	N-Nitrosodi-n-propylamine	U	3.00	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine	U	3.00	ug/L	3.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
98-95-3	Nitrobenzene	U	3.00	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol	U	3.00	ug/L	3.00	10.0
85-01-8	Phenanthrene	U	0.300	ug/L	0.300	1.00
108-95-2	Phenol	U	3.00	ug/L	3.00	10.0
129-00-0	Pyrene	U	0.300	ug/L	0.300	1.00
110-86-1	Pyridine	U	3.00	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.00	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane	U	3.00	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether	U	3.00	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.00	ug/L	3.00	1.00

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

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SDG Number: 2018-1829

Lab Sample ID: 1203979858

Client Sample: QC for batch 1742654

Client ID: MB for batch 1742654

Batch ID: 1742655

Run Date: 02/28/2018 21:27

Prep Date: 02/28/2018 09:02

Data File: s022818a.s\s3b2820.D

Matrix: WATER

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD3.I

Analyst: JLD1

Aliquot: 1000 mL

Column: DB-5ms

Project: QC

SOP Ref: GL-OA-E-009

Dilution: 1

Inj. Vol: 1 uL

Final Volume: 1 mL

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	81.8	100	ug/L	82	(32%-124%)
2-Fluorobiphenyl	38.3	50.0	ug/L	77	(32%-112%)
2-Fluorophenol	56.1	100	ug/L	56	(15%-88%)
Nitrobenzene-d5	41.7	50.0	ug/L	83	(36%-115%)
Phenol-d5	39.2	100	ug/L	39	(15%-91%)
p-Terphenyl-d14	48.6	50.0	ug/L	97	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	2.05	4.92	ug/L	0	J

Semi-Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2018-1829

Lab Sample ID: 1203979859

Client Sample: QC for batch 1742654

Client ID: LCS for batch 1742654

Batch ID: 1742655

Run Date: 02/28/2018 21:57

Prep Date: 02/28/2018 09:02

Data File: s022818a.s\3b2821.D

Matrix: WATER

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD3.I

Analyst: JLD1

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		39.3	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		40.4	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		41.9	ug/L	3.00	10.0
122-66-7	Azobenzene		42.0	ug/L	3.00	10.0
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		41.1	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		40.9	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		36.0	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		42.7	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		44.6	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		42.0	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		43.0	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		47.1	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		39.9	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		45.0	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		45.4	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		43.5	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		38.4	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		47.0	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		43.1	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		40.7	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		46.6	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		51.7	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		41.6	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		48.8	ug/L	3.00	10.0
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		62.0	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		46.0	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		25.8	ug/L	3.00	10.0
83-32-9	Acenaphthene		44.2	ug/L	0.300	1.00
208-96-8	Acenaphthylene		41.5	ug/L	0.300	1.00
62-53-3	Aniline		50.0	ug/L	4.20	10.0
120-12-7	Anthracene		44.0	ug/L	0.300	1.00
1912-24-9	Atrazine		37.2	ug/L	3.00	10.0
92-87-5	Benzidine		79.1	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		43.1	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		43.4	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		42.0	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		40.9	ug/L	0.300	1.00

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

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SDG Number: 2018-1829

Lab Sample ID: 1203979859

Client Sample: QC for batch 1742654

Client ID: LCS for batch 1742654

Batch ID: 1742655

Run Date: 02/28/2018 21:57

Prep Date: 02/28/2018 09:02

Data File: s022818a.s\s3b2821.D

Matrix: WATER

Client: ARSL004

Method: SW846 3510C/8270D

Inst: MSD3.I

Analyst: JLD1

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
207-08-9	Benzo(k)fluoranthene		42.7	ug/L	0.300	1.00
65-85-0	Benzoic acid		58.2	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		46.0	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		43.2	ug/L	3.00	10.0
218-01-9	Chrysene		44.0	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		52.8	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		47.4	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		44.8	ug/L	0.300	1.00
132-64-9	Dibenzofuran		43.5	ug/L	3.00	10.0
84-66-2	Diethylphthalate		49.7	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		46.9	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		42.1	ug/L	3.00	10.0
206-44-0	Fluoranthene		51.1	ug/L	0.300	1.00
86-73-7	Fluorene		44.6	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		42.4	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		38.6	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		26.4	ug/L	3.00	10.0
67-72-1	Hexachloroethane		39.5	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		43.3	ug/L	0.300	1.00
78-59-1	Isophorone		45.1	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		34.8	ug/L	3.00	10.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.00	ug/L	3.00	10.0
55-18-5	N-Nitrosodiethylamine	U	3.00	ug/L	3.00	10.0
621-64-7	N-Nitrosodi-n-propylamine		56.4	ug/L	3.00	10.0
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		54.4	ug/L	3.00	10.0
91-20-3	Naphthalene		42.0	ug/L	0.300	1.00
98-95-3	Nitrobenzene		46.4	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		53.1	ug/L	3.00	10.0
85-01-8	Phenanthrene		43.5	ug/L	0.300	1.00
108-95-2	Phenol		30.4	ug/L	3.00	10.0
129-00-0	Pyrene		34.9	ug/L	0.300	1.00
110-86-1	Pyridine		37.6	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		53.0	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		46.8	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		50.4	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		48.0	ug/L	3.00	1.00

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

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SDG Number: 2018-1829		Matrix: WATER
Lab Sample ID: 1203979859		
Client Sample: QC for batch 1742654	Client: ARSL004	Project: QC
Client ID: LCS for batch 1742654	Method: SW846 3510C/8270D	SOP Ref: GL-OA-E-009
Batch ID: 1742655	Inst: MSD3.I	Dilution: 1
Run Date: 02/28/2018 21:57	Analyst: JLD1	Inj. Vol: 1 uL
Prep Date: 02/28/2018 09:02	Aliquot: 1000 mL	Final Volume: 1 mL
Data File: s022818a.s\s3b2821.D	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		49.8	ug/L	3.70	10.0
99-09-2	3-Nitroaniline		56.2	ug/L	3.00	10.0
	<i>m-Nitroaniline</i>					
95-48-7	o-Cresol		44.3	ug/L	3.00	10.0
88-74-4	2-Nitroaniline		47.0	ug/L	3.00	10.0
	<i>o-Nitroaniline</i>					
100-01-6	4-Nitroaniline		50.6	ug/L	3.00	10.0
	<i>p-Nitroaniline</i>					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	104	100	ug/L	104	(32%-124%)
2-Fluorobiphenyl	41.8	50.0	ug/L	84	(32%-112%)
2-Fluorophenol	72.9	100	ug/L	73	(15%-88%)
Nitrobenzene-d5	47.6	50.0	ug/L	95	(36%-115%)
Phenol-d5	62.0	100	ug/L	62	(15%-91%)
p-Terphenyl-d14	40.4	50.0	ug/L	81	(36%-121%)

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

Page 1 of 3

SDG Number: 2018-1829
Lab Sample ID: 1203979860
Client Sample: QC for batch 1742654
Client ID: CAWA-18-12MS
Batch ID: 1742655
Run Date: 03/01/2018 06:20
Prep Date: 02/28/2018 09:02
Data File: s022818a.s\s3b2838.D

Date Collected: 02/23/2018 10:15
Date Received: 02/27/2018 09:15
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD3.I
Analyst: JLD1
Aliquot: 450 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		66.0	ug/L	6.67	22.2
120-82-1	1,2,4-Trichlorobenzene		64.1	ug/L	6.67	22.2
95-50-1	1,2-Dichlorobenzene		71.0	ug/L	6.67	22.2
122-66-7	Azobenzene		72.4	ug/L	6.67	22.2
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		67.5	ug/L	6.67	22.2
106-46-7	1,4-Dichlorobenzene		68.3	ug/L	6.67	22.2
123-91-1	1,4-Dioxane		69.0	ug/L	6.67	22.2
90-12-0	1-Methylnaphthalene		71.5	ug/L	0.667	2.22
58-90-2	2,3,4,6-Tetrachlorophenol		79.1	ug/L	6.67	22.2
95-95-4	2,4,5-Trichlorophenol		76.8	ug/L	6.67	22.2
88-06-2	2,4,6-Trichlorophenol		77.4	ug/L	6.67	22.2
120-83-2	2,4-Dichlorophenol		83.2	ug/L	6.67	22.2
105-67-9	2,4-Dimethylphenol		73.2	ug/L	6.67	22.2
51-28-5	2,4-Dinitrophenol		80.0	ug/L	11.1	44.4
121-14-2	2,4-Dinitrotoluene		79.8	ug/L	6.67	22.2
606-20-2	2,6-Dinitrotoluene		77.2	ug/L	6.67	22.2
91-58-7	2-Chloronaphthalene		65.2	ug/L	0.911	2.22
95-57-8	2-Chlorophenol		88.7	ug/L	6.67	22.2
534-52-1	2-Methyl-4,6-dinitrophenol		73.4	ug/L	6.67	22.2
91-57-6	2-Methylnaphthalene		68.1	ug/L	0.667	2.22
88-75-5	2-Nitrophenol		81.2	ug/L	6.67	22.2
91-94-1	3,3'-Dichlorobenzidine		92.6	ug/L	6.67	22.2
101-55-3	4-Bromophenylphenylether		70.8	ug/L	6.67	22.2
59-50-7	Parachlorometa cresol		86.3	ug/L	6.67	22.2
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		108	ug/L	7.33	22.2
7005-72-3	4-Chlorophenylphenylether		77.8	ug/L	6.67	22.2
100-02-7	4-Nitrophenol		50.9	ug/L	6.67	22.2
83-32-9	Acenaphthene		75.6	ug/L	0.667	2.22
208-96-8	Acenaphthylene		71.7	ug/L	0.667	2.22
62-53-3	Aniline		93.4	ug/L	9.33	22.2
120-12-7	Anthracene		76.3	ug/L	0.667	2.22
1912-24-9	Atrazine		85.9	ug/L	6.67	22.2
92-87-5	Benzidine		125	ug/L	8.67	22.2
56-55-3	Benzo(a)anthracene		76.8	ug/L	0.667	2.22
50-32-8	Benzo(a)pyrene		79.9	ug/L	0.667	2.22
205-99-2	Benzo(b)fluoranthene		79.4	ug/L	0.667	2.22
191-24-2	Benzo(ghi)perylene		61.4	ug/L	0.667	2.22

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

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SDG Number: 2018-1829
Lab Sample ID: 1203979860
Client Sample: QC for batch 1742654
Client ID: CAWA-18-12MS
Batch ID: 1742655
Run Date: 03/01/2018 06:20
Prep Date: 02/28/2018 09:02
Data File: s022818a.s\s3b2838.D

Date Collected: 02/23/2018 10:15
Date Received: 02/27/2018 09:15
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD3.I
Analyst: JLD1
Aliquot: 450 mL
Column: DB-5ms

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		80.6	ug/L	0.667	2.22
65-85-0	Benzoic acid		116	ug/L	13.3	44.4
100-51-6	Benzyl alcohol		91.5	ug/L	6.67	22.2
85-68-7	Butylbenzylphthalate		77.8	ug/L	6.67	22.2
218-01-9	Chrysene		78.1	ug/L	0.667	2.22
84-74-2	Di-n-butylphthalate		93.7	ug/L	6.67	22.2
117-84-0	Di-n-octylphthalate		82.6	ug/L	6.67	22.2
53-70-3	Dibenzo(a,h)anthracene		67.9	ug/L	0.667	2.22
132-64-9	Dibenzofuran		75.6	ug/L	6.67	22.2
84-66-2	Diethylphthalate		88.3	ug/L	6.67	22.2
131-11-3	Dimethylphthalate		83.8	ug/L	6.67	22.2
88-85-7	Dinoseb	U	6.67	ug/L	6.67	22.2
122-39-4	Diphenylamine		73.6	ug/L	6.67	22.2
206-44-0	Fluoranthene		89.4	ug/L	0.667	2.22
86-73-7	Fluorene		77.2	ug/L	0.667	2.22
118-74-1	Hexachlorobenzene		73.4	ug/L	6.67	22.2
87-68-3	Hexachlorobutadiene		57.4	ug/L	6.67	22.2
77-47-4	Hexachlorocyclopentadiene		41.0	ug/L	6.67	22.2
67-72-1	Hexachloroethane		62.8	ug/L	6.67	22.2
193-39-5	Indeno(1,2,3-cd)pyrene		67.8	ug/L	0.667	2.22
78-59-1	Isophorone		76.3	ug/L	7.78	22.2
62-75-9	N-Methyl-N-nitrosomethylamine		73.1	ug/L	6.67	22.2
924-16-3	N-Nitrosodi-n-butylamine	U	6.67	ug/L	6.67	22.2
55-18-5	N-Nitrosodiethylamine	U	6.67	ug/L	6.67	22.2
621-64-7	N-Nitrosodi-n-propylamine		104	ug/L	6.67	22.2
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		105	ug/L	6.67	22.2
91-20-3	Naphthalene		71.0	ug/L	0.667	2.22
98-95-3	Nitrobenzene		79.6	ug/L	6.67	22.2
608-93-5	Pentachlorobenzene	U	6.67	ug/L	6.67	22.2
87-86-5	Pentachlorophenol		87.7	ug/L	6.67	22.2
85-01-8	Phenanthrene		76.7	ug/L	0.667	2.22
108-95-2	Phenol		59.3	ug/L	6.67	22.2
129-00-0	Pyrene		62.6	ug/L	0.667	2.22
110-86-1	Pyridine		70.3	ug/L	6.67	22.2
108-60-1	bis(2-Chloro-1-methylethyl)ether		96.8	ug/L	6.67	22.2
111-91-1	bis(2-Chloroethoxy)methane		79.2	ug/L	6.67	22.2
111-44-4	bis(2-Chloroethyl) ether		91.5	ug/L	6.67	22.2
117-81-7	bis(2-Ethylhexyl)phthalate		84.3	ug/L	6.67	2.22

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-1829
Lab Sample ID: 1203979860
Client Sample: QC for batch 1742654
Client ID: CAWA-18-12MS
Batch ID: 1742655
Run Date: 03/01/2018 06:20
Prep Date: 02/28/2018 09:02
Data File: s022818a.s\s3b2838.D

Date Collected: 02/23/2018 10:15
Date Received: 02/27/2018 09:15
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD3.I
Analyst: JLD1
Aliquot: 450 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		102	ug/L	8.22	22.2
99-09-2	3-Nitroaniline		100	ug/L	6.67	22.2
	<i>m</i> -Nitroaniline					
95-48-7	o-Cresol		88.2	ug/L	6.67	22.2
88-74-4	2-Nitroaniline		82.8	ug/L	6.67	22.2
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline		86.6	ug/L	6.67	22.2
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	181	222	ug/L	81	(32%-124%)
2-Fluorobiphenyl	76.9	111	ug/L	69	(32%-112%)
2-Fluorophenol	146	222	ug/L	66	(15%-88%)
Nitrobenzene-d5	81.8	111	ug/L	74	(36%-115%)
Phenol-d5	118	222	ug/L	53	(15%-91%)
p-Terphenyl-d14	72.7	111	ug/L	65	(36%-121%)

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

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SDG Number: 2018-1829
Lab Sample ID: 1203979861
Client Sample: QC for batch 1742654
Client ID: CAWA-18-12MSD
Batch ID: 1742655
Run Date: 03/01/2018 19:04
Prep Date: 02/28/2018 09:02
Data File: s030118.s\s3c0114.D

Date Collected: 02/23/2018 10:15
Date Received: 02/27/2018 09:15
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD3.I
Analyst: JLD1
Aliquot: 450 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		65.9	ug/L	6.67	22.2
120-82-1	1,2,4-Trichlorobenzene		61.1	ug/L	6.67	22.2
95-50-1	1,2-Dichlorobenzene		60.1	ug/L	6.67	22.2
122-66-7	Azobenzene		71.7	ug/L	6.67	22.2
	<i>1,2-Diphenylhydrazine</i>					
541-73-1	1,3-Dichlorobenzene		57.4	ug/L	6.67	22.2
106-46-7	1,4-Dichlorobenzene		58.3	ug/L	6.67	22.2
123-91-1	1,4-Dioxane		66.4	ug/L	6.67	22.2
90-12-0	1-Methylnaphthalene		68.8	ug/L	0.667	2.22
58-90-2	2,3,4,6-Tetrachlorophenol		85.2	ug/L	6.67	22.2
95-95-4	2,4,5-Trichlorophenol		79.9	ug/L	6.67	22.2
88-06-2	2,4,6-Trichlorophenol		80.8	ug/L	6.67	22.2
120-83-2	2,4-Dichlorophenol		82.2	ug/L	6.67	22.2
105-67-9	2,4-Dimethylphenol		70.2	ug/L	6.67	22.2
51-28-5	2,4-Dinitrophenol		96.4	ug/L	11.1	44.4
121-14-2	2,4-Dinitrotoluene		85.9	ug/L	6.67	22.2
606-20-2	2,6-Dinitrotoluene		81.6	ug/L	6.67	22.2
91-58-7	2-Chloronaphthalene		65.9	ug/L	0.911	2.22
95-57-8	2-Chlorophenol		78.0	ug/L	6.67	22.2
534-52-1	2-Methyl-4,6-dinitrophenol		85.0	ug/L	6.67	22.2
91-57-6	2-Methylnaphthalene		65.4	ug/L	0.667	2.22
88-75-5	2-Nitrophenol		80.6	ug/L	6.67	22.2
91-94-1	3,3'-Dichlorobenzidine		101	ug/L	6.67	22.2
101-55-3	4-Bromophenylphenylether		72.0	ug/L	6.67	22.2
59-50-7	Parachlorometa cresol		86.8	ug/L	6.67	22.2
	<i>4-Chloro-3-methylphenol</i>					
106-47-8	4-Chloroaniline		112	ug/L	7.33	22.2
7005-72-3	4-Chlorophenylphenylether		79.8	ug/L	6.67	22.2
100-02-7	4-Nitrophenol		52.0	ug/L	6.67	22.2
83-32-9	Acenaphthene		76.2	ug/L	0.667	2.22
208-96-8	Acenaphthylene		73.4	ug/L	0.667	2.22
62-53-3	Aniline		85.5	ug/L	9.33	22.2
120-12-7	Anthracene		82.0	ug/L	0.667	2.22
1912-24-9	Atrazine		91.3	ug/L	6.67	22.2
92-87-5	Benzidine		178	ug/L	8.67	22.2
56-55-3	Benzo(a)anthracene		81.0	ug/L	0.667	2.22
50-32-8	Benzo(a)pyrene		82.2	ug/L	0.667	2.22
205-99-2	Benzo(b)fluoranthene		78.5	ug/L	0.667	2.22
191-24-2	Benzo(ghi)perylene		77.6	ug/L	0.667	2.22

**Semi-Volatile
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Sample Summary**

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SDG Number: 2018-1829
Lab Sample ID: 1203979861
Client Sample: QC for batch 1742654
Client ID: CAWA-18-12MSD
Batch ID: 1742655
Run Date: 03/01/2018 19:04
Prep Date: 02/28/2018 09:02
Data File: s030118.s\s3c0114.D

Date Collected: 02/23/2018 10:15
Date Received: 02/27/2018 09:15
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD3.I
Analyst: JLD1
Aliquot: 450 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		79.5	ug/L	0.667	2.22
65-85-0	Benzoic acid		114	ug/L	13.3	44.4
100-51-6	Benzyl alcohol		79.6	ug/L	6.67	22.2
85-68-7	Butylbenzylphthalate		81.6	ug/L	6.67	22.2
218-01-9	Chrysene		82.6	ug/L	0.667	2.22
84-74-2	Di-n-butylphthalate		103	ug/L	6.67	22.2
117-84-0	Di-n-octylphthalate		86.7	ug/L	6.67	22.2
53-70-3	Dibenzo(a,h)anthracene		85.1	ug/L	0.667	2.22
132-64-9	Dibenzofuran		77.0	ug/L	6.67	22.2
84-66-2	Diethylphthalate		94.7	ug/L	6.67	22.2
131-11-3	Dimethylphthalate		90.1	ug/L	6.67	22.2
88-85-7	Dinoseb	U	6.67	ug/L	6.67	22.2
122-39-4	Diphenylamine		76.0	ug/L	6.67	22.2
206-44-0	Fluoranthene		101	ug/L	0.667	2.22
86-73-7	Fluorene		79.4	ug/L	0.667	2.22
118-74-1	Hexachlorobenzene		76.1	ug/L	6.67	22.2
87-68-3	Hexachlorobutadiene		54.4	ug/L	6.67	22.2
77-47-4	Hexachlorocyclopentadiene		41.9	ug/L	6.67	22.2
67-72-1	Hexachloroethane		53.3	ug/L	6.67	22.2
193-39-5	Indeno(1,2,3-cd)pyrene		81.4	ug/L	0.667	2.22
78-59-1	Isophorone		74.5	ug/L	7.78	22.2
62-75-9	N-Methyl-N-nitrosomethylamine		58.4	ug/L	6.67	22.2
924-16-3	N-Nitrosodi-n-butylamine	U	6.67	ug/L	6.67	22.2
55-18-5	N-Nitrosodiethylamine	U	6.67	ug/L	6.67	22.2
621-64-7	N-Nitrosodi-n-propylamine		91.0	ug/L	6.67	22.2
	<i>N-Nitrosodipropylamine</i>					
930-55-2	N-Nitrosopyrrolidine		93.2	ug/L	6.67	22.2
91-20-3	Naphthalene		67.8	ug/L	0.667	2.22
98-95-3	Nitrobenzene		77.1	ug/L	6.67	22.2
608-93-5	Pentachlorobenzene	U	6.67	ug/L	6.67	22.2
87-86-5	Pentachlorophenol		101	ug/L	6.67	22.2
85-01-8	Phenanthrene		80.7	ug/L	0.667	2.22
108-95-2	Phenol		51.0	ug/L	6.67	22.2
129-00-0	Pyrene		68.0	ug/L	0.667	2.22
110-86-1	Pyridine		66.4	ug/L	6.67	22.2
108-60-1	bis(2-Chloro-1-methylethyl)ether		83.5	ug/L	6.67	22.2
111-91-1	bis(2-Chloroethoxy)methane		78.7	ug/L	6.67	22.2
111-44-4	bis(2-Chloroethyl) ether		79.3	ug/L	6.67	22.2
117-81-7	bis(2-Ethylhexyl)phthalate		90.4	ug/L	6.67	2.22

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Sample Summary**

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SDG Number: 2018-1829
Lab Sample ID: 1203979861
Client Sample: QC for batch 1742654
Client ID: CAWA-18-12MSD
Batch ID: 1742655
Run Date: 03/01/2018 19:04
Prep Date: 02/28/2018 09:02
Data File: s030118.s\s3c0114.D

Date Collected: 02/23/2018 10:15
Date Received: 02/27/2018 09:15
Client: ARSL004
Method: SW846 3510C/8270D
Inst: MSD3.I
Analyst: JLD1
Aliquot: 450 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		90.5	ug/L	8.22	22.2
99-09-2	3-Nitroaniline		109	ug/L	6.67	22.2
	<i>m</i> -Nitroaniline					
95-48-7	o-Cresol		77.8	ug/L	6.67	22.2
88-74-4	2-Nitroaniline		86.6	ug/L	6.67	22.2
	<i>o</i> -Nitroaniline					
100-01-6	4-Nitroaniline		97.2	ug/L	6.67	22.2
	<i>p</i> -Nitroaniline					

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	198	222	ug/L	89	(32%-124%)
2-Fluorobiphenyl	77.2	111	ug/L	70	(32%-112%)
2-Fluorophenol	129	222	ug/L	58	(15%-88%)
Nitrobenzene-d5	80.3	111	ug/L	72	(36%-115%)
Phenol-d5	102	222	ug/L	46	(15%-91%)
p-Terphenyl-d14	77.8	111	ug/L	70	(36%-121%)

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-1829
Work Order #: 444683**

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: 1742510

Prep Batch Number: 1742509

Sample Analysis

Sample ID	Client ID
444683001	444683001 (CAWA-18-11)
1203979483	Interference Check Sample (ICS)
1203979479	Method Blank (MB)
1203979480	Laboratory Control Sample (LCS)
1203979481	444396001(CAWA-18-27) Matrix Spike (MS)
1203979482	444396001(CAWA-18-27) 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 444396001 (CAWA-18-27) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

One or more of the required spiking analytes were not within the acceptance limits in the matrix spike (MS) (See Below). Both the LCS and MSD met spike recoveries. The failing recoveries are attributed to vagaries in the extraction process. .

Sample	Value
1203979481 (CAWA-18-27MS)	59* (75%-125%)

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: 2018-1829 GEL Work Order: 444683

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 02 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: 1742509Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-18-11Date Received: 27-FEB-18GEL Job No (SDG): 2018-1829GEL Sample ID: 444683001Date Filtered: 27-FEB-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	0.107	ug/L	J	1	28-FEB-18 19:12	per0228042a
	Perchlorate Isotope Ratio			3.09			1	28-FEB-18 19:12	per0228042a
14797-73-0	Perchlorate-101	.05	.2	0.101	ug/L	J	1	28-FEB-18 19:12	per0228042a
	Perchlorate-O(18)			0.419	ug/L		1	28-FEB-18 19:12	per0228042a

^ 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): 2018-1829

Extract Batch Code: 1742509

Date Filtered: 27-FEB-18

Matrix: WATER

Sample ID: 1203979480

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.176	ug/L	88		85 - 115
Perchlorate Isotope Ratio		2.76				-
Perchlorate-101	0.200	.186	ug/L	93		85 - 115
Perchlorate-O(18)		.479	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): 2018-1829

Extract Batch Code: 1742509

Date Extracted: 27-FEB-18

GEL MS/PS ID: 1203979481

Client ID: CAWA-18-27

GEL MSD/PSD ID: 1203979482

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	0.401	ug/L	0.520	59 *	.6	100	14	30	75 - 125
Perchlorate Isotope Ratio	0	3.23		2.78		3.01		8		-
Perchlorate-101	0.200	0.362	ug/L	0.546	92	.581	110	6	30	75 - 125
Perchlorate-O(18)	0	0.464	ug/L	0.467		.409		13		-

^ 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: 1742509Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 27-FEB-18GEL Job No (SDG): 2018-1829GEL Sample ID: 1203979479Date Filtered: 27-FEB-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	28-FEB-18 15:22	per0228013a
	Perchlorate Isotope Ratio						1	28-FEB-18 15:22	per0228013a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	28-FEB-18 15:22	per0228013a
	Perchlorate-O(18)			0.449	ug/L		1	28-FEB-18 15:22	per0228013a

^ 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: 1742509Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 27-FEB-18GEL Job No (SDG): 2018-1829GEL Sample ID: 1203979480Date Filtered: 27-FEB-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	0.176	ug/L	J	1	28-FEB-18 15:30	per0228014a
	Perchlorate Isotope Ratio			2.76			1	28-FEB-18 15:30	per0228014a
14797-73-0	Perchlorate-101	.05	.2	0.186	ug/L	J	1	28-FEB-18 15:30	per0228014a
	Perchlorate-O(18)			0.479	ug/L		1	28-FEB-18 15:30	per0228014a

^ 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: 1742509Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2018-1829GEL Sample ID: 1203979483Date Filtered: 27-FEB-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	0.213	ug/L		1	28-FEB-18 15:38	per0228015a
	Perchlorate Isotope Ratio			2.85			1	28-FEB-18 15:38	per0228015a
14797-73-0	Perchlorate-101	.05	.2	0.217	ug/L		1	28-FEB-18 15:38	per0228015a
	Perchlorate-O(18)			0.483	ug/L		1	28-FEB-18 15:38	per0228015a

^ 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: 1742509Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-18-27MSDate Received: 21-FEB-18GEL Job No (SDG): 2018-1829GEL Sample ID: 1203979481Date Filtered: 27-FEB-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	0.520	ug/L		1	28-FEB-18 15:53	per0228017a
	Perchlorate Isotope Ratio			2.78			1	28-FEB-18 15:53	per0228017a
14797-73-0	Perchlorate-101	.05	.2	0.546	ug/L		1	28-FEB-18 15:53	per0228017a
	Perchlorate-O(18)			0.467	ug/L		1	28-FEB-18 15:53	per0228017a

^ 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: 1742509Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-18-27MSDDate Received: 21-FEB-18GEL Job No (SDG): 2018-1829GEL Sample ID: 1203979482Date Filtered: 27-FEB-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	0.600	ug/L		1	28-FEB-18 16:01	per0228018a
	Perchlorate Isotope Ratio			3.01			1	28-FEB-18 16:01	per0228018a
14797-73-0	Perchlorate-101	.05	.2	0.581	ug/L		1	28-FEB-18 16:01	per0228018a
	Perchlorate-O(18)			0.409	ug/L		1	28-FEB-18 16:01	per0228018a

^ 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 #: 2018-1829
Work Order #: 444683**

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: 1743540

Prep Batch Number: 1743538

Sample Analysis

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

Sample ID	Client ID
444683003	CAWA-18-12
1203981842	Method Blank (MB)
1203981843	Laboratory Control Sample (LCS)
1203981844	444683003(CAWA-18-12) Matrix Spike (MS)
1203981845	444683003(CAWA-18-12) 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 444683003 (CAWA-18-12) 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 RPD values between the MS and MSD (See Below) were not within the acceptance limits. Since all other RPD values met acceptance criteria, the noted exceptions are attributed to vagaries in the extraction process. The data are reported.

Sample	Analyte	Value
1203981844MS and 1203981845MSD (CAWA-18-12)	PETN	RPD 35* (0%-30%)

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. Sample 444683003 (CAWA-18-12) was further diluted to bring the over range concentration within the calibration range. The final dilution in each case takes the 1:1 v/v dilution into account.

Analyte	444683
	003
HMX	25X

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: 2018-1829 GEL Work Order: 444683

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 12 MAR 2018

Title: Group Leader

Sample Data Summary

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-12

Lab Code: GEL

GEL Job No (SDG) 2018-1829

Matrix: WATER

GEL Sample ID: 444683003

Sample Amount 920 mL

Date Received: 27-FEB-18

Moisture: .

Extraction Batch ID: 1743538

Extraction Type Sol Exchange

Date Extracted: 02-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0305035.wiff

Date Analyzed: 06-MAR-18 06:13

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.087	U	0.087	0.272
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.087	U	0.087	0.272
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
479-45-8	Tetryl	.087	U	0.087	0.543
<i>479-45-8</i>	<i>Tetryl</i>				
606-20-2	2,6-Dinitrotoluene	.087	U	0.087	0.272
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.087	U	0.087	0.272
<i>80251-29-2</i>	<i>DNX</i>				
98-95-3	Nitrobenzene	.087	U	0.087	0.272
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.087	U	0.087	0.272
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-65-0	m-Dinitrobenzene	.087	U	0.087	0.272
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
88-72-2	o-Nitrotoluene	.0891	U	0.0891	0.272
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
78-11-5	PETN	.109	U	0.109	0.543
<i>78-11-5</i>	<i>PETN</i>				
13980-04-6	TNX	.137	J	0.087	0.272
<i>13980-04-6</i>	<i>TNX</i>				
99-99-0	p-Nitrotoluene	.163	U	0.163	0.543
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
5755-27-1	MNX	.293		0.087	0.272
<i>5755-27-1</i>	<i>MNX</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-12

Lab Code: GEL

GEL Job No (SDG) 2018-1829

Matrix: WATER

GEL Sample ID: 444683003

Sample Amount 920 mL

Date Received: 27-FEB-18

Moisture: .

Extraction Batch ID: 1743538

Extraction Type Sol Exchange

Date Extracted: 02-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	.326	U	0.326	1.09
<i>3058-38-6</i>	<i>TATB</i>				
78-30-8	tris(o-cresyl) phosphate	.326	U	0.326	1.09
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
99-35-4	1,3,5-Trinitrobenzene	.38		0.087	0.272
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	.543	U	0.543	2.72
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	.543	U	0.543	2.72
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
618-87-1	3,5-Dinitroaniline	.637	J	0.326	1.09
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.997		0.087	0.272
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	1.35		0.087	0.272
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-12

Lab Code: GEL

GEL Job No (SDG) 2018-1829

Matrix: WATER

GEL Sample ID: 444683003

Sample Amount 920 mL

Date Received: 27-FEB-18

Moisture: .

Extraction Batch ID: 1743538

Extraction Type Sol Exchange

Date Extracted: 02-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0305043.wiff

Date Analyzed: 06-MAR-18 10:57

Dilution Factor: 25

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
2691-41-0	HMX	12.9		1.09	3.40
2691-41-0	HMX				
121-82-4	RDX	80.4		1.09	3.40
121-82-4	RDX				

Quality Control Summary

High Explosives Surrogate Recovery Summary**Lab Name:** GEL Laboratories LLC**GEL Job No (SDG):** 2018-1829**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
444683003	CAWA-18-12	88	55 - 115	
444683003	CAWA-18-12DL	92	55 - 115	
1203981842	MB for batch 1743538	98	55 - 115	
1203981843	LCS for batch 1743538	80	55 - 115	
1203981844	CAWA-18-12MS	87	55 - 115	
1203981845	CAWA-18-12MSD	96	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) 2018-1829

Extract Batch Code: 1743538

Date Extracted: 02-MAR-18

GEL LCS ID: 1203981843

GEL LCSDUP ID: .

Analysis Date/Time: 06-MAR-18 05:37

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
Tetryl	5	3.94	79					55 - 122
m-Dinitrobenzene	5	4.64	93					74 - 117
m-Nitrotoluene	5	4.49	90					66 - 114
o-Nitrotoluene	5	4.27	85					64 - 115
p-Nitrotoluene	5	4.36	87					66 - 127
tris(o-cresyl) phosphate	5	3.26	65					43 - 104
1,3,5-Trinitrobenzene	5	4.32	86					70 - 110
2,4,6-Trinitrotoluene	5	4.34	87					69 - 113
2,4-Diamino-6-nitrotoluene	5	5.41	108					50 - 121
2,4-Dinitrotoluene	5	4.41	88					71 - 110
2,6-Diamino-4-nitrotoluene	5	5.07	101					53 - 127
2,6-Dinitrotoluene	5	4.22	84					72 - 105
2-Amino-4,6-dinitrotoluene	5	4.55	91					70 - 112
3,5-Dinitroaniline	5	4.39	88					70 - 121
4-Amino-2,6-dinitrotoluene	5	4.53	91					74 - 116
DNX	5	4.14	83					65 - 113
HMX	5	4.64	93					58 - 113
MNX	5	4.46	89					66 - 114
Nitrobenzene	5	4.79	96					64 - 115
PETN	5	4.75	95					57 - 126
RDX	5	3.93	79					64 - 117
TATB	5	2.45	49					47 - 135
TNX	5	4.38	88					51 - 110

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: CAWA-18-12

Lab Code: GEL

GEL Job No (SDG) 2018-1829

Extract Batch Code: 1743538

Date Extracted: 02-MAR-18

GEL Spike ID: 1203981844

GEL SpikeDup ID: 1203981845

Analysis Date/Time: 06-MAR-18 06:48

MSD Analysis Date/Time: 06-MAR-18 07:24

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
2,4-Diamino-6-nitrotoluene	5.81395	0	5.08	87	4.98	90	2	30	50 - 121
2,4-Dinitrotoluene	5.81395	.0701	5.16	88	6.05	108	16	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.81395	0	4.99	86	5.59	101	11	30	53 - 127
2,6-Dinitrotoluene	5.81395	.0323	5.07	87	5.46	98	7	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.81395	.997	6.29	91	6.9	106	9	30	67 - 115
3,5-Dinitroaniline	5.81395	.637	5.69	87	6.23	101	9	30	70 - 121
4-Amino-2,6-dinitrotoluene	5.81395	1.35	6.37	86	7	102	10	30	65 - 120
DNX	5.81395	.0619	4.85	82	4.64	82	4	30	53 - 124
HMX	5.81395	12.9	19.9	76	18.4	52	8	30	44 - 128
MNX	5.81395	.293	5.28	86	5.14	87	3	30	60 - 121
Nitrobenzene	5.81395	0	5.27	91	4.97	89	6	30	62 - 116
PETN	5.81395	0	5.12	88	7.29	131	35 *	30	51 - 131
RDX	5.81395	80.4	83.7	30 *	73.4	0 *	13	30	57 - 125
TATB	5.81395	0	3.35	58	2.88	52	15	30	38 - 149
TNX	5.81395	.137	5.57	93	4.91	86	13	30	46 - 120
Tetryl	5.81395	0	4.23	73	4.14	75	2	30	50 - 126
m-Dinitrobenzene	5.81395	0	5.5	95	5	90	10	30	74 - 117
m-Nitrotoluene	5.81395	0	5.09	88	5.4	97	6	30	59 - 120
o-Nitrotoluene	5.81395	0	4.93	85	5.19	93	5	30	56 - 119
p-Nitrotoluene	5.81395	0	5.25	90	5.66	102	8	30	61 - 129
tris(o-cresyl) phosphate	5.81395	0	3.98	69	4.33	78	8	30	38 - 105
1,3,5-Trinitrobenzene	5.81395	.38	5.48	88	5.56	93	2	30	67 - 111
2,4,6-Trinitrotoluene	5.81395	0	4.67	80	4.79	86	3	30	66 - 112

#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 1743538

Lab Code: GEL

GEL Job No (SDG) 2018-1829

Matrix: WATER

GEL Sample ID: 1203981842

Sample Amount 1000 mL

Date Received: 27-FEB-18

Moisture: .

Extraction Batch ID: 1743538

Extraction Type Sol Exchange

Date Extracted: 02-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0305033.wiff

Date Analyzed: 06-MAR-18 05:02

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>				
13980-04-6	TNX	.08	U	0.080	0.250
<i>13980-04-6</i>	<i>TNX</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>				
5755-27-1	MNX	.08	U	0.080	0.250
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.08	U	0.080	0.250
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.08	U	0.080	0.250
<i>80251-29-2</i>	<i>DNX</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>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1743538

Lab Code: GEL

GEL Job No (SDG) 2018-1829

Matrix: WATER

GEL Sample ID: 1203981842

Sample Amount 1000 mL

Date Received: 27-FEB-18

Moisture: .

Extraction Batch ID: 1743538

Extraction Type Sol Exchange

Date Extracted: 02-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-35-4	1,3,5-Trinitrobenzene	.08	U	0.080	0.250
99-35-4	1,3,5-Trinitrobenzene				
99-65-0	m-Dinitrobenzene	.08	U	0.080	0.250
99-65-0	m-Dinitrobenzene				
88-72-2	o-Nitrotoluene	.082	U	0.082	0.250
88-72-2	o-Nitrotoluene				
78-11-5	PETN	.1	U	0.100	0.500
78-11-5	PETN				
99-99-0	p-Nitrotoluene	.15	U	0.150	0.500
99-99-0	p-Nitrotoluene				
3058-38-6	TATB	.3	U	0.300	1.00
3058-38-6	TATB				
618-87-1	3,5-Dinitroaniline	.3	U	0.300	1.00
618-87-1	3,5-Dinitroaniline				
78-30-8	tris(o-cresyl) phosphate	.3	U	0.300	1.00
78-30-8	tris(o-cresyl) phosphate				
59229-75-3	2,6-Diamino-4-nitrotoluene	.5	U	0.500	2.50
59229-75-3	2,6-Diamino-4-nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	.5	U	0.500	2.50
6629-29-4	2,4-Diamino-6-nitrotoluene				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1743538

Lab Code: GEL

GEL Job No (SDG) 2018-1829

Matrix: WATER

GEL Sample ID: 1203981843

Sample Amount 1000 mL

Date Received: 27-FEB-18

Moisture: .

Extraction Batch ID: 1743538

Extraction Type Sol Exchange

Date Extracted: 02-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0305034.wiff

Date Analyzed: 06-MAR-18 05:37

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	2.45		0.300	1.00
3058-38-6	TATB				
78-30-8	tris(o-cresyl) phosphate	3.26		0.300	1.00
78-30-8	tris(o-cresyl) phosphate				
121-82-4	RDX	3.93		0.080	0.250
121-82-4	RDX				
479-45-8	Tetryl	3.94		0.080	0.500
479-45-8	Tetryl				
80251-29-2	DNX	4.14		0.080	0.250
80251-29-2	DNX				
606-20-2	2,6-Dinitrotoluene	4.22		0.080	0.250
606-20-2	2,6-Dinitrotoluene				
88-72-2	o-Nitrotoluene	4.27		0.082	0.250
88-72-2	o-Nitrotoluene				
99-35-4	1,3,5-Trinitrobenzene	4.32		0.080	0.250
99-35-4	1,3,5-Trinitrobenzene				
118-96-7	2,4,6-Trinitrotoluene	4.34		0.080	0.250
118-96-7	2,4,6-Trinitrotoluene				
99-99-0	p-Nitrotoluene	4.36		0.150	0.500
99-99-0	p-Nitrotoluene				
13980-04-6	TNX	4.38		0.080	0.250
13980-04-6	TNX				
618-87-1	3,5-Dinitroaniline	4.39		0.300	1.00
618-87-1	3,5-Dinitroaniline				
121-14-2	2,4-Dinitrotoluene	4.41		0.080	0.250
121-14-2	2,4-Dinitrotoluene				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1743538

Lab Code: GEL

GEL Job No (SDG) 2018-1829

Matrix: WATER

GEL Sample ID: 1203981843

Sample Amount 1000 mL

Date Received: 27-FEB-18

Moisture: .

Extraction Batch ID: 1743538

Extraction Type Sol Exchange

Date Extracted: 02-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
5755-27-1	MNX	4.46		0.080	0.250
<i>5755-27-1</i>	<i>MNX</i>				
99-08-1	m-Nitrotoluene	4.49		0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.53		0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.55		0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
2691-41-0	HMX	4.64		0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
99-65-0	m-Dinitrobenzene	4.64		0.080	0.250
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
78-11-5	PETN	4.75		0.100	0.500
<i>78-11-5</i>	<i>PETN</i>				
98-95-3	Nitrobenzene	4.79		0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	5.07		0.500	2.50
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	5.41		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: CAWA-18-12(444683003MS)MS

Lab Code: GEL

GEL Job No (SDG) 2018-1829

Matrix: WATER

GEL Sample ID: 1203981844

Sample Amount 860 mL

Date Received: 27-FEB-18

Moisture: .

Extraction Batch ID: 1743538

Extraction Type Sol Exchange

Date Extracted: 02-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0305036.wiff

Date Analyzed: 06-MAR-18 06:48

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	3.35		0.349	1.16
3058-38-6	TATB				
78-30-8	tris(o-cresyl) phosphate	3.98		0.349	1.16
78-30-8	tris(o-cresyl) phosphate				
479-45-8	Tetryl	4.23		0.093	0.581
479-45-8	Tetryl				
118-96-7	2,4,6-Trinitrotoluene	4.67		0.093	0.291
118-96-7	2,4,6-Trinitrotoluene				
80251-29-2	DNX	4.85		0.093	0.291
80251-29-2	DNX				
88-72-2	o-Nitrotoluene	4.93		0.0953	0.291
88-72-2	o-Nitrotoluene				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.99		0.581	2.91
59229-75-3	2,6-Diamino-4-nitrotoluene				
606-20-2	2,6-Dinitrotoluene	5.07		0.093	0.291
606-20-2	2,6-Dinitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	5.08		0.581	2.91
6629-29-4	2,4-Diamino-6-nitrotoluene				
99-08-1	m-Nitrotoluene	5.09		0.093	0.291
99-08-1	m-Nitrotoluene				
78-11-5	PETN	5.12		0.116	0.581
78-11-5	PETN				
121-14-2	2,4-Dinitrotoluene	5.16		0.093	0.291
121-14-2	2,4-Dinitrotoluene				
99-99-0	p-Nitrotoluene	5.25		0.174	0.581
99-99-0	p-Nitrotoluene				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-12(444683003MS)MS

Lab Code: GEL

GEL Job No (SDG) 2018-1829

Matrix: WATER

GEL Sample ID: 1203981844

Sample Amount 860 mL

Date Received: 27-FEB-18

Moisture: .

Extraction Batch ID: 1743538

Extraction Type Sol Exchange

Date Extracted: 02-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
98-95-3	Nitrobenzene	5.27		0.093	0.291
98-95-3	Nitrobenzene				
5755-27-1	MNX	5.28		0.093	0.291
5755-27-1	MNX				
99-35-4	1,3,5-Trinitrobenzene	5.48		0.093	0.291
99-35-4	1,3,5-Trinitrobenzene				
99-65-0	m-Dinitrobenzene	5.5		0.093	0.291
99-65-0	m-Dinitrobenzene				
13980-04-6	TNX	5.57		0.093	0.291
13980-04-6	TNX				
618-87-1	3,5-Dinitroaniline	5.69		0.349	1.16
618-87-1	3,5-Dinitroaniline				
35572-78-2	2-Amino-4,6-dinitrotoluene	6.29		0.093	0.291
35572-78-2	2-Amino-4,6-dinitrotoluene				
19406-51-0	4-Amino-2,6-dinitrotoluene	6.37		0.093	0.291
19406-51-0	4-Amino-2,6-dinitrotoluene				
2691-41-0	HMX	19.9		0.093	0.291
2691-41-0	HMX				
121-82-4	RDX	83.7		0.093	0.291
121-82-4	RDX				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-12(444683003MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2018-1829

Matrix: WATER

GEL Sample ID: 1203981845

Sample Amount 900 mL

Date Received: 27-FEB-18

Moisture: .

Extraction Batch ID: 1743538

Extraction Type Sol Exchange

Date Extracted: 02-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0305037.wiff

Date Analyzed: 06-MAR-18 07:24

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	2.88		0.333	1.11
<i>3058-38-6</i>	<i>TATB</i>				
479-45-8	Tetryl	4.14		0.0889	0.556
<i>479-45-8</i>	<i>Tetryl</i>				
78-30-8	tris(o-cresyl) phosphate	4.33		0.333	1.11
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
80251-29-2	DNX	4.64		0.0889	0.278
<i>80251-29-2</i>	<i>DNX</i>				
118-96-7	2,4,6-Trinitrotoluene	4.79		0.0889	0.278
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
13980-04-6	TNX	4.91		0.0889	0.278
<i>13980-04-6</i>	<i>TNX</i>				
98-95-3	Nitrobenzene	4.97		0.0889	0.278
<i>98-95-3</i>	<i>Nitrobenzene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	4.98		0.556	2.78
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5		0.0889	0.278
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
5755-27-1	MNX	5.14		0.0889	0.278
<i>5755-27-1</i>	<i>MNX</i>				
88-72-2	o-Nitrotoluene	5.19		0.0911	0.278
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
99-08-1	m-Nitrotoluene	5.4		0.0889	0.278
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	5.46		0.0889	0.278
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-12(444683003MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2018-1829

Matrix: WATER

GEL Sample ID: 1203981845

Sample Amount 900 mL

Date Received: 27-FEB-18

Moisture: .

Extraction Batch ID: 1743538

Extraction Type Sol Exchange

Date Extracted: 02-MAR-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-35-4	1,3,5-Trinitrobenzene	5.56		0.0889	0.278
99-35-4	1,3,5-Trinitrobenzene				
59229-75-3	2,6-Diamino-4-nitrotoluene	5.59		0.556	2.78
59229-75-3	2,6-Diamino-4-nitrotoluene				
99-99-0	p-Nitrotoluene	5.66		0.167	0.556
99-99-0	p-Nitrotoluene				
121-14-2	2,4-Dinitrotoluene	6.05		0.0889	0.278
121-14-2	2,4-Dinitrotoluene				
618-87-1	3,5-Dinitroaniline	6.23		0.333	1.11
618-87-1	3,5-Dinitroaniline				
35572-78-2	2-Amino-4,6-dinitrotoluene	6.9		0.0889	0.278
35572-78-2	2-Amino-4,6-dinitrotoluene				
19406-51-0	4-Amino-2,6-dinitrotoluene	7		0.0889	0.278
19406-51-0	4-Amino-2,6-dinitrotoluene				
78-11-5	PETN	7.29		0.111	0.556
78-11-5	PETN				
2691-41-0	HMX	18.4		0.0889	0.278
2691-41-0	HMX				
121-82-4	RDX	73.4		0.0889	0.278
121-82-4	RDX				

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2018-1829Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 05-MAR-18 10:05GEL Data File: EXP0305001.wiffInstrument ID: LCMSMS5Column: Ultracarb Phenomenex 5u ODS (20)

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

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2018-1829Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 05-MAR-18 10:40GEL Data File: EXP0305002.wiffInstrument ID: LCMSMS5Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1829

Lab Code: GEL

Lab Sample ID: XIBLK02

Analysis Date: 05-MAR-18 15:25

GEL Data File: EXP0305010.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): 2018-1829

Lab Code: GEL

Lab Sample ID: XIBLK03

Analysis Date: 05-MAR-18 17:47

GEL Data File: EXP0305014.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
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
MXN	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
PETN	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1829

Lab Code: GEL

Lab Sample ID: XIBLK04

Analysis Date: 05-MAR-18 21:56

GEL Data File: EXP0305021.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): 2018-1829

Lab Code: GEL

Lab Sample ID: XIBLK05

Analysis Date: 06-MAR-18 00:18

GEL Data File: EXP0305025.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1829

Lab Code: GEL

Lab Sample ID: XIBLK06

Analysis Date: 06-MAR-18 01:29

GEL Data File: EXP0305027.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): 2018-1829

Lab Code: GEL

Lab Sample ID: XIBLK07

Analysis Date: 06-MAR-18 04:26

GEL Data File: EXP0305032.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1829

Lab Code: GEL

Lab Sample ID: XIBLK08

Analysis Date: 06-MAR-18 07:59

GEL Data File: EXP0305038.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	6.73
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): 2018-1829

Lab Code: GEL

Lab Sample ID: XIBLK09

Analysis Date: 06-MAR-18 09:11

GEL Data File: EXP0305040.wiff

Instrument ID: LCMSMS5

Column: 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): 2018-1829

Lab Code: GEL

Lab Sample ID: XIBLK10

Analysis Date: 06-MAR-18 11:33

GEL Data File: EXP0305044.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): 2018-1829

Lab Code: GEL

Lab Sample ID: XIBLK11

Analysis Date: 06-MAR-18 16:53

GEL Data File: EXP0305053.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
MX	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

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-1829
Work Order #: 444683

Sample ID	Client ID
444683001	CAWA-18-11
444683002	CAWA-18-12
1203979951	Method Blank (MB) ICP
1203979952	Laboratory Control Sample (LCS)
1203979955	444683001(CAWA-18-11L) Serial Dilution (SD)
1203979953	444683001(CAWA-18-11D) Sample Duplicate (DUP)
1203979954	444683001(CAWA-18-11S) Matrix Spike (MS)
1203979892	Method Blank (MB) ICP-MS
1203979893	Laboratory Control Sample (LCS)
1203979896	444683001(CAWA-18-11L) Serial Dilution (SD)
1203979894	444683001(CAWA-18-11D) Sample Duplicate (DUP)
1203979895	444683001(CAWA-18-11S) Matrix Spike (MS)
1203980313	Method Blank (MB) CVAA
1203980314	Laboratory Control Sample (LCS)
1203980317	444617001(CAWA-18-31L) Serial Dilution (SD)
1203980315	444617001(CAWA-18-31D) Sample Duplicate (DUP)
1203980316	444617001(CAWA-18-31S) Matrix Spike (MS)

Sample Analysis

Samples 444683001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1742691, 1742668, 1742827 and 1749058
Prep Batch :	1742690, 1742665 and 1742826
Standard Operating Procedures:	GL-MA-E-013 REV# 30, GL-MA-E-006 REV# 14, GL-MA-E-014 REV# 32, GL-MA-E-010 REV# 36 and GL-GC-E-107 REV# 10
Analytical Method:	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
Prep Method :	SW846 3005A and EPA 245.1/245.2 Prep

Preparation/Analytical Method Verification

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

System Configuration

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

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

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

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

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

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

ICSA/ICSAB Statement

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

Continuing Calibration Blanks (CCB) Requirements

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

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 444683001 (CAWA-18-11)-ICP and ICP-MS and 444617001 (CAWA-18-31)-CVAA.

Matrix Spike (MS/MSD) Recovery Statement

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

Duplicate Relative Percent Difference (RPD) Statement

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

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

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Additional Comments

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

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2018-1829 GEL Work Order: 444683

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: 22 MAR 2018

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-1829**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 444683001**BASIS:** As Received**DATE COLLECTED** 23-FEB-18**CLIENT ID:** CAWA-18-11**LEVEL:** Low**DATE RECEIVED** 27-FEB-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	03/01/18 11:27	030118W1-3	1742827

METALS
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INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-1829

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 444683001

BASIS: As Received

DATE COLLECTED 23-FEB-18

CLIENT ID: CAWA-18-11

LEVEL: Low

DATE RECEIVED 27-FEB-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	152	ug/L	J	68	200	200	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	02/28/18 19:52	180228-2	1742668
7440-38-2	Arsenic	2.35	ug/L	J	2	5	5	1	MS	BAJ	02/28/18 19:52	180228-2	1742668
7440-39-3	Barium	158	ug/L		1	5	5	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7440-42-8	Boron	984	ug/L		15	50	50	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	02/28/18 19:52	180228-2	1742668
7440-70-2	Calcium	27400	ug/L		50	200	200	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	02/28/18 19:52	180228-2	1742668
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7439-89-6	Iron	95.9	ug/L	J	30	100	100	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	02/28/18 19:52	180228-2	1742668
7439-95-4	Magnesium	6170	ug/L		110	300	300	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7439-98-7	Molybdenum	3.21	ug/L		0.2	0.5	0.5	1	MS	BAJ	02/28/18 19:52	180228-2	1742668
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	02/28/18 19:52	180228-2	1742668
7440-09-7	Potassium	2940	ug/L		50	150	150	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	02/28/18 19:52	180228-2	1742668
7631-86-9	Silica	54600	ug/L		53	213	213	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	02/28/18 19:52	180228-2	1742668
7440-23-5	Sodium	33800	ug/L		100	300	300	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7440-24-6	Strontium	133	ug/L		1	5	5	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	02/28/18 19:52	180228-2	1742668
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7440-61-1	Uranium	1.86	ug/L		0.067	0.2	0.2	1	MS	BAJ	02/28/18 19:52	180228-2	1742668
7440-62-2	Vanadium	4.43	ug/L	J	1	5	5	1	P	TXT1	03/09/18 15:18	030918-1	1742691
7440-66-6	Zinc	3.38	ug/L	J	3.3	10	10	1	P	TXT1	03/09/18 15:18	030918-1	1742691

METALS
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INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-1829**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 444683001**BASIS:** As Received**DATE COLLECTED** 23-FEB-18**CLIENT ID:** CAWA-18-11**LEVEL:** Low**DATE RECEIVED** 27-FEB-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	93.8	mg/L		0.453	1.24	1.24	1		TXT1	03/21/18 11:12		1749058

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1742668	1742665	SW846 3005A	50	mL	50	mL	02/27/18	JXM8
1742691	1742690	SW846 3005A	50	mL	50	mL	02/27/18	JXM8
1742827	1742826	EPA 245.1/245.2 Prep	20	mL	20	mL	02/28/18	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018-1829**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 444683002**BASIS:** As Received**DATE COLLECTED** 23-FEB-18**CLIENT ID:** CAWA-18-12**LEVEL:** Low**DATE RECEIVED** 27-FEB-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	03/01/18 11:29	030118W1-3	1742827

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1742827	1742826	EPA 245.1/245.2 Prep	20	mL	20	mL	02/28/18	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2018-1829

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>
1203979892	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Antimony	1	ug/L	+/-3	U	MS	1	3
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Arsenic	2	ug/L	+/-5	U	MS	2	5
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Selenium	2	ug/L	+/-5	U	MS	2	5
1203979951	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	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203980313	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

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Matrix Spike Summary

SDG NO. 2018-1829 Client ID CAWA-18-11S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 444683001 Spike ID: 1203979895

<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	51.6		1	U	50	103		MS
Arsenic	ug/L	75-125	52.4		2.35	J	50	100		MS
Cadmium	ug/L	75-125	53.4		0.3	U	50	107		MS
Chromium	ug/L	75-125	50.5		3	U	50	97.9		MS
Lead	ug/L	75-125	50.6		0.5	U	50	101		MS
Molybdenum	ug/L	75-125	59.1		3.21		50	112		MS
Nickel	ug/L	75-125	50.2		0.6	U	50	99.4		MS
Selenium	ug/L	75-125	50.9		2	U	50	100		MS
Silver	ug/L	75-125	53.2		0.3	U	50	106		MS
Thallium	ug/L	75-125	47.6		0.6	U	50	95.2		MS
Uranium	ug/L	75-125	51.9		1.86		50	100		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2018-1829 Client ID: CAWA-18-11S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 444683001 Spike ID: 1203979954

<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	5090		152	J	5000	98.7		P
Barium	ug/L	75-125	647		158		500	97.8		P
Beryllium	ug/L	75-125	498		1	U	500	99.5		P
Boron	ug/L	75-125	1470		984		500	96.2		P
Calcium	ug/L		31500		27400		5000	82.8	N/A	P
Cobalt	ug/L	75-125	493		1	U	500	98.6		P
Copper	ug/L	75-125	509		3	U	500	102		P
Iron	ug/L	75-125	5020		95.9	J	5000	98.5		P
Magnesium	ug/L	75-125	10900		6170		5000	93.8		P
Manganese	ug/L	75-125	494		2	U	500	98.6		P
Potassium	ug/L	75-125	7900		2940		5000	99.2		P
Silica	ug/L		63800		54600		10700	85.9	N/A	P
Sodium	ug/L		37700		33800		5000	77.2	N/A	P
Strontium	ug/L	75-125	628		133		500	99		P
Tin	ug/L	75-125	495		2.5	U	500	98.9		P
Vanadium	ug/L	75-125	505		4.43	J	500	100		P
Zinc	ug/L	75-125	483		3.38	J	500	96		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Matrix Spike Summary

SDG NO. 2018-1829 Client ID CAWA-18-31S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 444617001 Spike ID: 1203980316

<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	2.01		0.067	U	2	99.1		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
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Duplicate Sample Summary

SDG No.: 2018-1829

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-18-11D

Matrix: WATER

Level: Low

Sample ID: 444683001

Duplicate ID: 1203979894

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L	+/-5	2.35 J		2.35 J		.213		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	+/-20%	3.21		3.18		1.07		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	+/-20%	1.86		1.82		2.34		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
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Duplicate Sample Summary

SDG No.: 2018–1829

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA–18–11D

Matrix: WATER

Level: Low

Sample ID: 444683001

Duplicate ID: 1203979953

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L	+/-200	152 J		150 J		1.83		P
Barium	ug/L	+/-20%	158		156		1.53		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-20%	984		964		2.08		P
Calcium	ug/L	+/-20%	27400		26600		2.82		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L	+/-100	95.9 J		90.8 J		5.51		P
Magnesium	ug/L	+/-20%	6170		5960		3.4		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	2940		2850		3.1		P
Silica	ug/L	+/-20%	54600		53700		1.71		P
Sodium	ug/L	+/-20%	33800		33000		2.56		P
Strontium	ug/L	+/-20%	133		130		2.25		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	4.43 J		4.5 J		1.58		P
Zinc	ug/L		3.38 J		3.3 U		200		P

*Analytical Methods:

P SW846 3005A/6010C

Metals
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Duplicate Sample Summary

SDG No.: 2018–1829**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAWA–18–31D**Matrix:** WATER**Level:** Low**Sample ID:** 444617001**Duplicate ID:** 1203980315**Percent Solids for Dup:** N/A

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

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-1829

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>
1203979893								
	Antimony	ug/L	50	48.4		96.8	80-120	MS
	Arsenic	ug/L	50	50.4		101	80-120	MS
	Cadmium	ug/L	50	51.7		103	80-120	MS
	Chromium	ug/L	50	49.1		98.1	80-120	MS
	Lead	ug/L	50	50.1		100	80-120	MS
	Molybdenum	ug/L	50	51.6		103	80-120	MS
	Nickel	ug/L	50	48.7		97.4	80-120	MS
	Selenium	ug/L	50	50.1		100	80-120	MS
	Silver	ug/L	50	51.3		103	80-120	MS
	Thallium	ug/L	50	47.7		95.4	80-120	MS
	Uranium	ug/L	50	47.9		95.8	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-1829

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>
1203979952								
	Magnesium	ug/L	5000	4930		98.5	80-120	P
	Manganese	ug/L	500	503		101	80-120	P
	Potassium	ug/L	5000	5030		101	80-120	P
	Silica	ug/L	10700	10400		97	80-120	P
	Sodium	ug/L	5000	4820		96.4	80-120	P
	Strontium	ug/L	500	502		100	80-120	P
	Tin	ug/L	500	500		99.9	80-120	P
	Vanadium	ug/L	500	501		100	80-120	P
	Zinc	ug/L	500	480		96.1	80-120	P
	Aluminum	ug/L	5000	4950		99	80-120	P
	Barium	ug/L	500	503		101	80-120	P
	Beryllium	ug/L	500	498		99.6	80-120	P
	Boron	ug/L	500	499		99.8	80-120	P
	Calcium	ug/L	5000	4930		98.7	80-120	P
	Cobalt	ug/L	500	503		101	80-120	P
	Copper	ug/L	500	500		99.9	80-120	P
	Iron	ug/L	5000	4940		98.9	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2018-1829

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>
1203980314	Mercury	ug/L	2	1.93		96.3	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2018-1829 **Client ID:** CAWA-18-11L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 444683001 **Serial Dilution ID:** 1203979896

<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	2.35	J	10	U	13.897			MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	3.21		3.03		5.578			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	1.86		1.8		3.278			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2018-1829

Client ID: CAWA-18-11L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 444683001

Serial Dilution ID: 1203979955

<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	152	J	340	U	7.783			P
Barium	158		168		6.44		10	P
Beryllium	1	U	5	U				P
Boron	984		1020		4.106		10	P
Calcium	27400		28100		2.519		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	95.9	J	150	U	3.501			P
Magnesium	6170		6380		3.522		10	P
Manganese	2	U	10	U				P
Potassium	2940		3050		3.941		10	P
Silica	54600		56700		3.913		10	P
Sodium	33800		35000		3.42		10	P
Strontium	133		139		3.968		10	P
Tin	2.5	U	12.5	U				P
Vanadium	4.43	J	5	U	4.938			P
Zinc	3.38	J	16.5	U	113.446			P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2018-1829 **Client ID:** CAWA-18-31L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 444617001 **Serial Dilution ID:** 1203980317

<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 #: 2018-1829
Work Order #: 444683**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1741854

Method: SW 9060 Total Organic Carbon

Sample Analysis

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

Sample ID	Client ID
444683002	CAWA-18-12
1203980262	Method Blank (MB)
1203980263	Laboratory Control Sample (LCS)
1203980265	444446006(CAMO-18-28) Sample Duplicate (DUP)
1203980269	444446006(CAMO-18-28) 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 444446006 (CAMO-18-28) 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:	1741722	Method:	WSP-CN(T)
Prep Batch :	1741721	Method:	EPA 335.4

Sample Analysis

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

Sample ID	Client ID
444683002	CAWA-18-12
1203977743	Method Blank (MB)
1203977744	Laboratory Control Sample (LCS)
1203980185	444683002(CAWA-18-12) Sample Duplicate (DUP)
1203980187	444683002(CAWA-18-12) 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.

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 444683002 (CAWA-18-12) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product: Ion Chromatography
Analytical Batch: 1744256 **Method:** WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
444683001	CAWA-18-11
1203983583	Method Blank (MB)
1203983584	Laboratory Control Sample (LCS)
1203983585	444875001(WST43-18-151800) Sample Duplicate (DUP)
1203983586	444875001(WST43-18-151800) 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 444875001 (WST43-18-151800) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The following sample 444683001 (CAWA-18-11) was diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	444683
	001
Chloride	5X
Sulfate	5X

Sample Re-analysis

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

Miscellaneous Information

Manual Integrations

Samples 1203983584 (LCS) and 1203983585 (WST43-18-151800DUP) were manually integrated to correctly position the baseline as set in the calibration standards.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product:	Ammonia Nitrogen		
Analytical Batch:	1743060	Method:	NH3
Prep Batch :	1743059	Method:	EPA 350.1 Prep

Sample Analysis

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

Sample ID	Client ID
444683001	CAWA-18-11
1203980848	Method Blank (MB)
1203980849	Laboratory Control Sample (LCS)
1203980850	444617001(CAWA-18-31) Sample Duplicate (DUP)
1203980852	444617001(CAWA-18-31) 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.

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 444617001 (CAWA-18-31) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1744737	Method:	TKN
Prep Batch :	1744736	Method:	EPA 351.2 Prep

Sample Analysis

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

Sample ID	Client ID
444683002	CAWA-18-12
1203984476	Method Blank (MB)
1203984477	Laboratory Control Sample (LCS)
1203984478	444683002(CAWA-18-12) Sample Duplicate (DUP)
1203986260	445461001(NonSDG) Sample Duplicate (DUP)
1203984479	444683002(CAWA-18-12) Matrix Spike (MS)
1203986262	445461001(NonSDG) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-104 REV# 15.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 444683002 (CAWA-18-12) and 445461001 (NonSDG) were selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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: 1743056

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
444683001	CAWA-18-11
1203980842	Method Blank (MB)
1203980843	Laboratory Control Sample (LCS)
1203980844	444683001(CAWA-18-11) Sample Duplicate (DUP)
1203980859	444683001(CAWA-18-11) 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 444683001 (CAWA-18-11) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The following samples 1203980844 (CAWA-18-11DUP), 1203980859 (CAWA-18-11PS) and 444683001 (CAWA-18-11) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	444683
	001
Nitrogen, Nitrate/Nitrite	5X

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1742100	Method:	PO4
Prep Batch :	1742099	Method:	EPA 365.4 Prep

Sample Analysis

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

Sample ID	Client ID
444683001	CAWA-18-11
1203978539	Method Blank (MB)
1203978540	Laboratory Control Sample (LCS)
1203978689	444617001(CAWA-18-31) Sample Duplicate (DUP)
1203978690	444617001(CAWA-18-31) 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

Sample 444617001 (CAWA-18-31) 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

Sample1203978539 (MB) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1742838

Method: TDS

Sample Analysis

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

Sample ID	Client ID
444683001	CAWA-18-11
1203980359	Method Blank (MB)
1203980360	Laboratory Control Sample (LCS)
1203980361	444683001(CAWA-18-11) 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 444683001 (CAWA-18-11) 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: 1744083

Method: EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
444683001	CAWA-18-11
1203983133	Laboratory Control Sample (LCS)
1203983134	444683001(CAWA-18-11) 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 444683001 (CAWA-18-11) 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: 1743846 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
444683001	CAWA-18-11
1203982521	Laboratory Control Sample (LCS)
1203982522	444617001(CAWA-18-31) 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 444617001 (CAWA-18-31) 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
1203982522 (CAWA-18-31DUP)	pH	Received 24-FEB-18, out of holding 22-FEB-18
444683001 (CAWA-18-11)	pH	Received 27-FEB-18, out of holding 23-FEB-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: 1743845 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:310.1:

Sample ID	Client ID
444683001	CAWA-18-11
1203982517	Laboratory Control Sample (LCS)
1203982518	444617001(CAWA-18-31) Sample Duplicate (DUP)
1203982520	444617001(CAWA-18-31) 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 444617001 (CAWA-18-31) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

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Qualifier Definition Report for

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

Client SDG: 2018-1829 GEL Work Order: 444683

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Kristen Mizzell

Date: 13 MAR 2018

Title: Team Leader

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: March 13, 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: 2018-1829

Client Sample ID: CAWA-18-11
Sample ID: 444683001
Matrix: W
Collect Date: 23-FEB-18 10:15
Receive Date: 27-FEB-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	J	0.117	0.067	0.200	mg/L		1	JXH5	03/05/18	2201	1744256	1
Fluoride		0.688	0.033	0.100	mg/L		1					
Chloride		24.0	0.335	1.00	mg/L		5	JXH5	03/06/18	1813	1744256	2
Sulfate		19.8	0.665	2.00	mg/L		5					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0664	0.017	0.050	mg/L	1.00	1	KLP1	03/01/18	1052	1743060	3
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		2.92	0.085	0.250	mg/L		5	AXH3	03/07/18	0557	1743056	4
PO4 "As Received"												
Phosphorus, Total as P		0.136	0.020	0.050	mg/L	1.00	1	KLP1	03/05/18	1148	1742100	5
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		253	3.40	14.3	mg/L			KLP1	02/28/18	1046	1742838	6
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		106	1.45	4.00	mg/L			RXB5	03/03/18	1225	1743845	7
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		364	1.00	1.00	umhos/cm		1	HXC1	03/05/18	1250	1744083	8
PH "As Received"												
pH at Temp 13.9C	H	7.49	0.010	0.100	SU		1	RXB5	03/03/18	1223	1743846	9

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	03/01/18	0717	1743059
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	03/05/18	0900	1742099

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Certificate of Analysis

Report Date: March 13, 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: 2018-1829

Client Sample ID: CAWA-18-11
Sample ID: 444683001

Project: ESHL00114
Client ID: ARSL004

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

Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: March 13, 2018

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2018-1829

Project: LANL- WQH Water Samples

Client Sample ID: CAWA-18-12

Project: ESHL00114

Sample ID: 444683002

Client ID: ARSL004

Matrix: W

Collect Date: 23-FEB-18 10:15

Receive Date: 27-FEB-18

Collector: Client

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		2.12	0.330	1.00	mg/L		1	TSM	03/01/18	0708	1741854	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total		12.7	1.67	5.00	ug/L	1.00	1	AXH3	02/28/18	0733	1741722	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	03/09/18	1327	1744737	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	02/28/18	0556	1741721
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	03/09/18	0900	1744736

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

DF: Dilution Factor

Lc/LC: Critical Level

DL: Detection Limit

PF: Prep Factor

MDA: Minimum Detectable Activity

RL: Reporting Limit

MDC: Minimum Detectable Concentration

SQL: Sample Quantitation Limit

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: March 13, 2018

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

Contact: Ms. Nita Patel

Workorder: 444683

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1741854										
QC1203980265	444446006	DUP									
Total Organic Carbon Average		J	0.422	J	0.432	mg/L	2.34 ^	(+/-1.00)	TSM	02/28/18	22:29
QC1203980263	LCS										
Total Organic Carbon Average	10.0				10.5	mg/L		105 (80%-120%)		02/28/18	15:35
QC1203980262	MB										
Total Organic Carbon Average			U	ND	mg/L					02/28/18	15:25
QC1203980269	444446006	PS									
Total Organic Carbon Average	10.0	J	0.422		11.8	mg/L		114 (75%-125%)		02/28/18	23:09
Flow Injection Analysis											
Batch	1741722										
QC1203980185	444683002	DUP									
Cyanide, Total			12.7		12.6	ug/L	0.791 ^	(+/-5.00)	AXH3	02/28/18	07:34
QC1203977744	LCS										
Cyanide, Total	50.0				49.7	ug/L		99.4 (90%-110%)		02/28/18	06:48
QC1203977743	MB										
Cyanide, Total			U	ND	ug/L					02/28/18	06:47
QC1203980187	444683002	MS									
Cyanide, Total	100		12.7		104	ug/L		91.3 (90%-110%)		02/28/18	07:39
Ion Chromatography											
Batch	1744256										
QC1203983585	444875001	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		JXH5	03/05/18	23:02

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QC Summary

Workorder: 444683

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1744256										
Chloride	J	0.104	J	0.105	mg/L	1.43	^	(+/-0.200)	JXH5	03/05/18	23:02
Fluoride	U	ND	U	ND	mg/L	N/A					
Sulfate	J	0.169	J	0.171	mg/L	1	^	(+/-0.400)			
QC1203983584 LCS											
Bromide	1.25			1.28	mg/L		103	(80%-120%)		03/05/18	21:30
Chloride	5.00			4.81	mg/L		96.2	(80%-120%)			
Fluoride	2.50			2.49	mg/L		99.8	(80%-120%)			
Sulfate	10.0			9.89	mg/L		98.9	(80%-120%)			
QC1203983583 MB											
Bromide			U	ND	mg/L					03/05/18	20:59
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203983586 444875001 PS											
Bromide	1.25	U	ND	1.29	mg/L		102	(75%-125%)		03/05/18	23:33
Chloride	5.00	J	0.104	4.80	mg/L		93.9	(75%-125%)			
Fluoride	2.50	U	ND	2.37	mg/L		94.9	(75%-125%)			
Sulfate	10.0	J	0.169	9.92	mg/L		97.5	(75%-125%)			

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QC Summary

Workorder: 444683

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1742100										
QC1203978689	444617001	DUP									
Phosphorus, Total as P		0.0941		0.0839	mg/L	11.5	^	(+/-0.050)	KLP1	03/05/18	11:37
QC1203978540	LCS										
Phosphorus, Total as P	1.00			1.10	mg/L			110	(80%-124%)	03/05/18	11:21
QC1203978539	MB										
Phosphorus, Total as P			U	ND	mg/L					03/05/18	11:33
QC1203978690	444617001	MS									
Phosphorus, Total as P	1.00	0.0941		1.12	mg/L			103	(63%-139%)	03/05/18	11:38
Batch	1743056										
QC1203980844	444683001	DUP									
Nitrogen, Nitrate/Nitrite		2.92		2.85	mg/L	2.43		(0%-20%)	AXH3	03/07/18	05:58
QC1203980843	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.01	mg/L			101	(90%-110%)	03/07/18	05:40
QC1203980842	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					03/07/18	05:39
QC1203980859	444683001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.584		1.57	mg/L			98.6	(90%-110%)	03/07/18	05:59
Batch	1743060										
QC1203980850	444617001	DUP									
Nitrogen, Ammonia		0.142		0.160	mg/L	11.9	^	(+/-0.050)	KLP1	03/01/18	10:41
QC1203980849	LCS										
Nitrogen, Ammonia	1.00			1.09	mg/L			109	(90%-110%)	03/01/18	10:39
QC1203980848	MB										
Nitrogen, Ammonia			U	ND	mg/L					03/01/18	10:39

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QC Summary

Workorder: 444683

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1743060										
QC1203980852	444617001	MS									
Nitrogen, Ammonia	1.00	0.142		1.09	mg/L		94.8	(90%-110%)	KLP1	03/01/18	10:42
Batch	1744737										
QC1203984478	444683002	DUP									
Nitrogen, Total Kjeldahl	U	ND	U	ND	mg/L	N/A			KLP1	03/09/18	13:28
QC1203986260	445461001	DUP									
Nitrogen, Total Kjeldahl		0.790		0.820	mg/L	3.73		(0%-20%)		03/09/18	13:44
QC1203984477	LCS										
Nitrogen, Total Kjeldahl	1.00			0.961	mg/L		96.1	(90%-110%)		03/09/18	13:26
QC1203984476	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					03/09/18	13:25
QC1203984479	444683002	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	1.07	mg/L		104	(90%-110%)		03/09/18	13:29
QC1203986262	445461001	MS									
Nitrogen, Total Kjeldahl	1.00	0.790		1.71	mg/L		92	(90%-110%)		03/09/18	13:45
Solids Analysis											
Batch	1742838										
QC1203980361	444683001	DUP									
Total Dissolved Solids		253		259	mg/L	2.23		(0%-5%)	KLP1	02/28/18	10:46
QC1203980360	LCS										
Total Dissolved Solids	300			304	mg/L		101	(95%-105%)		02/28/18	10:46
QC1203980359	MB										
Total Dissolved Solids			J	4.29	mg/L					02/28/18	10:46

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QC Summary

Workorder: 444683

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1743845										
QC1203982518	444617001	DUP									
Alkalinity, Total as CaCO3		61.2		59.8	mg/L	2.31		(0%-20%)	RXB5	03/03/18	12:00
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203982517	LCS										
Alkalinity, Total as CaCO3	100			106	mg/L		106	(90%-110%)		03/03/18	11:52
QC1203982520	444617001	MS									
Alkalinity, Total as CaCO3	100	61.2		165	mg/L		104	(80%-120%)		03/03/18	12:01
Batch	1743846										
QC1203982522	444617001	DUP									
pH	H	7.30	H	7.37	SU	0.954		(0%-5%)	RXB5	03/03/18	11:57
QC1203982521	LCS										
pH	7.00			7.05	SU		101	(99%-101%)		03/03/18	11:52
Batch	1744083										
QC1203983134	444683001	DUP									
Conductivity		364		363	umhos/cm	0.165		(0%-10%)	HXC1	03/05/18	12:53
QC1203983133	LCS										
Conductivity	1410			1420	umhos/cm		100	(95%-105%)		03/05/18	12:48

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

GEL LABORATORIES LLC

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QC Summary

Workorder: 444683

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

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

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

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

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

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

Radiological Analysis

Case Narrative

**Radiochemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-1829
Work Order #: 444683**

Method/Analysis Information

Product: Alphaspec Am241 Liquid

Analytical Method: HASL-300:AM-241

Analytical Batch Number: 1742617

Sample ID	Client ID
444683002	CAWA-18-12
1203979778	Method Blank (MB)
1203979780	Laboratory Control Sample (LCS)
1203979779	444683002(CAWA-18-12) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244. The initial Calibration was performed in February 2018.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

Aliquots for samples 1203979778 (MB) and 1203979780 (LCS) were changed to 1.0, and the MDCs (and Lc if requested) for all samples are calculated using a blank population per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Tracer/Carrier Yield

Sample, (See Below), did not meet the client tracer yield requirements, however it is less than 110 percent and does meet the GEL standard tracer yield requirements.

Sample	Analyte	Value
1203979780 (LCS)	Americium-243 Tracer	109* (50%-105%)

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 444683002 (CAWA-18-12). The QC was from ARSL work order 444683.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Sample result are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:**Manual Integration**

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: ISOPU
Analytical Method: HASL-300:ISOPU
Analytical Batch Number: 1742618

Sample ID	Client ID
444683002	CAWA-18-12
1203979781	Method Blank (MB)
1203979783	Laboratory Control Sample (LCS)
1203979782	444683002(CAWA-18-12) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244. The initial Calibration was performed in February 2018.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

Aliquots for samples 1203979781 (MB) and 1203979783 (LCS) were changed to 1.0, and the MDCs (and Lc if requested) for all samples are calculated using a blank population per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 444683002 (CAWA-18-12). The QC was from ARSL work order 444683.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Sample result are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:**Manual Integration**

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:

IsoU

Analytical Method: HASL-300:ISOU

Analytical Batch Number: 1742619

Sample ID	Client ID
444683002	CAWA-18-12
1203979784	Method Blank (MB)
1203979786	Laboratory Control Sample (LCS)
1203979785	444683002(CAWA-18-12) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. Calibrations are performed monthly using mixed alpha standards comprised of the following: Gd-148, Np-237, and Cm-244. The initial Calibration was performed in February 2018.

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

Aliquots for samples 1203979784 (MB) and 1203979786 (LCS) were changed to 1.0, and the MDCs (and Lc if requested) for all samples are calculated using a blank population per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

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

Sample	Analyte	Value
1203979784 (MB)	Uranium-238	Blank result > 1.65 CSU

Blank Decision Level

The blank result is less than the decision level.

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 444683002 (CAWA-18-12). The QC was from ARSL work order 444683.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:**Holding Time**

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

Negative > 3 sigma TPU

Sample result are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:**Manual Integration**

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	Gammaspec
Analytical Method:	EPA:901.1
Analytical Batch Number:	1742784

Sample ID	Client ID
444683002	CAWA-18-12
1203980189	Method Blank (MB)
1203980191	Laboratory Control Sample (LCS)
1203980190	444683002(CAWA-18-12) Sample Duplicate (DUP)

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

SOP Reference

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

Calibration Information:

Calibration Information

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

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

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

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

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

Sample	Analyte	Value
1203980189 (MB)	Cesium-137	Blank result > DL

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 444683002 (CAWA-18-12). The QC was from ARSL work order 444683.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

Additional Identified Radionuclides

No additional radionuclides were added.

Miscellaneous Information:

Sample-Specific MDA/MDC

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: GFPC, Sr90, liquid

Analytical Method: EPA:905.0

Analytical Batch Number: 1744105

Sample ID	Client ID
444683002	CAWA-18-12
1203983174	Method Blank (MB)
1203983177	Laboratory Control Sample (LCS)
1203983175	445075002(WSTMO-18-151501) Sample Duplicate (DUP)
1203983176	445075002(WSTMO-18-151501) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as

Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 19.

Calibration Information:

Calibration Information

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

Standards Information

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

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

Aliquots for samples 1203983174 (MB) and 1203983177 (LCS) were changed to 1.0 per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Tracer/Carrier Yield

All yields met the required acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 445075002 (WSTMO-18-151501). The QC was from ARSL work order 445075.

Matrix Spike (MS) Recovery

The MS spike recoveries met acceptance limits.

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:

Holding Time

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

Negative > 3 sigma TPU

Sample result are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Recounts

None of the samples in this sample set were recounted.

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

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

Additional Comments

The matrix spike, 1203983176 (WSTMO-18-151501MS), aliquot was reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	WSP-GrossA/B
Analytical Method:	EPA 900.0/SW846 9310
Analytical Batch Number:	1744109

Sample ID	Client ID
444683002	CAWA-18-12
1203983191	Method Blank (MB)
1203983195	Laboratory Control Sample (LCS)
1203983192	444875001(WST43-18-151800) Sample Duplicate (DUP)
1203983193	444875001(WST43-18-151800) Matrix Spike (MS)
1203983194	444875001(WST43-18-151800) Matrix Spike Duplicate (MSD)

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

SOP Reference

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

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met. The initial Calibration was performed in December 2017.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used

before the expiration dates.

Sample Geometry

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

Quality Control (QC) Information:

Blank Information

Aliquots for samples 1203983191 (MB) and 1203983195 (LCS) were changed to 1.0 per client request.

Method Blank Criteria

The Method Blank (MB) met acceptance criteria.

CSU

The blank result is less than 1.65 times the CSU.

Blank Decision Level

The blank result is less than the decision level.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Designated QC

The following sample was used for QC: 444875001 (WST43-18-151800). The QC was from ARSL work order 444875.

Matrix Spike (MS) Recovery

The MS spike recoveries met acceptance limits.

Duplication Criteria between MS and MSD

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

Duplication Criteria between QC Sample and Duplicate Sample

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

RDL Met

The method RDL has been met.

Technical Information:

Holding Time

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

Negative > 3 sigma TPU

Samples results are not more negative than three sigma TPU.

Sample Re-prep/Re-analysis

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

Gross Alpha/Beta Preparation Information

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

alpha activity.

Recounts

Sample 1203983191 (MB) was recounted due to a suspected blank false positive. The recount is reported.

Miscellaneous Information:

Sample-Specific MDA/MDC

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

Additional Comments

The matrix spike and matrix spike duplicate, 1203983193 (WST43-18-151800MS) and 1203983194 (WST43-18-151800MSD), aliquots were reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Certification Statement

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

GEL LABORATORIES LLC

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Qualifier Definition Report for

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

Client SDG: 2018-1829 GEL Work Order: 444683

The Qualifiers in this report are defined as follows:

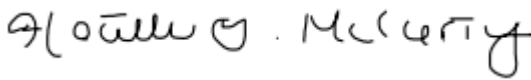
- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

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: 09 MAR 2018

Title: Analyst II

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Project: LANL- WQH Water Samples

Report Date: March 9, 2018

Client Sample ID: CAWA-18-12
Sample ID: 444683002
Matrix: W
Collect Date: 23-FEB-18
Receive Date: 27-FEB-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	0.00202	+/-0.00451	0.0341	0.0143	+/-0.00451	0.050	pCi/L			JXR5	03/01/18	1326	1742617	1
<i>ISOPU "As Received"</i>															
Plutonium-238	U	0.00906	+/-0.00544	0.0315	0.0133	+/-0.00545	0.050	pCi/L			JXR5	03/01/18	1326	1742618	2
Plutonium-239/240	U	0.00725	+/-0.0081	0.0254	0.0102	+/-0.00811	0.050	pCi/L							
<i>IsoU "As Received"</i>															
Uranium-234		1.29	+/-0.126	0.444	0.206	+/-0.162	1.00	pCi/L			JXR5	02/28/18	1657	1742619	3
Uranium-235/236	U	0.126	+/-0.0471	0.252	0.106	+/-0.0481	1.00	pCi/L							
Uranium-238		0.726	+/-0.095	0.228	0.0976	+/-0.111	0.500	pCi/L							

Rad Gamma Spec Analysis

Gammasespec "As Received"

Cesium-137	U	0.683	+/-0.907	3.57	1.57	+/-0.921	8.00	pCi/L			BSW1	02/28/18	0550	1742784	4
Cobalt-60	U	0.349	+/-1.28	4.95	2.15	+/-1.28	8.00	pCi/L							
Neptunium-237	U	0.431	+/-1.81	6.83	3.13	+/-1.81		pCi/L							
Potassium-40	U	2.02	+/-23.7	37.1	15.3	+/-23.7		pCi/L							
Sodium-22	U	-1.5	+/-0.857	2.67	1.02	+/-0.927		pCi/L							

Rad Gas Flow Proportional Counting

GFPC, Sr90, liquid "As Received"

Strontium-90	U	-0.349	+/-0.130	0.468	0.225	+/-0.130	0.500	pCi/L			KSD1	03/07/18	1508	1744105	5
<i>WSP-GrossA/B "As Received"</i>															
Beta		5.14	+/-0.943	2.64	1.22	+/-1.04	3.00	pCi/L			BXG2	03/06/18	1121	1744109	6
Alpha		4.48	+/-1.21	2.81	1.05	+/-1.27	3.00	pCi/L			BXG2	03/07/18	1107	1744109	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"	1742617	90.8	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1742618	94.7	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1742619	71.2	(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: CAWA-18-12

Sample ID: 444683002

Project: ESHL00114

Client ID: ARSL004

Report Date: March 9, 2018

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"							1744105	55.8	(50%-105%)				

Notes:

The MDC is a sample specific MDC.

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

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

Lc/LC: Critical Level

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Mtd.: Method

PF: Prep Factor

RL: Reporting Limit

TPU: Total Propagated Uncertainty

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: March 9, 2018

Page 1 of 6

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

Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 444683

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1742617										
QC1203979779	444683002	DUP									
Americium-241	U	0.00202	U	0.00787	pCi/L	0.272		(0-1)	JXR5	03/01/18	13:26
	Uncert:	+/-0.00451		+/-0.00622							
	TPU:	+/-0.00451		+/-0.00623							
**Americium-243 Tracer	2.62	2.38		2.43	pCi/L		92.7	(50%-105%)			
	Uncert:	+/-0.0724		+/-0.0718							
	TPU:	+/-0.135		+/-0.134							
QC1203979780	LCS										
Americium-241	1.97			1.77	pCi/L		89.8	(80%-120%)	JXR5	03/01/18	13:26
	Uncert:			+/-0.0503							
	TPU:			+/-0.0904							
**Americium-243 Tracer	2.10			2.29	pCi/L		109 *	(50%-105%)			
	Uncert:			+/-0.0547							
	TPU:			+/-0.105							
QC1203979778	MB										
Americium-241			U	0.00	pCi/L				JXR5	03/01/18	13:26
	Uncert:			+/-0.00472							
	TPU:			+/-0.00472							
**Americium-243 Tracer	2.10			2.10	pCi/L		100	(50%-105%)			
	Uncert:			+/-0.059							
	TPU:			+/-0.109							
Batch	1742618										
QC1203979782	444683002	DUP									
Plutonium-238	U	0.00906	U	-0.0074	pCi/L	0.604		(0-1)	JXR5	03/01/18	13:26
	Uncert:	+/-0.00544		+/-0.00818							
	TPU:	+/-0.00545		+/-0.00818							
Plutonium-239/240	U	0.00725	U	-0.0173	pCi/L	0.694		(0-1)			
	Uncert:	+/-0.0081		+/-0.00955							
	TPU:	+/-0.00811		+/-0.00955							
**Plutonium-242 Tracer	2.47	2.34		1.91	pCi/L		77.1	(50%-105%)			
	Uncert:	+/-0.0675		+/-0.0787							
	TPU:	+/-0.118		+/-0.131							
QC1203979783	LCS										
Plutonium-238			U	0.0155	pCi/L			(80%-120%)	JXR5	03/01/18	13:26
	Uncert:			+/-0.00709							
	TPU:			+/-0.00712							
Plutonium-239/240	1.98			2.15	pCi/L		109	(80%-120%)			
	Uncert:			+/-0.061							
	TPU:			+/-0.107							
**Plutonium-242 Tracer	1.98			1.55	pCi/L		78.5	(50%-105%)			
	Uncert:			+/-0.0585							
	TPU:			+/-0.0997							

GEL LABORATORIES LLC

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QC Summary

Workorder: 444683

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1742618										
QC1203979781	MB										
Plutonium-238			U	0.011	pCi/L				JXR5	03/01/18	13:26
				Uncert:							
				TPU:							
Plutonium-239/240			U	0.00365	pCi/L						
				Uncert:							
				TPU:							
**Plutonium-242 Tracer	1.98			1.43	pCi/L		72.5	(50%-105%)			
				Uncert:							
				TPU:							
Batch	1742619										
QC1203979785	444683002	DUP									
Uranium-234		1.29		0.907	pCi/L	0.686		(0-1)	JXR5	02/28/18	16:57
		Uncert:		+/-0.0991							
		TPU:		+/-0.120							
Uranium-235/236		U	0.126	U	0.0672	pCi/L	0.354	(0-1)			
		Uncert:		+/-0.0342							
		TPU:		+/-0.0346							
Uranium-238		0.726		0.683	pCi/L	0.101		(0-1)			
		Uncert:		+/-0.0859							
		TPU:		+/-0.0995							
**Uranium-232 Tracer	2.61	1.86		1.88	pCi/L		72.1	(50%-105%)			
		Uncert:		+/-0.166							
		TPU:		+/-0.254							
QC1203979786	LCS										
Uranium-234				2.54	pCi/L				JXR5	02/28/18	16:57
		Uncert:		+/-0.143							
		TPU:		+/-0.235							
Uranium-235/236				0.239	pCi/L						
		Uncert:		+/-0.0504							
		TPU:		+/-0.0534							
Uranium-238	2.70			2.79	pCi/L		103	(80%-120%)			
		Uncert:		+/-0.150							
		TPU:		+/-0.254							
**Uranium-232 Tracer	2.09			1.63	pCi/L		78.1	(50%-105%)			
		Uncert:		+/-0.132							
		TPU:		+/-0.202							
QC1203979784	MB										
Uranium-234			U	0.0161	pCi/L				JXR5	02/28/18	16:57
		Uncert:		+/-0.0206							
		TPU:		+/-0.0206							
Uranium-235/236			U	-0.0119	pCi/L						
		Uncert:		+/-0.0115							
		TPU:		+/-0.0115							
Uranium-238			U	0.0302	pCi/L						
		Uncert:		+/-0.0181							
		TPU:		+/-0.0183							

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1742619										
**Uranium-232 Tracer											
	2.09			1.51	pCi/L		72.2	(50%-105%)			
	Uncert:			+/-0.131							
	TPU:			+/-0.201							
Rad Gamma Spec											
Batch	1742784										
QC1203980190 444683002 DUP											
Cesium-137	U	0.683	U	1.09	pCi/L	0.101		(0-1)	BSW1	02/28/1809:05	
	Uncert:	+/-0.907		+/-1.06							
	TPU:	+/-0.921		+/-1.09							
Cobalt-60	U	0.349	U	-1.51	pCi/L	0.371		(0-1)			
	Uncert:	+/-1.28		+/-1.17							
	TPU:	+/-1.28		+/-1.22							
Neptunium-237	U	0.431	U	-3.29	pCi/L	0.464		(0-1)			
	Uncert:	+/-1.81		+/-2.06							
	TPU:	+/-1.81		+/-2.20							
Potassium-40	U	2.02	U	8.47	pCi/L	0.0727		(0-1)			
	Uncert:	+/-23.7		+/-20.7							
	TPU:	+/-23.7		+/-20.7							
Sodium-22	U	-1.5	U	-0.426	pCi/L	0.293		(0-1)			
	Uncert:	+/-0.857		+/-0.905							
	TPU:	+/-0.927		+/-0.911							
QC1203980191 LCS											
Americium-241	34300			35000	pCi/L		102	(80%-120%)	BSW1	02/28/1805:51	
	Uncert:			+/-872							
	TPU:			+/-3440							
Cesium-137	12900			14100	pCi/L		109	(80%-120%)			
	Uncert:			+/-174							
	TPU:			+/-942							
Cobalt-60	10800			10900	pCi/L		101	(80%-120%)			
	Uncert:			+/-170							
	TPU:			+/-489							
Neptunium-237			U	31.1	pCi/L						
	Uncert:			+/-60.1							
	TPU:			+/-60.6							
Potassium-40			U	157	pCi/L						
	Uncert:			+/-99.3							
	TPU:			+/-106							
Sodium-22			U	6.90	pCi/L						
	Uncert:			+/-18.0							
	TPU:			+/-18.1							
QC1203980189 MB											
Cesium-137			U	2.36	pCi/L				BSW1	02/28/1805:51	
	Uncert:			+/-2.03							
	TPU:			+/-2.03							
Cobalt-60			U	0.211	pCi/L						
	Uncert:			+/-0.449							

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gamma Spec											
Batch	1742784										
Neptunium-237	TPU:			+/-0.452							
			U	1.41	pCi/L						
	Uncert:			+/-1.62							
Potassium-40	TPU:			+/-1.65							
			U	10.7	pCi/L						
	Uncert:			+/-10.9							
Sodium-22	TPU:			+/-11.0							
			U	0.0537	pCi/L						
	Uncert:			+/-0.900							
	TPU:			+/-0.900							
Rad Gas Flow											
Batch	1744105										
QC1203983175	445075002	DUP									
Strontium-90	U	0.141	U	-0.105	pCi/L	0.512		(0-1)	KSD1	03/07/18	15:08
	Uncert:	+/-0.138		+/-0.101							
	TPU:	+/-0.139		+/-0.101							
**Strontium Carrier	4.30	2.20		2.40	mg		55.8	(50%-105%)			
QC1203983177	LCS										
Strontium-90	23.5			23.1	pCi/L		98.2	(80%-120%)	KSD1	03/07/18	15:08
	Uncert:			+/-0.696							
	TPU:			+/-1.97							
**Strontium Carrier	4.30			3.60	mg		83.7	(50%-105%)			
QC1203983174	MB										
Strontium-90			U	-0.68	pCi/L				KSD1	03/07/18	15:08
	Uncert:			+/-0.0559							
	TPU:			+/-0.0559							
**Strontium Carrier	4.30			3.70	mg		86	(50%-105%)			
QC1203983176	445075002	MS									
Strontium-90	235	U	0.141	283	pCi/L		120	(75%-125%)	KSD1	03/07/18	15:08
	Uncert:		+/-0.138	+/-8.36							
	TPU:		+/-0.139	+/-24.1							
**Strontium Carrier	4.30	2.20		3.10	mg		72.1	(50%-105%)			
Batch	1744109										
QC1203983192	444875001	DUP									
Alpha	U	-0.0847	U	0.338	pCi/L	0.222		(0-1)	BXG2	03/07/18	11:07
	Uncert:	+/-0.403		+/-0.546							
	TPU:	+/-0.403		+/-0.547							
Beta	U	1.66	U	2.20	pCi/L	0.168		(0-1)		03/06/18	11:21
	Uncert:	+/-0.752		+/-0.829							
	TPU:	+/-0.766		+/-0.850							
QC1203983195	LCS										
Alpha	12.1			9.89	pCi/L		81.8	(80%-120%)	BXG2	03/07/18	11:08
	Uncert:			+/-0.528							
	TPU:			+/-0.988							
Beta	47.0			46.3	pCi/L		98.5	(80%-120%)		03/06/18	11:20

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Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1744109										
				Uncert:							
				TPU:							
QC1203983191	MB										
Alpha			U	-0.0491	pCi/L				BXG2	03/07/18	11:07
				Uncert:							
				TPU:							
Beta			U	-0.06	pCi/L					03/06/18	13:26
				Uncert:							
				TPU:							
QC1203983193	444875001	MS									
Alpha	483	U	-0.0847	517	pCi/L		107	(75%-125%)	BXG2	03/07/18	11:08
			Uncert:	+/-0.403							
			TPU:	+/-0.403							
Beta	1880	U	1.66	2030	pCi/L		108	(75%-125%)		03/06/18	11:20
			Uncert:	+/-0.752							
			TPU:	+/-0.766							
QC1203983194	444875001	MSD									
Alpha	483	U	-0.0847	479	pCi/L	0.194	99.1	(0-1)	BXG2	03/07/18	11:08
			Uncert:	+/-0.403							
			TPU:	+/-0.403							
Beta	1880	U	1.66	2020	pCi/L	0.0135	108	(0-1)		03/06/18	11:20
			Uncert:	+/-0.752							
			TPU:	+/-0.766							

Notes:

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

The Qualifiers in this report are defined as follows:

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

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

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

** Indicates analyte is a surrogate/tracer compound.

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

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

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