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:

General Engineering

Charleston SC

Chain of Custody/Analysis Request

COC/Lab Request #: 2018-1615

Page 1 of 1

Client Contact:

Lab Agreement #:

Site Name: Los Alamos National Laboratory

Project Number: ADEP

Analysis Turnaround Time:

24 Hour - ☐ Other - ☒

7 Days - ☐

14 Days - ☐

21 Days - ☐

28 Days - ☒

Rad Screening Info: Location

Lab Reporting Limit Type: MDL

Field Sample ID	Sample Date	Sample Time	Sample Matrix	MSGP-Hg	WSP-8260B-VOA	WSP-8270C-SVOA	WSP-8330B-NMED HEXMOD	WSP-All Metals	WSP-CN(T)	WSP-GENINORG+PerChlorate	WSP-GrossA/B	WSP-NH3+NO3/NO2+PO4	WSP-RAD	WSP-TKN+TOC
CAWA-18-108	02/06/2018	12:20	W		½									
CAWA-18-33	02/06/2018	12:20	W					1		1		1		
CAWA-18-34	02/06/2018	12:20	W	1	2	2	3		1		1		1	1

Special Instructions:

Relinquished by:	Print Name:	Date/Time:	Received by:	Print Name:	Date/Time:
	Melissa Mart	2/7/18 300			
Relinquished by:	Print Name:	Date/Time:	Received by:	Print Name:	Date/Time:
Relinquished by:	Print Name:	Date/Time:	Received by:	Print Name:	Date/Time:

LANL SMO

Los Alamos NM

Chain of Custody/Analysis Request

COC/Lab Request #: 2018-1615

Client Contact:

Lab Agreement #:

Site Name: Los Alamos National Laboratory

Project Number:

Analysis Turnaround Time:

24 Hour - ☐ Other - ☒

7 Days - ☐

14 Days - ☐

21 Days - ☐

28 Days - ☐

Rad Screening Info:

Lab Reporting Limit Type: Method Detection Limit

Field Sample ID	Sample Date	Sample Time	Sample Matrix	MSGP-Hg	WSP-8260B-VOA	WSP-8270C-SVOA	WSP-8290-D/F	WSP-8330B-NMED HEXMOD	WSP-All Metals	WSP-CN(T)	WSP-EES-Br	WSP-EES-Tracers	WSP-GENINORG+PerChlorate	WSP-GrossA/B	WSP-LL-H-3	WSP-N15/O18-NO3	WSP-NH3+NO3/NO2+PO4	WSP-RAD	WSP-TKN+TOC				
CAWA-18-33	Feb 6 2018	12:20	W						1				1			2	1						
CAWA-18-108	Feb 6 2018	12:20	W		2																		
CAWA-18-34	Feb 6 2018	12:20	W	1	2	2	2	3		1				1	1			1	1				
CAWA-18-38	Feb 6 2018	12:20	W								1	2											

Special Instructions:

Relinquished by:	**Print Name:** Tanner Bonham	**Date/Time:** 2-6-2018 1324	**Received by:**	**Print Name:**	**Date/Time:** 2/6/18 1324
Relinquished by:	**Print Name:**	**Date/Time:**	**Received by:**	**Print Name:**	**Date/Time:**
Relinquished by:	**Print Name:**	**Date/Time:**	**Received by:**	**Print Name:**	**Date/Time:**

Shipping Classification Determination Checklist

Sampling Plan ID/Name: 11689 CDU-91(i) **COC:** 2018-1615

TEST - Explosives	YES	NO
Samples collected from a WFO area? (TAs -8, 9, 11, 16, 37, 14, 15, 36, 22, 39, 40, and 49)	X	

Field Test for Explosives Results	YES	NO	NA
HE SPOT test result positive. **If YES - Do not transport.**		X	

TEST - Chemical Preservation	YES	NO
Samples are chemically preserved?	X	

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

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

Sample Activity (dpm/100cm²)		Shipment Activity (dpm*g/100cm²)		Sampled Location	YES	NO	NA
Alpha detectable	**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			NA
Alpha ≥ 125	**AND**	Alpha ≥ 1,250,000	**AT**	other locations			NA
Beta ≥ 1,500	**AND**	Beta ≥ 15,000,000	**AT**	any location			NA
The sample Alpha ≥ 16,000,000 dpm*g/100cm² or Beta ≥ 160,000,000 dpm*g/100cm². **If YES - Do not ship.**							NA
On the external surface of the sample container, alpha activity ≥ 24 dpm/cm², beta activity ≥ 240 dpm/cm², or surface activity ≥ 0.5 mR/hr. **If YES - Do not ship.**							NA
The sample is tentatively identified as DOT hazard Class 7 (Radioactive). The shipment is labeled *Radioactive Material, Excepted Package - Limited Quantity Material - UN2910*, based on field screening measurements of alpha and beta activity.							NA

TEST - Location	YES	NO
Prior analytical measurements of radioactive isotopes are available?	X	

Sample Activity (pCi/g)		Shipment Activity (pCi)	YES	NO	NA
Am-241 ≥ 27 pCi/g	**AND**	Am-241 ≥ 270,000 pCi Total			
Cs-137 ≥ 270 pCi/g	**AND**	Cs-137 ≥ 270,000 pCi Total			
Pu-238 ≥ 27 pCi/g	**AND**	Pu-238 ≥ 270,000 pCi Total			
Pu-239/240 ≥ 27 pCi/g	**AND**	Pu-239/240 ≥ 270,000 pCi Total			
Th-228 ≥ 27 pCi/g	**AND**	Th-228 ≥ 270,000 pCi Total			
U-234 ≥ 270 pCi/g	**AND**	U-234 ≥ 1,600,000,000 pCi Total			
U-238 ≥ 270 pCi/g	**AND**	U-238 ≥ unlimited			
H-3 ≥ 27,000,000 pCi/g	**AND**	H-3 ≥ 27,000,000,000 pCi Total			
Am-241, Pu-238, Pu-239/240, or Th 228 ≥ 27,000,000 pCi; or Cs-137 ≥ 270,000,000 pCi or U-234 ≥ 160,000,000 pCi; or H-3 ≥ 1 Ci. **If YES - Do not ship.**				X	
The sample is tentatively identified as DOT hazard Class 7 (Radioactive). The shipment is labeled *Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910*, based on prior analytical measurements of radioactive isotopes.				X	

TEST - AK	YES	NO	NA
The shippers documented knowledge of the sample positively identifies appropriate labeling.		X	

Documented Field Team Member Statement	YES	NO	NA
The sample is tentatively identified as DOT hazard Class 7 (Radioactive). The shipment is labeled *Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910*, and the sample is submitted to ARS or RP for hazard classification analysis.			✓

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

Hazard Assessment Completed	Date/Time
(Printed Name) Maurice Shendo (Signature) [signature]	2/6/18 1324

Hazard Assessment Reviewed	Date/Time
(Printed Name) Renee Onstott (Signature) Renee Onstott	2/6/18 1324

DATA VALIDATION REPORT

Chain Of Custody No. 2018-1615

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
443345	EPA:120.1	1				
443345	EPA:150.1	1				
443345	EPA:160.1	1				
443345	EPA:170.0	2		1		
443345	EPA:245.2	2				
443345	EPA:300.0	1				
443345	EPA:310.1	1				
443345	EPA:335.4	1				
443345	EPA:350.1	1				
443345	EPA:351.2	1				
443345	EPA:353.2	1				
443345	EPA:365.4	1				
443345	EPA:900	1				
443345	EPA:901.1	1				
443345	EPA:905.0	1				
443345	HASL-300:AM-241	1				
443345	HASL-300:ISOPU	1				
443345	HASL-300:ISOU	1				
443345	SM:A2340B	1				
443345	SW-846:6010C	1				
443345	SW-846:6020	1				
443345	SW-846:6850	1				
443345	SW-846:8260B	1		1		
443345	SW-846:8270D	1				
443345	SW-846:8330B	1				
443345	SW-846:9060	1				

DATA VALIDATION REPORT

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
443345	EPA:120.1	1738543	1738543	1										1				1			
443345	EPA:150.1	1737969	1737969	1										1				1			
443345	EPA:160.1	1738394	1738394	1					1					1				1			
443345	EPA:170.0	NA	NA	2		1															
443345	EPA:245.2	1738152	1738151	2					1	1				1				1			
443345	EPA:300.0	1738628	1738628	1					1					1				1			
443345	EPA:310.1	1737964	1737964	1						1				1				1			
443345	EPA:335.4	1737905	1737904	1					1	2				1				2			
443345	EPA:350.1	1737833	1737831	1					1	1				1				1			
443345	EPA:351.2	1738103	1738102	1					1	1				1				1			
443345	EPA:353.2	1737615	1737615	1					1					1				1			
443345	EPA:365.4	1737836	1737834	1					1	1				1				1			
443345	EPA:900	1738567	1738567	1					1	1	1			1				1			
443345	EPA:901.1	1738193	1738193	1					1					1				1			
443345	EPA:905.0	1738564	1738564	1					1	1				1				1			
443345	HASL-300:AM-241	1737914	1737914	1					1					1				1			
443345	HASL-300:ISOPU	1737915	1737915	1					1					1				1			
443345	HASL-300:ISOU	1737916	1737916	1					1					1				1			
443345	SM:A2340B	1744377	1744377	1																	
443345	SW-846:6010C	1737862	1737861	1					1	1				1				1			
443345	SW-846:6020	1737866	1737865	1					1	1				1				1			
443345	SW-846:6850	1738590	1738588	1					1	1	1			1							
443345	SW-846:8260B	1740377	1740377	1		1			1					2							
443345	SW-846:8270D	1738268	1738267	1					1	1	1			1							
443345	SW-846:8330B	1738503	1738498	1					1	1	1			1							
443345	SW-846:9060	1738436	1738436	1					1					1				1			

2. Distribution Of Analytes In EDD.

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-18-33	443345002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CrPZ-2-18-151284	1203969858	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203970773	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-18-33	443345002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-18-80	1203968361	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203968359	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-18-33	1203969495	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-18-33	443345002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203969494	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203969493	MB	1	0	0	0
EPA:170.0	VOC	CAWA-18-108	443345001	FTB	1	0	0	0
EPA:170.0	VOC	CAWA-18-33	443345002	REG	1	0	0	0
EPA:170.0	VOC	CAWA-18-34	443345004	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-33	443345002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-34	443345003	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-80	1203968778	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAWA-18-80	1203968779	MS	0	0	1	0
EPA:245.2	INORGANIC	LCS	1203968777	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203968776	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-18-33	443345002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-18-80	1203970120	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203970119	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203970118	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-33	443345002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-80	1203968352	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-18-80	1203968356	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203968350	LCS	0	0	1	0
EPA:335.4	INORGANIC	CAWA-18-34	1203968145	DUP	1	0	0	0
EPA:335.4	INORGANIC	CAWA-18-34	1203968146	MS	0	0	1	0
EPA:335.4	INORGANIC	CAWA-18-34	443345003	REG	1	0	0	0
EPA:335.4	INORGANIC	LCS	1203968144	LCS	0	0	1	0
EPA:335.4	INORGANIC	MB	1203968143	MB	1	0	0	0
EPA:335.4	INORGANIC	NP160-18-150759	1203968934	DUP	1	0	0	0
EPA:335.4	INORGANIC	NP160-18-150759	1203968935	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-18-33	443345002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CrPZ-2-18-151289	1203967965	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CrPZ-2-18-151289	1203967966	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203967964	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203967963	MB	1	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-34	1203968652	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-34	1203968653	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-18-34	443345003	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203968651	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203968650	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-18-33	443345002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-18-80	1203968156	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203967397	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203967396	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-18-33	443345002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CrPZ-2-18-151289	1203968186	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CrPZ-2-18-151289	1203968187	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203967972	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203967971	MB	1	0	0	0
EPA:900	RAD	CAWA-18-34	443345003	REG	2	0	0	0
EPA:900	RAD	CAWA-18-4	1203969943	DUP	2	0	0	0
EPA:900	RAD	CAWA-18-4	1203969944	MS	0	0	2	0
EPA:900	RAD	CAWA-18-4	1203969945	MSD	0	0	2	0
EPA:900	RAD	LCS	1203969946	LCS	0	0	2	0
EPA:900	RAD	MB	1203969942	MB	2	0	0	0
EPA:901.1	RAD	CAWA-18-34	1203968985	DUP	5	0	0	0
EPA:901.1	RAD	CAWA-18-34	443345003	REG	5	0	0	0
EPA:901.1	RAD	LCS	1203968986	LCS	0	0	3	0
EPA:901.1	RAD	MB	1203968984	MB	5	0	0	0
EPA:905.0	RAD	CAWA-18-34	1203969933	DUP	1	0	0	0
EPA:905.0	RAD	CAWA-18-34	1203969934	MS	0	0	1	0
EPA:905.0	RAD	CAWA-18-34	443345003	REG	1	0	0	0
EPA:905.0	RAD	LCS	1203969935	LCS	0	0	1	0
EPA:905.0	RAD	MB	1203969932	MB	1	0	0	0
HASL-300:AM-241	RAD	CAWA-18-34	443345003	REG	1	0	0	0
HASL-300:AM-241	RAD	CAWA-18-81	1203968159	DUP	1	0	0	0
HASL-300:AM-241	RAD	LCS	1203968160	LCS	0	0	1	0
HASL-300:AM-241	RAD	MB	1203968158	MB	1	0	0	0
HASL-300:ISOPU	RAD	CAWA-18-34	443345003	REG	2	0	0	0
HASL-300:ISOPU	RAD	CAWA-18-81	1203968162	DUP	2	0	0	0
HASL-300:ISOPU	RAD	LCS	1203968163	LCS	0	0	1	0
HASL-300:ISOPU	RAD	MB	1203968161	MB	2	0	0	0
HASL-300:ISOU	RAD	CAWA-18-34	443345003	REG	3	0	0	0
HASL-300:ISOU	RAD	CAWA-18-81	1203968165	DUP	3	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
HASL-300:ISOU	RAD	LCS	1203968166	LCS	0	0	1	0
HASL-300:ISOU	RAD	MB	1203968164	MB	3	0	0	0
SM:A2340B	INORGANIC	CAWA-18-33	443345002	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAWA-18-33	1203968034	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAWA-18-33	1203968035	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAWA-18-33	443345002	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203968033	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203968032	MB	17	0	0	0
SW-846:6020	INORGANIC	CAWA-18-33	1203968050	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAWA-18-33	1203968051	MS	0	0	11	0
SW-846:6020	INORGANIC	CAWA-18-33	443345002	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203968049	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203968048	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-18-33	443345002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CrPZ-1-18-151275	1203970020	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CrPZ-1-18-151275	1203970021	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203970019	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203970018	MB	1	0	0	0
SW-846:8260B	VOC	CAWA-18-108	443345001	FTB	80	3	0	0
SW-846:8260B	VOC	CAWA-18-34	443345003	REG	80	3	0	0
SW-846:8260B	VOC	LCS	1203974812	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203974815	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203974811	MB	80	3	0	0
SW-846:8270D	SVOC	CAWA-18-34	443345003	REG	80	6	0	0
SW-846:8270D	SVOC	CAWA-18-81	1203969167	MS	0	6	76	0
SW-846:8270D	SVOC	CAWA-18-81	1203969168	MSD	0	6	76	0
SW-846:8270D	SVOC	LCS	1203969166	LCS	0	6	76	0
SW-846:8270D	SVOC	MB	1203969165	MB	80	6	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-18-34	443345004	REG	23	1	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-18-72	1203969748	MS	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	CAWA-18-72	1203969749	MSD	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	LCS	1203969747	LCS	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	MB	1203969746	MB	23	1	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-18-34	1203969630	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-18-34	443345003	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203969628	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203969627	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
CAWA-18-108	443345001	TRIP BLANK	EPA:170.0	W	Temperature	3		Deg C	
CAWA-18-108	443345001	TRIP BLANK	SW-846:8260B	W	Methylene Chloride	1.04	J	ug/L	10.0

Field Sample ID	Blank Lab	Blank Type	Analytical Method	Parameter Name	Blank Lab Result	Blank Lab Units	Lab Result	Lab Qualifier	Lab Detection Limit	Detect Flag	Detect to Nondetect Factor	Detect to Estimated Factor	Use Factors
CAWA-18-34	443345001	TRIP BLANK	SW-846:8260B	Methylene Chloride	1.04	ug/L	1.07	J	10.0	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

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

No.

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Paramter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
CDV-9-1(i) S1	2018-1615	CAWA-18-34	REG	INIT	RAD	HASL-300:AM-241	Americium-241	U	U	R5	N	0.00316	pCi/L	0.00316	pCi/L	0.0267	0.00387	W	02/06/2018		1737914	VAL	Y
CDV-9-1(i) S1	2018-1615	CAWA-18-34	REG	INIT	RAD	EPA:901.1	Cesium-137	U	U	R5	N	1.6	pCi/L	1.6	pCi/L	6.42	1.82	W	02/06/2018		1738193	VAL	Y
CDV-9-1(i) S1	2018-1615	CAWA-18-34	REG	INIT	RAD	EPA:901.1	Cobalt-60	U	U	R5	N	-0.706	pCi/L	-0.706	pCi/L	7.33	1.94	W	02/06/2018		1738193	VAL	Y
CDV-9-1(i) S1	2018-1615	CAWA-18-34	REG	INIT	RAD	EPA:900	Gross beta	U	U	R5	N	-0.021	pCi/L	-0.021	pCi/L	1.85	0.482	W	02/06/2018		1738567	VAL	Y
CDV-9-1(i) S1	2018-1615	CAWA-18-34	REG	INIT	VOC	SW-846:8260B	Methylene Chloride	J	U	V4d	N	1.07	ug/L	1.07	ug/L			W	02/06/2018		1740377	VAL	Y
CDV-9-1(i) S1	2018-1615	CAWA-18-34	REG	INIT	RAD	EPA:901.1	Neptunium-237	U	U	R5	N	1.2	pCi/L	1.2	pCi/L	15.0	4.26	W	02/06/2018		1738193	VAL	Y
CDV-9-1(i) S1	2018-1615	CAWA-18-34	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-238	U	U	R5	N	0.0162	pCi/L	0.0162	pCi/L	0.0351	0.007	W	02/06/2018		1737915	VAL	Y
CDV-9-1(i) S1	2018-1615	CAWA-18-34	REG	INIT	RAD	HASL-300:ISOPU	Plutonium-239/240	U	U	R5	N	0.0101	pCi/L	0.0101	pCi/L	0.0283	0.00534	W	02/06/2018		1737915	VAL	Y
CDV-9-1(i) S1	2018-1615	CAWA-18-34	REG	INIT	RAD	EPA:901.1	Potassium-40	U	U	R5	N	-1.86	pCi/L	-1.86	pCi/L	82.3	21.4	W	02/06/2018		1738193	VAL	Y
CDV-9-1(i) S1	2018-1615	CAWA-18-34	REG	INIT	RAD	EPA:901.1	Sodium-22	U	U	R5	N	-2.26	pCi/L	-2.26	pCi/L	5.95	1.70	W	02/06/2018		1738193	VAL	Y
CDV-9-1(i) S1	2018-1615	CAWA-18-34	REG	INIT	RAD	EPA:905.0	Strontium-90	U	U	R5	N	-0.326	pCi/L	-0.326	pCi/L	0.493	0.118	W	02/06/2018		1738564	VAL	Y

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

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Paramter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
CDV-9-1(i) S1	2018-1615	CAWA-18-34	REG	INIT	RAD	HASL-300:ISOU	Uranium-235/236	U	U	R5	N	0.0339	pCi/L	0.0339	pCi/L	0.0645	0.0141	W	02/06/2018		1737916	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 qualifiy the analyte as not detected and/or any other standard qualifire. The analyte is detected in the sample.
R5	Analyte is not detected because the amount reported is less than the MDC.
U_LAB	The analytical laboratory qualified the analyte as not detected.
V4d	The samples result is </=5x the concentration of the related analyte in the trip, rinsate and/or equipment blank.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-18-108	CDV-9-1(i) S1	FTB	EPA:170.0	0	1
CAWA-18-108	CDV-9-1(i) S1	FTB	SW-846:8260B	0	80
CAWA-18-33	CDV-9-1(i) S1	REG	EPA:120.1	0	1
CAWA-18-33	CDV-9-1(i) S1	REG	EPA:150.1	0	1
CAWA-18-33	CDV-9-1(i) S1	REG	EPA:160.1	0	1
CAWA-18-33	CDV-9-1(i) S1	REG	EPA:170.0	0	1
CAWA-18-33	CDV-9-1(i) S1	REG	EPA:245.2	0	1
CAWA-18-33	CDV-9-1(i) S1	REG	EPA:300.0	0	4
CAWA-18-33	CDV-9-1(i) S1	REG	EPA:310.1	0	2
CAWA-18-33	CDV-9-1(i) S1	REG	EPA:350.1	0	1
CAWA-18-33	CDV-9-1(i) S1	REG	EPA:353.2	0	1
CAWA-18-33	CDV-9-1(i) S1	REG	EPA:365.4	0	1
CAWA-18-33	CDV-9-1(i) S1	REG	SM:A2340B	0	1
CAWA-18-33	CDV-9-1(i) S1	REG	SW-846:6010C	0	17
CAWA-18-33	CDV-9-1(i) S1	REG	SW-846:6020	0	11
CAWA-18-33	CDV-9-1(i) S1	REG	SW-846:6850	0	1
CAWA-18-34	CDV-9-1(i) S1	REG	EPA:170.0	0	1
CAWA-18-34	CDV-9-1(i) S1	REG	EPA:245.2	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-18-34	CDV-9-1(i) S1	REG	EPA:335.4	0	1
CAWA-18-34	CDV-9-1(i) S1	REG	EPA:351.2	0	1
CAWA-18-34	CDV-9-1(i) S1	REG	EPA:900	0	2
CAWA-18-34	CDV-9-1(i) S1	REG	EPA:901.1	0	5
CAWA-18-34	CDV-9-1(i) S1	REG	EPA:905.0	0	1
CAWA-18-34	CDV-9-1(i) S1	REG	HASL-300:AM-241	0	1
CAWA-18-34	CDV-9-1(i) S1	REG	HASL-300:ISOPU	0	2
CAWA-18-34	CDV-9-1(i) S1	REG	HASL-300:ISOU	0	3
CAWA-18-34	CDV-9-1(i) S1	REG	SW-846:8260B	0	80
CAWA-18-34	CDV-9-1(i) S1	REG	SW-846:8270D	0	80
CAWA-18-34	CDV-9-1(i) S1	REG	SW-846:8330B	0	23
CAWA-18-34	CDV-9-1(i) S1	REG	SW-846:9060	0	1

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
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F 843.766.1178

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March 05, 2018

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

Re: LANL- WQH Water Samples
Work Order: 443345
SDG: 2018-1615

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on February 08, 2018, and analyzed for Explosives by LCMSMS, GC/MS Semivolatile, GC/MS Volatile, General Chemistry, Metals, Perchlorates by LCMSMS and Radiochemistry. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4485.

Sincerely,

B Luthman

Brielle Luthman for
Valerie Davis
Project Manager

Chain of Custody: 2018-1615
Enclosures

ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 443345
SDG: 2018-1615

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Case Narrative

Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 443345
SDG # : 2018-1615

March 05, 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 08, 2018 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperatures were checked, documented, and within specifications. Shipping container temperature was within specification (0 - 6C). There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
443345001	CAWA-18-108
443345002	CAWA-18-33
443345003	CAWA-18-34
443345004	CAWA-18-34

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 05 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 Radchem	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

General Engineering

Charleston SC

443345

Chain of Custody/Analysis Request

COC/Lab Request #: 2018-1615

Page 1 of 1

Client Contact:

Lab Agreement #:

Site Name: Los Alamos National Laboratory

Project Number: ADEP

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

Rad Screening Info: Location No

Lab Reporting Limit Type: MDL

Field Sample ID	Sample Date	Sample Time	Sample Matrix	MSGP-Hg	WSP-8260B-VOA	WSP-8270C-SVOA	WSP-8330B-NMED HEXMOD	WSP-All Metals	WSP-CN(T)	WSP-GENINORG+PerChlorate	WSP-GrossA/B	WSP-NH3+NO3/NO2+PO4	WSP-RAD	WSP-TKN+TOC
CAWA-18-108	02/06/2018	12:20	W		~~2~~ 1									
CAWA-18-33	02/06/2018	12:20	W					1		1		1		
CAWA-18-34	02/06/2018	12:20	W	1	2	2	3		1		1		1	1

Special Instructions:

Relinquished by:	Print Name: Melissa Martin	Date/Time: 2/7/18 300	Received by: P. Nient	Print Name: Patricia Dent	Date/Time: 2/8/18 0845
Relinquished by:	Print Name:	Date/Time:	Received by:	Print Name:	Date/Time:
Relinquished by:	Print Name:	Date/Time:	Received by:	Print Name:	Date/Time:

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: LANL	SDG/AR/COC/Work Order: 443345
Received By: P. Plant	Date Received: 2-8-18
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 5908 1783 4720 5908 1783 4731 5908 1783 4716

Suspected Hazard Information	Yes	No	
			*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
COC/Samples marked or classified as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 8 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
Is package, COC, and/or Samples marked HAZ?		✓	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: 3.4
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR2-17 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	✓			Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?	✓			If Yes, Are Encores or Soil Kits present? Yes___ No ✓ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ✓ No___ N/A___ (If unknown, select No) VOA vials free of headspace? Yes ✓ No___ N/A___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials TMC Date 2/9/18 Page 1 of 1

GL-CHL-SR-001 Rev 5

IGIN ID:SAFA (505) 665-9966
ITH GREENE
S ALAMOS NATL LAB.
00 BLDG 1237 DPU 03

S ALAMOS, NM 87545
ITED STATES US

SHIP DATE: 07FEB18
ACTWGT: 48.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407
)43) 556-8171
EF: 21PD0ASRGW04BAGWE0

4°c

538C1/122D/3298

FedEx Express

J151315081301av

1 of 3
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0201
MASTER
X7 RBWA

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PRIORITY OVERNIGHT

29407
SC-US CHS

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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 07FEB18
ACTWGT: 49.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407
(843) 556-8171
REF: 21PD0ASRGW04BAGWE0

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3 of 3
MPS# 0263 5908 1783 4731
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PRIORITY OVERNIGHT

29407
SC-US CHS

Part # 156148V-434 RMT2 EXP 02/18 ***

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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 07FEB18
ACTWGT: 38.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407
(843) 556-8171
REF: 21PD0ASRGW04BAGWE0

3

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Mstr# 5908 1783 4710 0201
X7 RBWA

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PRIORITY OVERNIGHT

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SC-US CHS

P 02/18 ***

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 #: 2018-1615
Work Order #: 443345

Method/Analysis Information

Procedure:	**Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer**
Analytical Method:	SW-846:8260B
Analytical Batch Number:	1740377

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
443345001	CAWA-18-108
443345003	CAWA-18-34
1203974811	Method Blank (MB)
1203974812	Laboratory Control Sample (LCS)
1203974813	443360003(CAWA-18-81) Post Spike (PS)
1203974814	443360003(CAWA-18-81) Post Spike Duplicate (PSD)
1203974815	Laboratory Control Sample (LCS)
1203974816	443360003(CAWA-18-81) Post Spike (PS)
1203974817	443360003(CAWA-18-81) Post Spike Duplicate (PSD)

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

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

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

Calibration Information

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

Initial Calibration

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

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

Quality Control (QC) Information

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

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

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

QC Sample Designation
Sample 443360003 (CAWA-18-81) 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) were not required for this SDG.

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
VOA4.I	Hewlett Packard 6890/5973 GC/MS w/ OI 4560/Archon Autosampler	HP6890/HP5973	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

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

Client SDG: 2018-1615 GEL Work Order: 443345

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: Erin Haubert **Name: Erin Haubert**

Date: 06 MAR 2018 **Title: Data Validator**

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 12:20**	**Matrix:**	**W**
Lab Sample ID:	**443345001**	**Date Received:**	**02/08/2018 08:45**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAWA-18-108**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 14:59**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 14:59**				
Data File:	**021918V4\4W112.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	J	1.63	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:	**2018-1615**	**Date Collected:**	**02/06/2018 12:20**	**Matrix:**	**W**
Lab Sample ID:	**443345001**	**Date Received:**	**02/08/2018 08:45**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAWA-18-108**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 14:59**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 14:59**				
Data File:	**021918V4\4W112.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	J	1.04	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 12:20**	**Matrix:**	**W**
Lab Sample ID:	**443345001**	**Date Received:**	**02/08/2018 08:45**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAWA-18-108**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 14:59**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 14:59**				
Data File:	**021918V4\4W112.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	50.5	50.0	ug/L	101	(71%-134%)
Bromofluorobenzene	46.5	50.0	ug/L	93	(70%-131%)
Toluene-d8	44.7	50.0	ug/L	89	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	4.27	11.2	ug/L	0	J
	unknown siloxane	12.107	17.8	ug/L	0	J
	unknown siloxane	14.491	23.8	ug/L	0	J
	unknown	16.448	6.35	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 12:20**	**Matrix:**	**W**
Lab Sample ID:	**443345003**	**Date Received:**	**02/08/2018 08:45**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAWA-18-34**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 15:28**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 15:28**				
Data File:	**021918V4\4W113.D**	**Column:**	**DB-624**		

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 12:20**	**Matrix:**	**W**
Lab Sample ID:	**443345003**	**Date Received:**	**02/08/2018 08:45**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAWA-18-34**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 15:28**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 15:28**				
Data File:	**021918V4\4W113.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	J	1.07	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		1.23	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	J	0.480	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 12:20**	**Matrix:**	**W**
Lab Sample ID:	**443345003**	**Date Received:**	**02/08/2018 08:45**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAWA-18-34**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 15:28**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 15:28**				
Data File:	**021918V4\4W113.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether	J	0.730	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	49.9	50.0	ug/L	100	(71%-134%)
Bromofluorobenzene	45.1	50.0	ug/L	90	(70%-131%)
Toluene-d8	43.9	50.0	ug/L	88	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	4.191	8.24	ug/L	0	J
	unknown siloxane	12.107	15.6	ug/L	0	J
	unknown siloxane	14.491	24.5	ug/L	0	J
	unknown	16.448	6.39	ug/L	0	J

Quality Control Summary

Volatile

Surrogate Recovery Report

SDG Number: 2018-1615

Matrix Type: LIQUID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203974812	LCS for batch 1740377	94	88	87
1203974815	LCS for batch 1740377	95	90	93
1203974811	MB for batch 1740377	94	89	89
443345001	CAWA-18-108	101	89	93
443345003	CAWA-18-34	100	88	90
1203974813	CAWA-18-81PS	100	91	91
1203974814	CAWA-18-81PSD	96	88	90
1203974816	CAWA-18-81PS	96	88	91
1203974817	CAWA-18-81PSD	97	88	93

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

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Laboratory Control Sample**
Client ID: **LCS for batch 1740377**
Matrix: **WATER**
Lab Sample ID **1203974812**
Instrument: **VOA4.I**
Analysis Date: **02/19/2018 10:35**
Dilution: **1**
Analyst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

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	85.5	85	71-127
75-05-8	LCS	Acetonitrile	1250	0.0	996	80	61-125
67-64-1	LCS	Acetone	250	0.0	239	95	48-157
74-88-4	LCS	Iodomethane	250	0.0	212	85	72-128
75-15-0	LCS	Carbon disulfide	250	0.0	222	89	69-138
108-05-4	LCS	Vinyl acetate	250	0.0	277	111	67-125
78-93-3	LCS	2-Butanone	250	0.0	239	95	55-138
108-10-1	LCS	4-Methyl-2-pentanone	250	0.0	195	78	66-124
591-78-6	LCS	2-Hexanone	250	0.0	237	95	56-140
75-71-8	LCS	Dichlorodifluoromethane	50.0	0.0	58.5	117	40-160
74-87-3	LCS	Chloromethane	50.0	0.0	56.1	112	58-135
75-01-4	LCS	Vinyl chloride	50.0	0.0	60.9	122	65-137
74-83-9	LCS	Bromomethane	50.0	0.0	61.2	122	63-137
75-00-3	LCS	Chloroethane	50.0	0.0	58.9	118	69-129
75-69-4	LCS	Trichlorofluoromethane	50.0	0.0	60.3	121	69-138
60-29-7	LCS	Ethyl ether	50.0	0.0	52.5	105	72-125
75-35-4	LCS	1,1-Dichloroethylene	50.0	0.0	45.3	91	66-126
75-09-2	LCS	Methylene chloride	50.0	0.0	41.7	83	68-119
1634-04-4	LCS	tert-Butyl methyl ether	50.0	0.0	42.3	85	76-128
156-60-5	LCS	trans-1,2-Dichloroethylene	50.0	0.0	46.4	93	71-124
75-34-3	LCS	1,1-Dichloroethane	50.0	0.0	44.8	90	73-123
156-59-2	LCS	cis-1,2-Dichloroethylene	50.0	0.0	44.7	89	75-123

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Laboratory Control Sample**
Client ID: **LCS for batch 1740377**
Matrix: **WATER**
Lab Sample ID **1203974812**
Instrument: **VOA4.I**
Analysis Date: **02/19/2018 10:35**
Dilution: **1**
Analyst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

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	49.7	99	72-138
74-97-5	LCS	Bromochloromethane	50.0	0.0	43.7	87	76-125
67-66-3	LCS	Chloroform	50.0	0.0	44.4	89	76-123
71-55-6	LCS	1,1,1-Trichloroethane	50.0	0.0	47.0	94	74-136
563-58-6	LCS	1,1-Dichloropropene	50.0	0.0	45.3	91	72-129
56-23-5	LCS	Carbon tetrachloride	50.0	0.0	49.6	99	72-140
107-06-2	LCS	1,2-Dichloroethane	50.0	0.0	44.4	89	74-122
71-43-2	LCS	Benzene	50.0	0.0	43.4	87	72-121
79-01-6	LCS	Trichloroethylene	50.0	0.0	45.2	90	74-125
78-87-5	LCS	1,2-Dichloropropane	50.0	0.0	43.7	87	73-121
74-95-3	LCS	Dibromomethane	50.0	0.0	42.6	85	78-123
75-27-4	LCS	Bromodichloromethane	50.0	0.0	46.2	92	77-131
10061-01-5	LCS	cis-1,3-Dichloropropylene	50.0	0.0	44.7	89	78-131
108-88-3	LCS	Toluene	50.0	0.0	41.6	83	71-121
10061-02-6	LCS	trans-1,3-Dichloropropylene	50.0	0.0	43.1	86	78-131
79-00-5	LCS	1,1,2-Trichloroethane	50.0	0.0	39.8	80	74-118
142-28-9	LCS	1,3-Dichloropropane	50.0	0.0	39.3	79	74-118
127-18-4	LCS	Tetrachloroethylene	50.0	0.0	43.0	86	69-129
124-48-1	LCS	Dibromochloromethane	50.0	0.0	44.2	88	76-137
106-93-4	LCS	1,2-Dibromoethane	50.0	0.0	41.6	83	78-122
108-90-7	LCS	Chlorobenzene	50.0	0.0	40.7	81	74-120
100-41-4	LCS	Ethylbenzene	50.0	0.0	43.1	86	73-125

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Laboratory Control Sample**
Client ID: **LCS for batch 1740377**
Matrix: **WATER**
Lab Sample ID **1203974812**
Instrument: **VOA4.I**
Analysis Date: **02/19/2018 10:35**
Dilution: **1**
Analyst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

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	42.5	85	74-126
100-42-5	LCS	Styrene	50.0	0.0	43.6	87	72-130
75-25-2	LCS	Bromoform	50.0	0.0	37.2	74	72-136
98-82-8	LCS	Isopropylbenzene	50.0	0.0	43.4	87	70-130
79-34-5	LCS	1,1,2,2-Tetrachloroethane	50.0	0.0	38.8	78	70-126
96-18-4	LCS	1,2,3-Trichloropropane	50.0	0.0	38.7	77	74-122
108-86-1	LCS	Bromobenzene	50.0	0.0	39.8	80	74-120
103-65-1	LCS	n-Propylbenzene	50.0	0.0	42.8	86	67-128
108-67-8	LCS	1,3,5-Trimethylbenzene	50.0	0.0	43.4	87	70-129
95-49-8	LCS	2-Chlorotoluene	50.0	0.0	41.4	83	71-124
106-43-4	LCS	4-Chlorotoluene	50.0	0.0	41.0	82	69-125
98-06-6	LCS	tert-Butylbenzene	50.0	0.0	43.9	88	72-130
95-63-6	LCS	1,2,4-Trimethylbenzene	50.0	0.0	43.0	86	70-126
135-98-8	LCS	sec-Butylbenzene	50.0	0.0	45.0	90	70-131
99-87-6	LCS	4-Isopropyltoluene	50.0	0.0	45.1	90	71-131
541-73-1	LCS	1,3-Dichlorobenzene	50.0	0.0	39.6	79	72-121
106-46-7	LCS	1,4-Dichlorobenzene	50.0	0.0	40.0	80	71-120
104-51-8	LCS	n-Butylbenzene	50.0	0.0	44.4	89	68-134
96-12-8	LCS	1,2-Dibromo-3-chloropropane	50.0	0.0	35.2	70	68-141
87-68-3	LCS	Hexachlorobutadiene	50.0	0.0	44.5	89	72-136
91-20-3	LCS	Naphthalene	50.0	0.0	41.6	83	72-132
87-61-6	LCS	1,2,3-Trichlorobenzene	50.0	0.0	40.7	81	70-130

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Laboratory Control Sample**
Client ID: **LCS for batch 1740377**
Matrix: **WATER**
Lab Sample ID **1203974812**
Instrument: **VOA4.I**
Analvsis Date: **02/19/2018 10:35**
Dilution: **1**
Analvst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

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	42.0	84	71-129
630-20-6	LCS	1,1,1,2-Tetrachloroethane	50.0	0.0	44.1	88	79-127
95-50-1	LCS	1,2-Dichlorobenzene	50.0	0.0	40.1	80	74-120
71-36-3	LCS	n-Butyl alcohol	5000	0.0	4540	91	63-138

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Post Spike**
Client ID: **CAWA-18-81PS**
Matrix: **W**
Lab Sample ID **1203974813**
Instrument: **VOA4.I**
Analysis Date: **02/19/2018 18:53**
Dilution: **1**
Analyst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

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	99.9	100	59-132
75-05-8	PS	Acetonitrile	1250	0.00	U	1270	102	56-131
67-64-1	PS	Acetone	250	0.00	U	124	49	25-155
74-88-4	PS	Iodomethane	250	0.00	U	272	109	66-133
75-15-0	PS	Carbon disulfide	250	0.00	U	287	115	61-141
108-05-4	PS	Vinyl acetate	250	0.00	U	279	111	48-133
78-93-3	PS	2-Butanone	250	0.00	U	171	68	25-143
108-10-1	PS	4-Methyl-2-pentanone	250	0.00	U	230	92	61-127
591-78-6	PS	2-Hexanone	250	0.00	U	186	75	33-138
75-09-2	PS	Methylene chloride	50.0	1.24	J	53.2	104	62-123
127-18-4	PS	Tetrachloroethylene	50.0	0.350	J	50.3	100	60-130
75-71-8	PS	Dichlorodifluoromethane	50.0	0.00	U	54.1	108	33-164
74-87-3	PS	Chloromethane	50.0	0.00	U	57.4	115	53-139
75-01-4	PS	Vinyl chloride	50.0	0.00	U	57.1	114	58-140
74-83-9	PS	Bromomethane	50.0	0.00	U	61.0	122	59-146
75-00-3	PS	Chloroethane	50.0	0.00	U	57.6	115	65-129
75-69-4	PS	Trichlorofluoromethane	50.0	0.00	U	59.3	119	65-141
60-29-7	PS	Ethyl ether	50.0	0.00	U	52.0	104	69-127
75-35-4	PS	1,1-Dichloroethylene	50.0	0.00	U	57.1	114	59-130
1634-04-4	PS	tert-Butyl methyl ether	50.0	0.00	U	52.7	105	69-132
156-60-5	PS	trans-1,2-Dichloroethylene	50.0	0.00	U	58.3	117	65-127
75-34-3	PS	1,1-Dichloroethane	50.0	0.00	U	56.5	113	67-127

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Post Spike**
Client ID: **CAWA-18-81PS**
Matrix: **W**
Lab Sample ID **1203974813**
Instrument: **VOA4.I**
Analysis Date: **02/19/2018 18:53**
Dilution: **1**
Analyst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits
156-59-2	PS	cis-1,2-Dichloroethylene	50.0	0.00	U	56.4	113	69-127
594-20-7	PS	2,2-Dichloropropane	50.0	0.00	U	59.9	120	66-137
74-97-5	PS	Bromochloromethane	50.0	0.00	U	56.1	112	71-130
67-66-3	PS	Chloroform	50.0	0.00	U	56.6	113	71-129
71-55-6	PS	1,1,1-Trichloroethane	50.0	0.00	U	57.1	114	69-139
563-58-6	PS	1,1-Dichloropropene	50.0	0.00	U	54.6	109	67-130
56-23-5	PS	Carbon tetrachloride	50.0	0.00	U	60.5	121	66-143
107-06-2	PS	1,2-Dichloroethane	50.0	0.00	U	58.1	116	69-130
71-43-2	PS	Benzene	50.0	0.00	U	54.3	109	66-125
79-01-6	PS	Trichloroethylene	50.0	0.00	U	54.8	110	65-131
78-87-5	PS	1,2-Dichloropropane	50.0	0.00	U	54.0	108	67-127
74-95-3	PS	Dibromomethane	50.0	0.00	U	55.2	110	72-129
75-27-4	PS	Bromodichloromethane	50.0	0.00	U	58.9	118	70-138
10061-01-5	PS	cis-1,3-Dichloropropylene	50.0	0.00	U	54.2	108	70-134
108-88-3	PS	Toluene	50.0	0.00	U	49.9	100	60-126
10061-02-6	PS	trans-1,3-Dichloropropylene	50.0	0.00	U	54.0	108	69-135
79-00-5	PS	1,1,2-Trichloroethane	50.0	0.00	U	51.2	102	66-125
142-28-9	PS	1,3-Dichloropropane	50.0	0.00	U	50.0	100	67-124
124-48-1	PS	Dibromochloromethane	50.0	0.00	U	55.3	111	68-143
106-93-4	PS	1,2-Dibromoethane	50.0	0.00	U	51.3	103	71-127
108-90-7	PS	Chlorobenzene	50.0	0.00	U	49.1	98	64-124
100-41-4	PS	Ethylbenzene	50.0	0.00	U	50.0	100	61-130

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Post Spike**
Client ID: **CAWA-18-81PS**
Matrix: **W**
Lab Sample ID **1203974813**
Instrument: **VOA4.I**
Analysis Date: **02/19/2018 18:53**
Dilution: **1**
Analyst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

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	50.5	101	62-131
100-42-5	PS	Styrene	50.0	0.00	U	52.0	104	59-135
75-25-2	PS	Bromoform	50.0	0.00	U	45.8	92	64-138
98-82-8	PS	Isopropylbenzene	50.0	0.00	U	47.8	96	55-133
79-34-5	PS	1,1,2,2-Tetrachloroethane	50.0	0.00	U	47.6	95	62-129
96-18-4	PS	1,2,3-Trichloropropane	50.0	0.00	U	49.1	98	70-124
108-86-1	PS	Bromobenzene	50.0	0.00	U	46.8	94	62-124
103-65-1	PS	n-Propylbenzene	50.0	0.00	U	46.4	93	50-133
108-67-8	PS	1,3,5-Trimethylbenzene	50.0	0.00	U	47.9	96	53-135
95-49-8	PS	2-Chlorotoluene	50.0	0.00	U	46.5	93	56-128
106-43-4	PS	4-Chlorotoluene	50.0	0.00	U	45.9	92	53-130
98-06-6	PS	tert-Butylbenzene	50.0	0.00	U	47.9	96	55-135
95-63-6	PS	1,2,4-Trimethylbenzene	50.0	0.00	U	47.6	95	53-132
135-98-8	PS	sec-Butylbenzene	50.0	0.00	U	48.3	97	50-138
99-87-6	PS	4-Isopropyltoluene	50.0	0.00	U	47.5	95	49-138
541-73-1	PS	1,3-Dichlorobenzene	50.0	0.00	U	45.3	91	56-126
106-46-7	PS	1,4-Dichlorobenzene	50.0	0.00	U	44.9	90	55-125
104-51-8	PS	n-Butylbenzene	50.0	0.00	U	45.3	91	43-142
96-12-8	PS	1,2-Dibromo-3-chloropropane	50.0	0.00	U	41.8	84	62-141
87-68-3	PS	Hexachlorobutadiene	50.0	0.00	U	44.4	89	40-147
91-20-3	PS	Naphthalene	50.0	0.00	U	49.1	98	62-134
87-61-6	PS	1,2,3-Trichlorobenzene	50.0	0.00	U	46.7	93	52-135

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Post Spike**
Client ID: **CAWA-18-81PS**
Matrix: **W**
Lab Sample ID **1203974813**
Instrument: **VOA4.I**
Analysis Date: **02/19/2018 18:53**
Dilution: **1**
Analyst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

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	45.5	91	50-133
630-20-6	PS	1,1,1,2-Tetrachloroethane	50.0	0.00	U	55.5	111	71-133
95-50-1	PS	1,2-Dichlorobenzene	50.0	0.00	U	46.2	92	60-125
71-36-3	PS	n-Butyl alcohol	5000	0.00	U	5740	115	60-140

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Post Spike Duplicate**
Client ID: **CAWA-18-81PSD**
Matrix: **W**
Lab Sample ID **1203974814**
Instrument: **VOA4.I**
Analysis Date: **02/19/2018 19:23**
Dilution: **1**
Analyst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

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	98.7	99	59-132	1	0-20
75-05-8	PSD	Acetonitrile	1250	0.00	U	1250	100	56-131	2	0-20
67-64-1	PSD	Acetone	250	0.00	U	122	49	25-155	1	0-20
74-88-4	PSD	Iodomethane	250	0.00	U	264	105	66-133	3	0-20
75-15-0	PSD	Carbon disulfide	250	0.00	U	273	109	61-141	5	0-20
108-05-4	PSD	Vinyl acetate	250	0.00	U	273	109	48-133	2	0-20
78-93-3	PSD	2-Butanone	250	0.00	U	171	68	25-143	0	0-20
108-10-1	PSD	4-Methyl-2-pentanone	250	0.00	U	231	92	61-127	0	0-20
591-78-6	PSD	2-Hexanone	250	0.00	U	186	74	33-138	0	0-20
75-09-2	PSD	Methylene chloride	50.0	1.24	J	51.6	101	62-123	3	0-20
127-18-4	PSD	Tetrachloroethylene	50.0	0.350	J	48.8	97	60-130	3	0-20
75-71-8	PSD	Dichlorodifluoromethane	50.0	0.00	U	48.8	98	33-164	10	0-20
74-87-3	PSD	Chloromethane	50.0	0.00	U	54.9	110	53-139	4	0-20
75-01-4	PSD	Vinyl chloride	50.0	0.00	U	56.6	113	58-140	1	0-20
74-83-9	PSD	Bromomethane	50.0	0.00	U	58.3	117	59-146	5	0-20
75-00-3	PSD	Chloroethane	50.0	0.00	U	55.7	111	65-129	3	0-20
75-69-4	PSD	Trichlorofluoromethane	50.0	0.00	U	55.1	110	65-141	7	0-20
60-29-7	PSD	Ethyl ether	50.0	0.00	U	51.9	104	69-127	0	0-20
75-35-4	PSD	1,1-Dichloroethylene	50.0	0.00	U	53.8	108	59-130	6	0-20
1634-04-4	PSD	tert-Butyl methyl ether	50.0	0.00	U	53.5	107	69-132	2	0-20
156-60-5	PSD	trans-1,2-Dichloroethylene	50.0	0.00	U	56.0	112	65-127	4	0-20
75-34-3	PSD	1,1-Dichloroethane	50.0	0.00	U	54.1	108	67-127	4	0-20

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Post Spike Duplicate**
Client ID: **CAWA-18-81PSD**
Matrix: **W**
Lab Sample ID **1203974814**
Instrument: **VOA4.I**
Analysis Date: **02/19/2018 19:23**
Dilution: **1**
Analyst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
156-59-2	PSD	cis-1,2-Dichloroethylene	50.0	0.00	U	54.6	109	69-127	3	0-20
594-20-7	PSD	2,2-Dichloropropane	50.0	0.00	U	57.2	114	66-137	5	0-20
74-97-5	PSD	Bromochloromethane	50.0	0.00	U	54.7	109	71-130	2	0-20
67-66-3	PSD	Chloroform	50.0	0.00	U	54.2	108	71-129	4	0-20
71-55-6	PSD	1,1,1-Trichloroethane	50.0	0.00	U	54.9	110	69-139	4	0-20
563-58-6	PSD	1,1-Dichloropropene	50.0	0.00	U	52.2	104	67-130	4	0-20
56-23-5	PSD	Carbon tetrachloride	50.0	0.00	U	57.4	115	66-143	5	0-20
107-06-2	PSD	1,2-Dichloroethane	50.0	0.00	U	55.4	111	69-130	5	0-20
71-43-2	PSD	Benzene	50.0	0.00	U	52.1	104	66-125	4	0-20
79-01-6	PSD	Trichloroethylene	50.0	0.00	U	52.7	105	65-131	4	0-20
78-87-5	PSD	1,2-Dichloropropane	50.0	0.00	U	52.8	106	67-127	2	0-20
74-95-3	PSD	Dibromomethane	50.0	0.00	U	53.9	108	72-129	2	0-20
75-27-4	PSD	Bromodichloromethane	50.0	0.00	U	56.8	114	70-138	4	0-20
10061-01-5	PSD	cis-1,3-Dichloropropylene	50.0	0.00	U	54.3	109	70-134	0	0-20
108-88-3	PSD	Toluene	50.0	0.00	U	48.6	97	60-126	3	0-20
10061-02-6	PSD	trans-1,3-Dichloropropylene	50.0	0.00	U	52.8	106	69-135	2	0-20
79-00-5	PSD	1,1,2-Trichloroethane	50.0	0.00	U	49.5	99	66-125	3	0-20
142-28-9	PSD	1,3-Dichloropropane	50.0	0.00	U	48.4	97	67-124	3	0-20
124-48-1	PSD	Dibromochloromethane	50.0	0.00	U	54.8	110	68-143	1	0-20
106-93-4	PSD	1,2-Dibromoethane	50.0	0.00	U	50.8	102	71-127	1	0-20
108-90-7	PSD	Chlorobenzene	50.0	0.00	U	48.5	97	64-124	1	0-20
100-41-4	PSD	Ethylbenzene	50.0	0.00	U	49.4	99	61-130	1	0-20

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Post Spike Duplicate**
Client ID: **CAWA-18-81PSD**
Matrix: **W**
Lab Sample ID **1203974814**
Instrument: **VOA4.I**
Analysis Date: **02/19/2018 19:23**
Dilution: **1**
Analyst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
95-47-6	PSD	o-Xylene	50.0	0.00	U	49.9	100	62-131	1	0-20
100-42-5	PSD	Styrene	50.0	0.00	U	51.5	103	59-135	1	0-20
75-25-2	PSD	Bromoform	50.0	0.00	U	46.0	92	64-138	1	0-20
98-82-8	PSD	Isopropylbenzene	50.0	0.00	U	48.9	98	55-133	2	0-20
79-34-5	PSD	1,1,2,2-Tetrachloroethane	50.0	0.00	U	48.4	97	62-129	2	0-20
96-18-4	PSD	1,2,3-Trichloropropane	50.0	0.00	U	49.6	99	70-124	1	0-20
108-86-1	PSD	Bromobenzene	50.0	0.00	U	48.0	96	62-124	3	0-20
103-65-1	PSD	n-Propylbenzene	50.0	0.00	U	47.9	96	50-133	3	0-20
108-67-8	PSD	1,3,5-Trimethylbenzene	50.0	0.00	U	49.5	99	53-135	3	0-20
95-49-8	PSD	2-Chlorotoluene	50.0	0.00	U	47.9	96	56-128	3	0-20
106-43-4	PSD	4-Chlorotoluene	50.0	0.00	U	48.1	96	53-130	5	0-20
98-06-6	PSD	tert-Butylbenzene	50.0	0.00	U	49.8	100	55-135	4	0-20
95-63-6	PSD	1,2,4-Trimethylbenzene	50.0	0.00	U	49.5	99	53-132	4	0-20
135-98-8	PSD	sec-Butylbenzene	50.0	0.00	U	50.3	101	50-138	4	0-20
99-87-6	PSD	4-Isopropyltoluene	50.0	0.00	U	50.4	101	49-138	6	0-20
541-73-1	PSD	1,3-Dichlorobenzene	50.0	0.00	U	47.4	95	56-126	5	0-20
106-46-7	PSD	1,4-Dichlorobenzene	50.0	0.00	U	46.8	94	55-125	4	0-20
104-51-8	PSD	n-Butylbenzene	50.0	0.00	U	49.0	98	43-142	8	0-20
96-12-8	PSD	1,2-Dibromo-3-chloropropane	50.0	0.00	U	44.3	89	62-141	6	0-20
87-68-3	PSD	Hexachlorobutadiene	50.0	0.00	U	49.0	98	40-147	10	0-20
91-20-3	PSD	Naphthalene	50.0	0.00	U	51.0	102	62-134	4	0-20
87-61-6	PSD	1,2,3-Trichlorobenzene	50.0	0.00	U	48.2	96	52-135	3	0-20

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Post Spike Duplicate**
Client ID: **CAWA-18-81PSD**
Matrix: **W**
Lab Sample ID **1203974814**
Instrument: **VOA4.I**
Analysis Date: **02/19/2018 19:23**
Dilution: **1**
Analyst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

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	48.4	97	50-133	6	0-20
630-20-6	PSD	1,1,1,2-Tetrachloroethane	50.0	0.00	U	53.6	107	71-133	3	0-20
95-50-1	PSD	1,2-Dichlorobenzene	50.0	0.00	U	48.2	96	60-125	4	0-20
71-36-3	PSD	n-Butyl alcohol	5000	0.00	U	5700	114	60-140	1	0-20

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Laboratory Control Sample**
Client ID: **LCS for batch 1740377**
Matrix: **WATER**
Lab Sample ID **1203974815**
Instrument: **VOA4.I**
Analvsis Date: **02/19/2018 12:03**
Dilution: **1**
Analvst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

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	300	120	60-140
76-13-1	LCS	Trichlorotrifluoroethane	250	0.0	280	112	61-148
107-05-1	LCS	Allyl chloride	250	0.0	261	105	59-125
107-13-1	LCS	Acrylonitrile	250	0.0	259	103	65-122
107-12-0	LCS	Propionitrile	250	0.0	252	101	64-124
126-98-7	LCS	Methacrylonitrile	250	0.0	263	105	64-126
80-62-6	LCS	Methyl methacrylate	250	0.0	258	103	69-127
97-63-2	LCS	Ethyl methacrylate	250	0.0	232	93	66-130
78-83-1	LCS	Isobutyl alcohol	2500	0.0	2710	108	65-135
126-99-8	LCS	2-Chloro-1,3-butadiene	50.0	0.0	56.4	113	66-147

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Post Spike**
Client ID: **CAWA-18-81PS**
Matrix: **W**
Lab Sample ID **1203974816**
Instrument: **VOA4.I**
Analysis Date: **02/19/2018 19:51**
Dilution: **1**
Analyst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

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	235	94	49-141
76-13-1	PS	Trichlorotrifluoroethane	250	0.00	U	292	117	57-149
107-05-1	PS	Allyl chloride	250	0.00	U	269	107	54-128
107-13-1	PS	Acrylonitrile	250	0.00	U	278	111	59-129
107-12-0	PS	Propionitrile	250	0.00	U	268	107	58-131
126-98-7	PS	Methacrylonitrile	250	0.00	U	280	112	59-134
80-62-6	PS	Methyl methacrylate	250	0.00	U	277	111	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	2920	117	60-143
126-99-8	PS	2-Chloro-1,3-butadiene	50.0	0.00	U	57.5	115	63-146

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Post Spike Duplicate**
Client ID: **CAWA-18-81PSD**
Matrix: **W**
Lab Sample ID **1203974817**
Instrument: **VOA4.I**
Analysis Date: **02/19/2018 20:21**
Dilution: **1**
Analyst: **MXL2**
Purge Vol: **5 mL**
Batch ID: **1740377**

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	235	94	49-141	0	0-20
76-13-1	PSD	Trichlorotrifluoroethane	250	0.00	U	285	114	57-149	2	0-20
107-05-1	PSD	Allyl chloride	250	0.00	U	266	106	54-128	1	0-20
107-13-1	PSD	Acrylonitrile	250	0.00	U	270	108	59-129	3	0-20
107-12-0	PSD	Propionitrile	250	0.00	U	263	105	58-131	2	0-20
126-98-7	PSD	Methacrylonitrile	250	0.00	U	276	110	59-134	1	0-20
80-62-6	PSD	Methyl methacrylate	250	0.00	U	273	109	62-135	1	0-20
97-63-2	PSD	Ethyl methacrylate	250	0.00	U	238	95	60-136	1	0-20
78-83-1	PSD	Isobutyl alcohol	2500	0.00	U	2880	115	60-143	2	0-20
126-99-8	PSD	2-Chloro-1,3-butadiene	50.0	0.00	U	56.7	113	63-146	1	0-20

Method Blank Summary

SDG Number:	**2018-1615**	**Client:**	**ARSL004**	**Matrix:**	**WATER**
Client ID:	**MB for batch 1740377**	**Instrument ID:**	**VOA4.I**	**Data File:**	**021918V4\4W108BA.D**
Lab Sample ID:	**1203974811**	**Prep Date:**	**02/19/2018 13:02**	**Analyzed:**	**02/19/18 13:02**
Column:	**DB-624**				

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

	Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01	LCS for batch 1740377	1203974812	021918V4\4W103LA.D	02/19/18	1035
02	LCS for batch 1740377	1203974815	021918V4\4W106LA.D	02/19/18	1203
03	CAWA-18-108	443345001	021918V4\4W112.D	02/19/18	1459
04	CAWA-18-34	443345003	021918V4\4W113.D	02/19/18	1528
05	CAWA-18-81PS	1203974813	021918V4\4W120.D	02/19/18	1853
06	CAWA-18-81PSD	1203974814	021918V4\4W121.D	02/19/18	1923
07	CAWA-18-81PS	1203974816	021918V4\4W122.D	02/19/18	1951
08	CAWA-18-81PSD	1203974817	021918V4\4W123.D	02/19/18	2021

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203974811**				
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1740377**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 13:02**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 13:02**				
Data File:	**021918V4\4W108BA.D**	**Column:**	**DB-624**		

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203974811**				
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1740377**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 13:02**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 13:02**				
Data File:	**021918V4\4W108BA.D**	**Column:**	**DB-624**		

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203974811**				
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1740377**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 13:02**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 13:02**				
Data File:	**021918V4\4W108BA.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	47.2	50.0	ug/L	94	(71%-134%)
Bromofluorobenzene	44.3	50.0	ug/L	89	(70%-131%)
Toluene-d8	44.3	50.0	ug/L	89	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	4.293	8.14	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203974812**				
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1740377**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 10:35**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 10:35**				
Data File:	**021918V4\4W103LA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		44.1	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		47.0	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		38.8	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		39.8	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		44.8	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		45.3	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		45.3	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		40.7	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		38.7	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		42.0	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		43.0	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		35.2	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		41.6	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		40.1	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		44.4	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		43.7	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		43.4	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		39.6	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		39.3	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		40.0	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		49.7	ug/L	0.300	1.00
78-93-3	2-Butanone		239	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		41.4	ug/L	0.300	1.00
591-78-6	2-Hexanone		237	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		41.0	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		45.1	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		195	ug/L	1.50	5.00
67-64-1	Acetone		239	ug/L	1.50	10.0
75-05-8	Acetonitrile		996	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		43.4	ug/L	0.300	1.00
108-86-1	Bromobenzene		39.8	ug/L	0.300	1.00
74-97-5	Bromochloromethane		43.7	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		46.2	ug/L	0.300	1.00
75-25-2	Bromoform		37.2	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203974812**				
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1740377**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 10:35**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 10:35**				
Data File:	**021918V4\4W103LA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		61.2	ug/L	0.300	1.00
75-15-0	Carbon disulfide		222	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		49.6	ug/L	0.300	1.00
108-90-7	Chlorobenzene		40.7	ug/L	0.300	1.00
75-00-3	Chloroethane		58.9	ug/L	0.300	1.00
67-66-3	Chloroform		44.4	ug/L	0.300	1.00
74-87-3	Chloromethane		56.1	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		44.2	ug/L	0.300	1.00
74-95-3	Dibromomethane		42.6	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		58.5	ug/L	0.300	1.00
60-29-7	Ethyl ether		52.5	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		43.1	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		44.5	ug/L	0.300	1.00
74-88-4	Iodomethane		212	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		43.4	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		41.7	ug/L	1.00	10.0
91-20-3	Naphthalene		41.6	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		43.6	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		43.0	ug/L	0.300	1.00
108-88-3	Toluene		41.6	ug/L	0.300	1.00
79-01-6	Trichloroethylene		45.2	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		60.3	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		277	ug/L	1.50	5.00
75-01-4	Vinyl chloride		60.9	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		44.7	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		44.7	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		85.5	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4540	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		44.4	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		42.8	ug/L	0.300	1.00
95-47-6	o-Xylene		42.5	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		45.0	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203974812**				
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1740377**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 10:35**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 10:35**				
Data File:	**021918V4\4W103LA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		42.3	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		43.9	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		46.4	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		43.1	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	46.8	50.0	ug/L	94	(71%-134%)
Bromofluorobenzene	43.4	50.0	ug/L	87	(70%-131%)
Toluene-d8	43.8	50.0	ug/L	88	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203974813**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 18:53**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 18:53**				
Data File:	**021918V4\4W120.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		55.5	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		57.1	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		47.6	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		51.2	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		56.5	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		57.1	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		54.6	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		46.7	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		49.1	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		45.5	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		47.6	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		41.8	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		51.3	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		46.2	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		58.1	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		54.0	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		47.9	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		45.3	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		50.0	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		44.9	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		59.9	ug/L	0.300	1.00
78-93-3	2-Butanone		171	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		46.5	ug/L	0.300	1.00
591-78-6	2-Hexanone		186	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		45.9	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		47.5	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		230	ug/L	1.50	5.00
67-64-1	Acetone		124	ug/L	1.50	10.0
75-05-8	Acetonitrile		1270	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		54.3	ug/L	0.300	1.00
108-86-1	Bromobenzene		46.8	ug/L	0.300	1.00
74-97-5	Bromochloromethane		56.1	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		58.9	ug/L	0.300	1.00
75-25-2	Bromoform		45.8	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203974813**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 18:53**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 18:53**				
Data File:	**021918V4\4W120.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		61.0	ug/L	0.300	1.00
75-15-0	Carbon disulfide		287	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		60.5	ug/L	0.300	1.00
108-90-7	Chlorobenzene		49.1	ug/L	0.300	1.00
75-00-3	Chloroethane		57.6	ug/L	0.300	1.00
67-66-3	Chloroform		56.6	ug/L	0.300	1.00
74-87-3	Chloromethane		57.4	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		55.3	ug/L	0.300	1.00
74-95-3	Dibromomethane		55.2	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		54.1	ug/L	0.300	1.00
60-29-7	Ethyl ether		52.0	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		50.0	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		44.4	ug/L	0.300	1.00
74-88-4	Iodomethane		272	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		47.8	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		53.2	ug/L	1.00	10.0
91-20-3	Naphthalene		49.1	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		52.0	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		50.3	ug/L	0.300	1.00
108-88-3	Toluene		49.9	ug/L	0.300	1.00
79-01-6	Trichloroethylene		54.8	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		59.3	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		279	ug/L	1.50	5.00
75-01-4	Vinyl chloride		57.1	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		56.4	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		99.9	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5740	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		45.3	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		46.4	ug/L	0.300	1.00
95-47-6	o-Xylene		50.5	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		48.3	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203974813**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 18:53**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 18:53**				
Data File:	**021918V4\4W120.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		52.7	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		47.9	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		58.3	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		54.0	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	49.8	50.0	ug/L	100	(71%-134%)
Bromofluorobenzene	45.5	50.0	ug/L	91	(70%-131%)
Toluene-d8	45.3	50.0	ug/L	91	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203974814**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 19:23**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 19:23**				
Data File:	**021918V4\4W121.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		53.6	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		54.9	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		48.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		49.5	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		54.1	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		53.8	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		52.2	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		48.2	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		49.6	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		48.4	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		49.5	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		44.3	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		50.8	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		48.2	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		55.4	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		52.8	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		49.5	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		47.4	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		48.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		46.8	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		57.2	ug/L	0.300	1.00
78-93-3	2-Butanone		171	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		47.9	ug/L	0.300	1.00
591-78-6	2-Hexanone		186	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		48.1	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		50.4	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		231	ug/L	1.50	5.00
67-64-1	Acetone		122	ug/L	1.50	10.0
75-05-8	Acetonitrile		1250	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		52.1	ug/L	0.300	1.00
108-86-1	Bromobenzene		48.0	ug/L	0.300	1.00
74-97-5	Bromochloromethane		54.7	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		56.8	ug/L	0.300	1.00
75-25-2	Bromoform		46.0	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203974814**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 19:23**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 19:23**				
Data File:	**021918V4\4W121.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		58.3	ug/L	0.300	1.00
75-15-0	Carbon disulfide		273	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		57.4	ug/L	0.300	1.00
108-90-7	Chlorobenzene		48.5	ug/L	0.300	1.00
75-00-3	Chloroethane		55.7	ug/L	0.300	1.00
67-66-3	Chloroform		54.2	ug/L	0.300	1.00
74-87-3	Chloromethane		54.9	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		54.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		53.9	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		48.8	ug/L	0.300	1.00
60-29-7	Ethyl ether		51.9	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		49.4	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		49.0	ug/L	0.300	1.00
74-88-4	Iodomethane		264	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		48.9	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		51.6	ug/L	1.00	10.0
91-20-3	Naphthalene		51.0	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		51.5	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		48.8	ug/L	0.300	1.00
108-88-3	Toluene		48.6	ug/L	0.300	1.00
79-01-6	Trichloroethylene		52.7	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		55.1	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		273	ug/L	1.50	5.00
75-01-4	Vinyl chloride		56.6	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		54.6	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		54.3	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		98.7	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5700	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		49.0	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		47.9	ug/L	0.300	1.00
95-47-6	o-Xylene		49.9	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		50.3	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203974814**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 19:23**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 19:23**				
Data File:	**021918V4\4W121.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		53.5	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		56.0	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		52.8	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	48.2	50.0	ug/L	96	(71%-134%)
Bromofluorobenzene	44.8	50.0	ug/L	90	(70%-131%)
Toluene-d8	44.1	50.0	ug/L	88	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203974815**				
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1740377**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 12:03**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 12:03**				
Data File:	**021918V4\4W106LA.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		56.4	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		300	ug/L	1.50	5.00
107-13-1	Acrylonitrile		259	ug/L	1.50	5.00
107-05-1	Allyl chloride		261	ug/L	1.50	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	1.00
108-86-1	Bromobenzene	U	0.300	ug/L	0.300	1.00
74-97-5	Bromochloromethane	U	0.300	ug/L	0.300	1.00
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	1.00
75-25-2	Bromoform	U	0.300	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203974815**				
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1740377**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 12:03**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 12:03**				
Data File:	**021918V4\4W106LA.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		232	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2710	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		263	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		258	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		252	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane		280	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:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203974815**				
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1740377**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 12:03**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 12:03**				
Data File:	**021918V4\4W106LA.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	47.4	50.0	ug/L	95	(71%-134%)
Bromofluorobenzene	46.5	50.0	ug/L	93	(70%-131%)
Toluene-d8	44.9	50.0	ug/L	90	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203974816**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 19:51**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 19:51**				
Data File:	**021918V4\4W122.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		57.5	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		235	ug/L	1.50	5.00
107-13-1	Acrylonitrile		278	ug/L	1.50	5.00
107-05-1	Allyl chloride		269	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:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203974816**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 19:51**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 19:51**				
Data File:	**021918V4\4W122.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		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		2920	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		280	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		277	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		268	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		292	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:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203974816**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81PS**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 19:51**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 19:51**				
Data File:	**021918V4\4W122.D**	**Column:**	**DB-624**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	48.2	50.0	ug/L	96	(71%-134%)
Bromofluorobenzene	45.4	50.0	ug/L	91	(70%-131%)
Toluene-d8	44.0	50.0	ug/L	88	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203974817**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 20:21**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 20:21**				
Data File:	**021918V4\4W123.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		56.7	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		235	ug/L	1.50	5.00
107-13-1	Acrylonitrile		270	ug/L	1.50	5.00
107-05-1	Allyl chloride		266	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:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203974817**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 20:21**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 20:21**				
Data File:	**021918V4\4W123.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		238	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2880	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		276	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		273	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		263	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		285	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:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203974817**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1740377**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81PSD**	**Method:**	**SW-846:8260B**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**1740377**	**Inst:**	**VOA4.I**	**Dilution:**	**1**
Run Date:	**02/19/2018 20:21**	**Analyst:**	**MXL2**	**Purge Vol:**	**5 mL**
Prep Date:	**02/19/2018 20:21**				
Data File:	**021918V4\4W123.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	48.5	50.0	ug/L	97	(71%-134%)
Bromofluorobenzene	46.4	50.0	ug/L	93	(70%-131%)
Toluene-d8	44.1	50.0	ug/L	88	(74%-124%)

Semi-Volatile Analysis

Case Narrative

GC/MS Semivolatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-1615
Work Order #: 443345

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:	1738268
Prep Batch Number:	1738267

Sample Analysis

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

Sample ID	Client ID
443345003	CAWA-18-34
1203969165	Method Blank (MB)
1203969166	Laboratory Control Sample (LCS)
1203969167	443360003(CAWA-18-81) Matrix Spike (MS)
1203969168	443360003(CAWA-18-81) 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 443345003 (CAWA-18-34) and the associated QC. However, the method allows for a designated number of outliers dependent on the requested analyte list. This SDG satisfied the 8270D outlier acceptance criteria. If required, a CRDL was analyzed after the CCVs to demonstrate that there is adequate sensitivity to detect the failed compounds at the applicable lower quantitation limit.

Quality Control (QC) Information

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

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

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

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

QC Sample Designation
A matrix spike/matrix spike duplicate pair was not extracted and analyzed with this batch for this SDG.

Spike Recovery Statement
The MS or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. As similar recoveries were displayed in the MS and MSD, the failures were attributed to sample matrix interference and the data were reported.

Sample	Analyte	Value
1203969167 (CAWA-18-81MS)	Hexachlorocyclopentadiene	22* (26%-79%)
1203969168 (CAWA-18-81MSD)	Hexachlorocyclopentadiene	19* (26%-79%)

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

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

Technical Information:

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

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

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

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

Miscellaneous Information:

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

TIC Comment
Tentatively identified compounds (TIC) were requested for sample 443345003 (CAWA-18-34) 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

MSD3.I	Agilent 7890A/5975C GC/MS w/ 7683 Autosampler	HP7890A/HP5975C	DB-5MS	25m x 0.2mm, 0.33um (5% Phenylmethylpolysiloxane)

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

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

Client SDG: 2018-1615 GEL Work Order: 443345

The Qualifiers in this report are defined as follows:

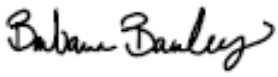
* A quality control analyte recovery is outside of specified acceptance criteria
** Analyte is a surrogate compound
E Concentration of the target analyte exceeds the instrument calibration range
J Value is estimated
U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

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: Barbara Bailey**

Date: 05 MAR 2018 **Title: Data Validator**

Sample Data Summary

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 12:20**	**Matrix:**	**W**
Lab Sample ID:	**443345003**	**Date Received:**	**02/08/2018 08:45**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAWA-18-34**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 16:50**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**980 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1211.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene	U	3.06	ug/L	3.06	10.2
120-82-1	1,2,4-Trichlorobenzene	U	3.06	ug/L	3.06	10.2
95-50-1	1,2-Dichlorobenzene	U	3.06	ug/L	3.06	10.2
122-66-7	Azobenzene	U	3.06	ug/L	3.06	10.2
	1,2-Diphenylhydrazine					
541-73-1	1,3-Dichlorobenzene	U	3.06	ug/L	3.06	10.2
106-46-7	1,4-Dichlorobenzene	U	3.06	ug/L	3.06	10.2
123-91-1	1,4-Dioxane	U	3.06	ug/L	3.06	10.2
90-12-0	1-Methylnaphthalene	U	0.306	ug/L	0.306	1.02
58-90-2	2,3,4,6-Tetrachlorophenol	U	3.06	ug/L	3.06	10.2
95-95-4	2,4,5-Trichlorophenol	U	3.06	ug/L	3.06	10.2
88-06-2	2,4,6-Trichlorophenol	U	3.06	ug/L	3.06	10.2
120-83-2	2,4-Dichlorophenol	U	3.06	ug/L	3.06	10.2
105-67-9	2,4-Dimethylphenol	U	3.06	ug/L	3.06	10.2
51-28-5	2,4-Dinitrophenol	U	5.10	ug/L	5.10	20.4
121-14-2	2,4-Dinitrotoluene	U	3.06	ug/L	3.06	10.2
606-20-2	2,6-Dinitrotoluene	U	3.06	ug/L	3.06	10.2
91-58-7	2-Chloronaphthalene	U	0.418	ug/L	0.418	1.02
95-57-8	2-Chlorophenol	U	3.06	ug/L	3.06	10.2
534-52-1	2-Methyl-4,6-dinitrophenol	U	3.06	ug/L	3.06	10.2
91-57-6	2-Methylnaphthalene	U	0.306	ug/L	0.306	1.02
88-75-5	2-Nitrophenol	U	3.06	ug/L	3.06	10.2
91-94-1	3,3'-Dichlorobenzidine	U	3.06	ug/L	3.06	10.2
101-55-3	4-Bromophenylphenylether	U	3.06	ug/L	3.06	10.2
59-50-7	Parachlorometa cresol	U	3.06	ug/L	3.06	10.2
	4-Chloro-3-methylphenol					
106-47-8	4-Chloroaniline	U	3.37	ug/L	3.37	10.2
7005-72-3	4-Chlorophenylphenylether	U	3.06	ug/L	3.06	10.2
100-02-7	4-Nitrophenol	U	3.06	ug/L	3.06	10.2
83-32-9	Acenaphthene	U	0.306	ug/L	0.306	1.02
208-96-8	Acenaphthylene	U	0.306	ug/L	0.306	1.02
62-53-3	Aniline	U	4.29	ug/L	4.29	10.2
120-12-7	Anthracene	U	0.306	ug/L	0.306	1.02
1912-24-9	Atrazine	U	3.06	ug/L	3.06	10.2
92-87-5	Benzidine	U	3.98	ug/L	3.98	10.2
56-55-3	Benzo(a)anthracene	U	0.306	ug/L	0.306	1.02
50-32-8	Benzo(a)pyrene	U	0.306	ug/L	0.306	1.02
205-99-2	Benzo(b)fluoranthene	U	0.306	ug/L	0.306	1.02
191-24-2	Benzo(ghi)perylene	U	0.306	ug/L	0.306	1.02

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 12:20**	**Matrix:**	**W**
Lab Sample ID:	**443345003**	**Date Received:**	**02/08/2018 08:45**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAWA-18-34**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 16:50**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**980 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1211.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene	U	0.306	ug/L	0.306	1.02
65-85-0	Benzoic acid	U	6.12	ug/L	6.12	20.4
100-51-6	Benzyl alcohol	U	3.06	ug/L	3.06	10.2
85-68-7	Butylbenzylphthalate	U	3.06	ug/L	3.06	10.2
218-01-9	Chrysene	U	0.306	ug/L	0.306	1.02
84-74-2	Di-n-butylphthalate	U	3.06	ug/L	3.06	10.2
117-84-0	Di-n-octylphthalate	U	3.06	ug/L	3.06	10.2
53-70-3	Dibenzo(a,h)anthracene	U	0.306	ug/L	0.306	1.02
132-64-9	Dibenzofuran	U	3.06	ug/L	3.06	10.2
84-66-2	Diethylphthalate	U	3.06	ug/L	3.06	10.2
131-11-3	Dimethylphthalate	U	3.06	ug/L	3.06	10.2
88-85-7	Dinoseb	U	3.06	ug/L	3.06	10.2
122-39-4	Diphenylamine	U	3.06	ug/L	3.06	10.2
206-44-0	Fluoranthene	U	0.306	ug/L	0.306	1.02
86-73-7	Fluorene	U	0.306	ug/L	0.306	1.02
118-74-1	Hexachlorobenzene	U	3.06	ug/L	3.06	10.2
87-68-3	Hexachlorobutadiene	U	3.06	ug/L	3.06	10.2
77-47-4	Hexachlorocyclopentadiene	U	3.06	ug/L	3.06	10.2
67-72-1	Hexachloroethane	U	3.06	ug/L	3.06	10.2
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.306	ug/L	0.306	1.02
78-59-1	Isophorone	U	3.57	ug/L	3.57	10.2
62-75-9	N-Methyl-N-nitrosomethylamine	U	3.06	ug/L	3.06	10.2
924-16-3	N-Nitrosodi-n-butylamine	U	3.06	ug/L	3.06	10.2
55-18-5	N-Nitrosodiethylamine	U	3.06	ug/L	3.06	10.2
621-64-7	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*	U	3.06	ug/L	3.06	10.2
930-55-2	N-Nitrosopyrrolidine	U	3.06	ug/L	3.06	10.2
91-20-3	Naphthalene	U	0.306	ug/L	0.306	1.02
98-95-3	Nitrobenzene	U	3.06	ug/L	3.06	10.2
608-93-5	Pentachlorobenzene	U	3.06	ug/L	3.06	10.2
87-86-5	Pentachlorophenol	U	3.06	ug/L	3.06	10.2
85-01-8	Phenanthrene	U	0.306	ug/L	0.306	1.02
108-95-2	Phenol	U	3.06	ug/L	3.06	10.2
129-00-0	Pyrene	U	0.306	ug/L	0.306	1.02
110-86-1	Pyridine	U	3.06	ug/L	3.06	10.2
108-60-1	bis(2-Chloro-1-methylethyl)ether	U	3.06	ug/L	3.06	10.2
111-91-1	bis(2-Chloroethoxy)methane	U	3.06	ug/L	3.06	10.2
111-44-4	bis(2-Chloroethyl) ether	U	3.06	ug/L	3.06	10.2
117-81-7	bis(2-Ethylhexyl)phthalate	U	3.06	ug/L	3.06	1.02

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 12:20**	**Matrix:**	**W**
Lab Sample ID:	**443345003**	**Date Received:**	**02/08/2018 08:45**		
		Client:	**ARSL004**	**Project:**	**ESHL00114**
Client ID:	**CAWA-18-34**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 16:50**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**980 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1211.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols	U	3.78	ug/L	3.78	10.2
99-09-2	3-Nitroaniline *m-Nitroaniline*	U	3.06	ug/L	3.06	10.2
95-48-7	o-Cresol	U	3.06	ug/L	3.06	10.2
88-74-4	2-Nitroaniline *o-Nitroaniline*	U	3.06	ug/L	3.06	10.2
100-01-6	4-Nitroaniline *p-Nitroaniline*	U	3.06	ug/L	3.06	10.2

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	77.7	102	ug/L	76	(32%-124%)
2-Fluorobiphenyl	37.8	51.0	ug/L	74	(32%-112%)
2-Fluorophenol	43.9	102	ug/L	43	(15%-88%)
Nitrobenzene-d5	39.3	51.0	ug/L	77	(36%-115%)
Phenol-d5	27.8	102	ug/L	27	(15%-91%)
p-Terphenyl-d14	43.7	51.0	ug/L	86	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000079-01-6	Trichloroethylene	2.43	5.31	ug/L	99	NJ

Quality Control Summary

Semi-Volatile

Surrogate Recovery Report

SDG Number: 2018-1615

Matrix Type: LIQUID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203969165	MB for batch 1738267	50	31	80	75	89	103
1203969166	LCS for batch 1738267	48	29	76	67	89	85
443345003	CAWA-18-34	43	27	77	74	76	86
1203969167	CAWA-18-81MS	63	49	74	72	74	86
1203969168	CAWA-18-81MSD	55	42	66	68	67	80

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

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Laboratory Control Sample**
Client ID: **LCS for batch 1738267**
Matrix: **WATER**
Lab Sample ID **1203969166**
Instrument: **MSD3.I**
Analysis Date: **02/12/2018 16:20**
Dilution: **1**
Analyst: **JLD1**
Prep Batch ID: **1738267**
Inj. Vol: **1 uL**
Batch ID: **1738268**

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	24.0	48	30-88
110-86-1	LCS	Pyridine	50.0	0.0	27.5	55	27-89
62-53-3	LCS	Aniline	50.0	0.0	36.7	73	49-112
108-95-2	LCS	Phenol	50.0	0.0	14.8	30	16-82
111-44-4	LCS	bis(2-Chloroethyl) ether	50.0	0.0	40.5	81	51-111
95-57-8	LCS	2-Chlorophenol	50.0	0.0	37.2	74	49-105
541-73-1	LCS	1,3-Dichlorobenzene	50.0	0.0	30.0	60	37-95
106-46-7	LCS	1,4-Dichlorobenzene	50.0	0.0	29.8	60	38-96
95-50-1	LCS	1,2-Dichlorobenzene	50.0	0.0	30.8	62	39-97
108-60-1	LCS	bis(2-Chloro-1-methylethyl)ether	50.0	0.0	39.7	79	44-123
100-51-6	LCS	Benzyl alcohol	50.0	0.0	33.3	67	44-102
95-48-7	LCS	o-Cresol	50.0	0.0	31.9	64	41-101
65794-96-9	LCS	m,p-Cresols	50.0	0.0	32.6	65	43-102
621-64-7	LCS	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*	50.0	0.0	40.7	81	54-115
67-72-1	LCS	Hexachloroethane	50.0	0.0	27.0	54	36-96
98-95-3	LCS	Nitrobenzene	50.0	0.0	38.9	78	53-115
78-59-1	LCS	Isophorone	50.0	0.0	39.1	78	56-117
88-75-5	LCS	2-Nitrophenol	50.0	0.0	40.4	81	51-113
105-67-9	LCS	2,4-Dimethylphenol	50.0	0.0	33.2	66	51-104
111-91-1	LCS	bis(2-Chloroethoxy)methane	50.0	0.0	40.9	82	55-114
120-83-2	LCS	2,4-Dichlorophenol	50.0	0.0	40.7	81	53-109
65-85-0	LCS	Benzoic acid	100	0.0	29.1	29	21-74

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Laboratory Control Sample**
Client ID: **LCS for batch 1738267**
Matrix: **WATER**
Lab Sample ID **1203969166**
Instrument: **MSD3.I**
Analysis Date: **02/12/2018 16:20**
Dilution: **1**
Analyst: **JLD1**
Prep Batch ID: **1738267**
Inj. Vol: **1 uL**
Batch ID: **1738268**

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
106-47-8	LCS	4-Chloroaniline	50.0	0.0	49.3	99	65-136
87-68-3	LCS	Hexachlorobutadiene	50.0	0.0	31.1	62	35-98
59-50-7	LCS	Parachlorometa cresol *4-Chloro-3-methylphenol*	50.0	0.0	38.1	76	55-115
91-57-6	LCS	2-Methylnaphthalene	50.0	0.0	32.3	65	42-103
91-20-3	LCS	Naphthalene	50.0	0.0	32.9	66	44-102
90-12-0	LCS	1-Methylnaphthalene	50.0	0.0	34.0	68	45-108
77-47-4	LCS	Hexachlorocyclopentadiene	50.0	0.0	19.5	39	34-89
88-06-2	LCS	2,4,6-Trichlorophenol	50.0	0.0	42.0	84	55-120
95-95-4	LCS	2,4,5-Trichlorophenol	50.0	0.0	40.7	81	55-116
91-58-7	LCS	2-Chloronaphthalene	50.0	0.0	37.9	76	44-107
88-74-4	LCS	2-Nitroaniline *o-Nitroaniline*	50.0	0.0	39.6	79	53-121
99-09-2	LCS	3-Nitroaniline *m-Nitroaniline*	50.0	0.0	47.3	95	61-139
131-11-3	LCS	Dimethylphthalate	50.0	0.0	43.9	88	60-122
606-20-2	LCS	2,6-Dinitrotoluene	50.0	0.0	40.8	82	59-122
121-14-2	LCS	2,4-Dinitrotoluene	50.0	0.0	39.9	80	57-124
208-96-8	LCS	Acenaphthylene	50.0	0.0	39.4	79	50-113
83-32-9	LCS	Acenaphthene	50.0	0.0	43.4	87	49-112
51-28-5	LCS	2,4-Dinitrophenol	50.0	0.0	35.8	72	34-122
132-64-9	LCS	Dibenzofuran	50.0	0.0	40.9	82	50-111
58-90-2	LCS	2,3,4,6-Tetrachlorophenol	50.0	0.0	39.9	80	54-122
84-66-2	LCS	Diethylphthalate	50.0	0.0	45.2	90	57-122
100-02-7	LCS	4-Nitrophenol	50.0	0.0	16.9	34	15-137

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Laboratory Control Sample**
Client ID: **LCS for batch 1738267**
Matrix: **WATER**
Lab Sample ID **1203969166**
Instrument: **MSD3.I**
Analysis Date: **02/12/2018 16:20**
Dilution: **1**
Analyst: **JLD1**
Prep Batch ID: **1738267**
Inj. Vol: **1 uL**
Batch ID: **1738268**

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	40.7	81	52-114
7005-72-3	LCS	4-Chlorophenylphenylether	50.0	0.0	44.6	89	52-121
100-01-6	LCS	4-Nitroaniline *p-Nitroaniline*	50.0	0.0	42.6	85	44-137
534-52-1	LCS	2-Methyl-4,6-dinitrophenol	50.0	0.0	38.7	77	45-124
122-39-4	LCS	Diphenylamine	50.0	0.0	41.5	83	55-113
122-66-7	LCS	Azobenzene *1,2-Diphenylhydrazine*	50.0	0.0	40.8	82	53-115
101-55-3	LCS	4-Bromophenylphenylether	50.0	0.0	44.6	89	54-116
118-74-1	LCS	Hexachlorobenzene	50.0	0.0	43.6	87	54-115
87-86-5	LCS	Pentachlorophenol	50.0	0.0	46.6	93	41-116
85-01-8	LCS	Phenanthrene	50.0	0.0	42.6	85	55-110
120-12-7	LCS	Anthracene	50.0	0.0	43.1	86	56-112
84-74-2	LCS	Di-n-butylphthalate	50.0	0.0	49.9	100	57-123
206-44-0	LCS	Fluoranthene	50.0	0.0	49.0	98	54-118
129-00-0	LCS	Pyrene	50.0	0.0	37.3	75	49-121
85-68-7	LCS	Butylbenzylphthalate	50.0	0.0	40.7	81	52-125
117-81-7	LCS	bis(2-Ethylhexyl)phthalate	50.0	0.0	40.6	81	52-125
56-55-3	LCS	Benzo(a)anthracene	50.0	0.0	42.0	84	57-112
218-01-9	LCS	Chrysene	50.0	0.0	42.1	84	58-117
117-84-0	LCS	Di-n-octylphthalate	50.0	0.0	37.4	75	50-129
205-99-2	LCS	Benzo(b)fluoranthene	50.0	0.0	41.0	82	41-118
207-08-9	LCS	Benzo(k)fluoranthene	50.0	0.0	41.9	84	42-121
50-32-8	LCS	Benzo(a)pyrene	50.0	0.0	42.4	85	40-118

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-1615
Client ID: LCS for batch 1738267
Lab Sample ID 1203969166
Instrument: MSD3.I
Analvst: JLD1
Inj. Vol: 1 uL

Sample Type: Laboratory Control Sample
Matrix: WATER
Analvsis Date: 02/12/2018 16:20
Prep Batch ID: 1738267
Batch ID: 1738268
Dilution: 1

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	44.4	89	34-125
53-70-3	LCS	Dibenzo(a,h)anthracene	50.0	0.0	45.0	90	38-129
191-24-2	LCS	Benzo(ghi)perylene	50.0	0.0	44.4	89	33-131
123-91-1	LCS	1,4-Dioxane	50.0	0.0	26.2	52	38-78
930-55-2	LCS	N-Nitrosopyrrolidine	50.0	0.0	37.9	76	54-113
95-94-3	LCS	1,2,4,5-Tetrachlorobenzene	50.0	0.0	39.2	78	44-102
1912-24-9	LCS	Atrazine	50.0	0.0	48.7	97	60-131
92-87-5	LCS	Benzidine	100	0.0	128	128	20-144
91-94-1	LCS	3,3'-Dichlorobenzidine	50.0	0.0	50.2	100	43-127
120-82-1	LCS	1,2,4-Trichlorobenzene	50.0	0.0	32.7	65	39-99

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Matrix Spike**
Client ID: **CAWA-18-81MS**
Matrix: **W**
Lab Sample ID **1203969167**
Instrument: **MSD3.I**
Analysis Date: **02/12/2018 19:47**
Dilution: **1**
Analyst: **JLD1**
Prep Batch ID: **1738267**
Inj. Vol: **1 uL**
Batch ID: **1738268**

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	68.6	62	25-106
110-86-1	MS	Pyridine	111	0.00	U	73.2	66	24-93
62-53-3	MS	Aniline	111	0.00	U	84.6	76	37-113
108-95-2	MS	Phenol	111	0.00	U	55.4	50	23-82
111-44-4	MS	bis(2-Chloroethyl) ether	111	0.00	U	89.0	80	39-114
95-57-8	MS	2-Chlorophenol	111	0.00	U	84.5	76	37-108
541-73-1	MS	1,3-Dichlorobenzene	111	0.00	U	69.4	62	27-97
106-46-7	MS	1,4-Dichlorobenzene	111	0.00	U	69.4	62	28-97
95-50-1	MS	1,2-Dichlorobenzene	111	0.00	U	70.8	64	28-99
108-60-1	MS	bis(2-Chloro-1-methylethyl)ether	111	0.00	U	88.5	80	32-127
100-51-6	MS	Benzyl alcohol	111	0.00	U	86.5	78	37-116
95-48-7	MS	o-Cresol	111	0.00	U	81.6	73	34-109
65794-96-9	MS	m,p-Cresols	111	0.00	U	88.7	80	36-120
621-64-7	MS	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*	111	0.00	U	92.3	83	42-118
67-72-1	MS	Hexachloroethane	111	0.00	U	63.2	57	29-94
98-95-3	MS	Nitrobenzene	111	0.00	U	84.5	76	38-123
78-59-1	MS	Isophorone	111	0.00	U	83.7	75	43-120
88-75-5	MS	2-Nitrophenol	111	0.00	U	86.8	78	39-115
105-67-9	MS	2,4-Dimethylphenol	111	0.00	U	71.0	64	39-107
111-91-1	MS	bis(2-Chloroethoxy)methane	111	0.00	U	87.5	79	42-118
120-83-2	MS	2,4-Dichlorophenol	111	0.00	U	86.4	78	40-111
65-85-0	MS	Benzoic acid	222	0.00	U	94.8	43	17-95

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Matrix Spike**
Client ID: **CAWA-18-81MS**
Matrix: **W**
Lab Sample ID **1203969167**
Instrument: **MSD3.I**
Analysis Date: **02/12/2018 19:47**
Dilution: 1
Analyst: **JLD1**
Prep Batch ID: **1738267**
Inj. Vol: **1 uL**
Batch ID: **1738268**

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	110	99	44-138
87-68-3	MS	Hexachlorobutadiene	111	0.00	U	69.5	63	26-98
59-50-7	MS	Parachlorometa cresol *4-Chloro-3-methylphenol*	111	0.00	U	84.8	76	41-122
91-57-6	MS	2-Methylnaphthalene	111	0.00	U	71.4	64	29-109
91-20-3	MS	Naphthalene	111	0.00	U	73.7	66	31-108
90-12-0	MS	1-Methylnaphthalene	111	0.00	U	74.2	67	33-112
77-47-4	MS	Hexachlorocyclopentadiene	111	0.00	U	24.5	22 *	26-79
88-06-2	MS	2,4,6-Trichlorophenol	111	0.00	U	81.6	73	39-124
95-95-4	MS	2,4,5-Trichlorophenol	111	0.00	U	78.2	70	42-120
91-58-7	MS	2-Chloronaphthalene	111	0.00	U	78.6	71	29-113
88-74-4	MS	2-Nitroaniline *o-Nitroaniline*	111	0.00	U	86.6	78	41-121
99-09-2	MS	3-Nitroaniline *m-Nitroaniline*	111	0.00	U	103	93	42-144
131-11-3	MS	Dimethylphthalate	111	0.00	U	93.2	84	45-128
606-20-2	MS	2,6-Dinitrotoluene	111	0.00	U	88.1	79	46-124
121-14-2	MS	2,4-Dinitrotoluene	111	0.00	U	88.2	79	45-125
208-96-8	MS	Acenaphthylene	111	0.00	U	83.2	75	35-120
83-32-9	MS	Acenaphthene	111	0.00	U	90.8	82	35-117
51-28-5	MS	2,4-Dinitrophenol	111	0.00	U	51.3	46	27-122
132-64-9	MS	Dibenzofuran	111	0.00	U	89.4	80	38-113
58-90-2	MS	2,3,4,6-Tetrachlorophenol	111	0.00	U	67.6	61	40-128
84-66-2	MS	Diethylphthalate	111	0.00	U	96.0	86	43-127
100-02-7	MS	4-Nitrophenol	111	0.00	U	40.8	37	17-85

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Matrix Spike**
Client ID: **CAWA-18-81MS**
Matrix: **W**
Lab Sample ID **1203969167**
Instrument: **MSD3.I**
Analysis Date: **02/12/2018 19:47**
Dilution: **1**
Analyst: **JLD1**
Prep Batch ID: **1738267**
Inj. Vol: **1 uL**
Batch ID: **1738268**

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	89.8	81	39-117
7005-72-3	MS	4-Chlorophenylphenylether	111	0.00	U	95.7	86	39-121
100-01-6	MS	4-Nitroaniline *p-Nitroaniline*	111	0.00	U	85.9	77	30-133
534-52-1	MS	2-Methyl-4,6-dinitrophenol	111	0.00	U	48.5	44	32-126
122-39-4	MS	Diphenylamine	111	0.00	U	88.3	79	37-118
122-66-7	MS	Azobenzene *1,2-Diphenylhydrazine*	111	0.00	U	85.8	77	38-120
101-55-3	MS	4-Bromophenylphenylether	111	0.00	U	94.4	85	39-121
118-74-1	MS	Hexachlorobenzene	111	0.00	U	94.5	85	40-118
87-86-5	MS	Pentachlorophenol	111	0.00	U	59.6	54	35-121
85-01-8	MS	Phenanthrene	111	0.00	U	91.3	82	40-115
120-12-7	MS	Anthracene	111	0.00	U	91.7	83	38-120
84-74-2	MS	Di-n-butylphthalate	111	0.00	U	103	93	41-128
206-44-0	MS	Fluoranthene	111	0.00	U	101	91	41-119
129-00-0	MS	Pyrene	111	0.00	U	85.7	77	35-128
85-68-7	MS	Butylbenzylphthalate	111	0.00	U	94.8	85	40-129
117-81-7	MS	bis(2-Ethylhexyl)phthalate	111	0.00	U	102	92	38-131
56-55-3	MS	Benzo(a)anthracene	111	0.00	U	91.4	82	39-120
218-01-9	MS	Chrysene	111	0.00	U	92.2	83	41-124
117-84-0	MS	Di-n-octylphthalate	111	0.00	U	95.3	86	37-134
205-99-2	MS	Benzo(b)fluoranthene	111	0.00	U	93.4	84	31-122
207-08-9	MS	Benzo(k)fluoranthene	111	0.00	U	96.6	87	33-123
50-32-8	MS	Benzo(a)pyrene	111	0.00	U	94.7	85	32-118

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Matrix Spike**
Client ID: **CAWA-18-81MS**
Matrix: **W**
Lab Sample ID **1203969167**
Instrument: **MSD3.I**
Analysis Date: **02/12/2018 19:47**
Dilution: **1**
Analyst: **JLD1**
Prep Batch ID: **1738267**
Inj. Vol: **1 uL**
Batch ID: **1738268**

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	87.0	78	27-121
53-70-3	MS	Dibenzo(a,h)anthracene	111	0.00	U	85.0	76	30-125
191-24-2	MS	Benzo(ghi)perylene	111	0.00	U	81.9	74	24-126
123-91-1	MS	1,4-Dioxane	111	0.00	U	72.5	65	24-110
930-55-2	MS	N-Nitrosopyrrolidine	111	0.00	U	93.2	84	47-119
95-94-3	MS	1,2,4,5-Tetrachlorobenzene	111	0.00	U	78.9	71	32-101
1912-24-9	MS	Atrazine	111	0.00	U	99.2	89	42-129
92-87-5	MS	Benzidine	222	0.00	U	217	98	15-130
91-94-1	MS	3,3'-Dichlorobenzidine	111	0.00	U	92.2	83	34-124
120-82-1	MS	1,2,4-Trichlorobenzene	111	0.00	U	71.4	64	26-102

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Sample Type: **Matrix Spike Duplicate**
Client ID: **CAWA-18-81MSD**
Matrix: **W**
Lab Sample ID **1203969168**
Instrument: **MSD3.I**
Analysis Date: **02/12/2018 20:16**
Dilution: **1**
Analyst: **JLD1**
Prep Batch ID: **1738267**
Inj. Vol: **1 uL**
Batch ID: **1738268**

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	58.9	53	25-106	15	0-30
110-86-1	MSD	Pyridine	111	0.00	U	58.8	53	24-93	22	0-30
62-53-3	MSD	Aniline	111	0.00	U	73.3	66	37-113	14	0-30
108-95-2	MSD	Phenol	111	0.00	U	47.7	43	23-82	15	0-30
111-44-4	MSD	bis(2-Chloroethyl) ether	111	0.00	U	76.7	69	39-114	15	0-30
95-57-8	MSD	2-Chlorophenol	111	0.00	U	73.5	66	37-108	14	0-30
541-73-1	MSD	1,3-Dichlorobenzene	111	0.00	U	60.2	54	27-97	14	0-30
106-46-7	MSD	1,4-Dichlorobenzene	111	0.00	U	60.2	54	28-97	14	0-30
95-50-1	MSD	1,2-Dichlorobenzene	111	0.00	U	61.2	55	28-99	15	0-30
108-60-1	MSD	bis(2-Chloro-1-methylethyl)ether	111	0.00	U	75.7	68	32-127	16	0-30
100-51-6	MSD	Benzyl alcohol	111	0.00	U	74.7	67	37-116	15	0-30
95-48-7	MSD	o-Cresol	111	0.00	U	71.0	64	34-109	14	0-30
65794-96-9	MSD	m,p-Cresols	111	0.00	U	77.7	70	36-120	13	0-30
621-64-7	MSD	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*	111	0.00	U	80.1	72	42-118	14	0-30
67-72-1	MSD	Hexachloroethane	111	0.00	U	54.1	49	29-94	16	0-30
98-95-3	MSD	Nitrobenzene	111	0.00	U	73.6	66	38-123	14	0-30
78-59-1	MSD	Isophorone	111	0.00	U	74.1	67	43-120	12	0-30
88-75-5	MSD	2-Nitrophenol	111	0.00	U	77.3	70	39-115	12	0-30
105-67-9	MSD	2,4-Dimethylphenol	111	0.00	U	62.4	56	39-107	13	0-30
111-91-1	MSD	bis(2-Chloroethoxy)methane	111	0.00	U	77.6	70	42-118	12	0-30
120-83-2	MSD	2,4-Dichlorophenol	111	0.00	U	77.1	69	40-111	11	0-30
65-85-0	MSD	Benzoic acid	222	0.00	U	92.2	41	17-95	3	0-30

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: **2018-1615**
Client ID: **CAWA-18-81MSD**
Lab Sample ID **1203969168**
Instrument: **MSD3.I**
Analyst: **JLD1**
Inj. Vol: **1 uL**

Sample Type: **Matrix Spike Duplicate**
Matrix: **W**
Analysis Date: **02/12/2018 20:16**
Prep Batch ID: **1738267**
Batch ID: **1738268**
Dilution: **1**

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
106-47-8	MSD	4-Chloroaniline	111	0.00	U	98.3	89	44-138	11	0-30
87-68-3	MSD	Hexachlorobutadiene	111	0.00	U	60.2	54	26-98	14	0-30
59-50-7	MSD	Parachlorometa cresol *4-Chloro-3-methylphenol*	111	0.00	U	75.0	68	41-122	12	0-30
91-57-6	MSD	2-Methylnaphthalene	111	0.00	U	63.6	57	29-109	11	0-30
91-20-3	MSD	Naphthalene	111	0.00	U	65.0	58	31-108	13	0-30
90-12-0	MSD	1-Methylnaphthalene	111	0.00	U	66.4	60	33-112	11	0-30
77-47-4	MSD	Hexachlorocyclopentadiene	111	0.00	U	20.6	19 *	26-79	18	0-30
88-06-2	MSD	2,4,6-Trichlorophenol	111	0.00	U	74.2	67	39-124	10	0-30
95-95-4	MSD	2,4,5-Trichlorophenol	111	0.00	U	70.0	63	42-120	11	0-30
91-58-7	MSD	2-Chloronaphthalene	111	0.00	U	71.4	64	29-113	10	0-30
88-74-4	MSD	2-Nitroaniline *o-Nitroaniline*	111	0.00	U	77.3	70	41-121	11	0-30
99-09-2	MSD	3-Nitroaniline *m-Nitroaniline*	111	0.00	U	90.6	82	42-144	13	0-30
131-11-3	MSD	Dimethylphthalate	111	0.00	U	83.3	75	45-128	11	0-30
606-20-2	MSD	2,6-Dinitrotoluene	111	0.00	U	78.6	71	46-124	11	0-30
121-14-2	MSD	2,4-Dinitrotoluene	111	0.00	U	78.0	70	45-125	12	0-30
208-96-8	MSD	Acenaphthylene	111	0.00	U	75.0	68	35-120	10	0-30
83-32-9	MSD	Acenaphthene	111	0.00	U	82.0	74	35-117	10	0-30
51-28-5	MSD	2,4-Dinitrophenol	111	0.00	U	49.2	44	27-122	4	0-30
132-64-9	MSD	Dibenzofuran	111	0.00	U	79.8	72	38-113	11	0-30
58-90-2	MSD	2,3,4,6-Tetrachlorophenol	111	0.00	U	61.5	55	40-128	10	0-30
84-66-2	MSD	Diethylphthalate	111	0.00	U	85.2	77	43-127	12	0-30
100-02-7	MSD	4-Nitrophenol	111	0.00	U	38.2	34	17-85	7	0-30

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-1615
Client ID: CAWA-18-81MSD
Lab Sample ID 1203969168
Instrument: MSD3.I
Analyst: JLD1
Inj. Vol: 1 uL

Sample Type: Matrix Spike Duplicate
Matrix: W
Analysis Date: 02/12/2018 20:16
Prep Batch ID: 1738267
Batch ID: 1738268
Dilution: 1

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	79.2	71	39-117	13	0-30
7005-72-3	MSD	4-Chlorophenylphenylether	111	0.00	U	84.4	76	39-121	13	0-30
100-01-6	MSD	4-Nitroaniline *p-Nitroaniline*	111	0.00	U	74.4	67	30-133	14	0-30
534-52-1	MSD	2-Methyl-4,6-dinitrophenol	111	0.00	U	47.2	43	32-126	3	0-30
122-39-4	MSD	Diphenylamine	111	0.00	U	79.0	71	37-118	11	0-30
122-66-7	MSD	Azobenzene *1,2-Diphenylhydrazine*	111	0.00	U	77.8	70	38-120	10	0-30
101-55-3	MSD	4-Bromophenylphenylether	111	0.00	U	83.7	75	39-121	12	0-30
118-74-1	MSD	Hexachlorobenzene	111	0.00	U	84.5	76	40-118	11	0-30
87-86-5	MSD	Pentachlorophenol	111	0.00	U	54.4	49	35-121	9	0-30
85-01-8	MSD	Phenanthrene	111	0.00	U	80.9	73	40-115	12	0-30
120-12-7	MSD	Anthracene	111	0.00	U	81.9	74	38-120	11	0-30
84-74-2	MSD	Di-n-butylphthalate	111	0.00	U	92.1	83	41-128	12	0-30
206-44-0	MSD	Fluoranthene	111	0.00	U	89.3	80	41-119	12	0-30
129-00-0	MSD	Pyrene	111	0.00	U	77.7	70	35-128	10	0-30
85-68-7	MSD	Butylbenzylphthalate	111	0.00	U	85.0	77	40-129	11	0-30
117-81-7	MSD	bis(2-Ethylhexyl)phthalate	111	0.00	U	91.1	82	38-131	11	0-30
56-55-3	MSD	Benzo(a)anthracene	111	0.00	U	82.8	74	39-120	10	0-30
218-01-9	MSD	Chrysene	111	0.00	U	83.7	75	41-124	10	0-30
117-84-0	MSD	Di-n-octylphthalate	111	0.00	U	84.9	76	37-134	12	0-30
205-99-2	MSD	Benzo(b)fluoranthene	111	0.00	U	80.8	73	31-122	15	0-30
207-08-9	MSD	Benzo(k)fluoranthene	111	0.00	U	82.9	75	33-123	15	0-30
50-32-8	MSD	Benzo(a)pyrene	111	0.00	U	82.3	74	32-118	14	0-30

Semi-Volatile

Quality Control Summary
Spike Recovery Report

SDG Number: 2018-1615
Client ID: CAWA-18-81MSD
Lab Sample ID 1203969168
Instrument: MSD3.I
Analyst: JLD1
Inj. Vol: 1 uL

Sample Type: Matrix Spike Duplicate
Matrix: W
Analysis Date: 02/12/2018 20:16
Prep Batch ID: 1738267
Batch ID: 1738268
Dilution: 1

CAS No		Parmname	Amount Added ug/L	Sample Conc. ug/L		Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
193-39-5	MSD	Indeno(1,2,3-cd)pyrene	111	0.00	U	85.9	77	27-121	1	0-30
53-70-3	MSD	Dibenzo(a,h)anthracene	111	0.00	U	84.2	76	30-125	1	0-30
191-24-2	MSD	Benzo(ghi)perylene	111	0.00	U	82.8	75	24-126	1	0-30
123-91-1	MSD	1,4-Dioxane	111	0.00	U	63.3	57	24-110	14	0-30
930-55-2	MSD	N-Nitrosopyrrolidine	111	0.00	U	82.3	74	47-119	12	0-30
95-94-3	MSD	1,2,4,5-Tetrachlorobenzene	111	0.00	U	72.7	65	32-101	8	0-30
1912-24-9	MSD	Atrazine	111	0.00	U	88.6	80	42-129	11	0-30
92-87-5	MSD	Benzidine	222	0.00	U	164	74	15-130	28	0-30
91-94-1	MSD	3,3'-Dichlorobenzidine	111	0.00	U	84.5	76	34-124	9	0-30
120-82-1	MSD	1,2,4-Trichlorobenzene	111	0.00	U	63.2	57	26-102	12	0-30

Method Blank Summary

SDG Number:	**2018-1615**	**Client:**	**ARSL004**	**Matrix:**	**WATER**
Client ID:	**MB for batch 1738267**	**Instrument ID:**	**MSD3.I**	**Data File:**	**s021218.s\s3b1209.D**
Lab Sample ID:	**1203969165**	**Prep Date:**	**02/12/2018 09:00**	**Analyzed:**	**02/12/18 15:51**
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 1738267	1203969166	s021218.s\s3b1210.D	02/12/18	1620
02	CAWA-18-34	443345003	s021218.s\s3b1211.D	02/12/18	1650
03	CAWA-18-81MS	1203969167	s021218.s\s3b1217.D	02/12/18	1947
04	CAWA-18-81MSD	1203969168	s021218.s\s3b1218.D	02/12/18	2016

Quality Control Data

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203969165**				
Client Sample:	**QC for batch 1738267**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1738267**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 15:51**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1209.D**	**Column:**	**DB-5ms**		

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

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203969165**				
Client Sample:	**QC for batch 1738267**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1738267**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 15:51**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1209.D**	**Column:**	**DB-5ms**		

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

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203969165**				
Client Sample:	**QC for batch 1738267**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**MB for batch 1738267**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 15:51**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1209.D**	**Column:**	**DB-5ms**		

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	88.9	100	ug/L	89	(32%-124%)
2-Fluorobiphenyl	37.3	50.0	ug/L	75	(32%-112%)
2-Fluorophenol	49.6	100	ug/L	50	(15%-88%)
Nitrobenzene-d5	40.1	50.0	ug/L	80	(36%-115%)
Phenol-d5	30.7	100	ug/L	31	(15%-91%)
p-Terphenyl-d14	51.7	50.0	ug/L	103	(36%-121%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
000079-01-6	Trichloroethylene	2.425	5.61	ug/L	99	NJ

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203969166**				
Client Sample:	**QC for batch 1738267**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1738267**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 16:20**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1210.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		39.2	ug/L	3.00	10.0
120-82-1	1,2,4-Trichlorobenzene		32.7	ug/L	3.00	10.0
95-50-1	1,2-Dichlorobenzene		30.8	ug/L	3.00	10.0
122-66-7	Azobenzene		40.8	ug/L	3.00	10.0
	1,2-Diphenylhydrazine					
541-73-1	1,3-Dichlorobenzene		30.0	ug/L	3.00	10.0
106-46-7	1,4-Dichlorobenzene		29.8	ug/L	3.00	10.0
123-91-1	1,4-Dioxane		26.2	ug/L	3.00	10.0
90-12-0	1-Methylnaphthalene		34.0	ug/L	0.300	1.00
58-90-2	2,3,4,6-Tetrachlorophenol		39.9	ug/L	3.00	10.0
95-95-4	2,4,5-Trichlorophenol		40.7	ug/L	3.00	10.0
88-06-2	2,4,6-Trichlorophenol		42.0	ug/L	3.00	10.0
120-83-2	2,4-Dichlorophenol		40.7	ug/L	3.00	10.0
105-67-9	2,4-Dimethylphenol		33.2	ug/L	3.00	10.0
51-28-5	2,4-Dinitrophenol		35.8	ug/L	5.00	20.0
121-14-2	2,4-Dinitrotoluene		39.9	ug/L	3.00	10.0
606-20-2	2,6-Dinitrotoluene		40.8	ug/L	3.00	10.0
91-58-7	2-Chloronaphthalene		37.9	ug/L	0.410	1.00
95-57-8	2-Chlorophenol		37.2	ug/L	3.00	10.0
534-52-1	2-Methyl-4,6-dinitrophenol		38.7	ug/L	3.00	10.0
91-57-6	2-Methylnaphthalene		32.3	ug/L	0.300	1.00
88-75-5	2-Nitrophenol		40.4	ug/L	3.00	10.0
91-94-1	3,3'-Dichlorobenzidine		50.2	ug/L	3.00	10.0
101-55-3	4-Bromophenylphenylether		44.6	ug/L	3.00	10.0
59-50-7	Parachlorometa cresol		38.1	ug/L	3.00	10.0
	4-Chloro-3-methylphenol					
106-47-8	4-Chloroaniline		49.3	ug/L	3.30	10.0
7005-72-3	4-Chlorophenylphenylether		44.6	ug/L	3.00	10.0
100-02-7	4-Nitrophenol		16.9	ug/L	3.00	10.0
83-32-9	Acenaphthene		43.4	ug/L	0.300	1.00
208-96-8	Acenaphthylene		39.4	ug/L	0.300	1.00
62-53-3	Aniline		36.7	ug/L	4.20	10.0
120-12-7	Anthracene		43.1	ug/L	0.300	1.00
1912-24-9	Atrazine		48.7	ug/L	3.00	10.0
92-87-5	Benzidine	E	128	ug/L	3.90	10.0
56-55-3	Benzo(a)anthracene		42.0	ug/L	0.300	1.00
50-32-8	Benzo(a)pyrene		42.4	ug/L	0.300	1.00
205-99-2	Benzo(b)fluoranthene		41.0	ug/L	0.300	1.00
191-24-2	Benzo(ghi)perylene		44.4	ug/L	0.300	1.00

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203969166**				
Client Sample:	**QC for batch 1738267**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1738267**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 16:20**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1210.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		41.9	ug/L	0.300	1.00
65-85-0	Benzoic acid		29.1	ug/L	6.00	20.0
100-51-6	Benzyl alcohol		33.3	ug/L	3.00	10.0
85-68-7	Butylbenzylphthalate		40.7	ug/L	3.00	10.0
218-01-9	Chrysene		42.1	ug/L	0.300	1.00
84-74-2	Di-n-butylphthalate		49.9	ug/L	3.00	10.0
117-84-0	Di-n-octylphthalate		37.4	ug/L	3.00	10.0
53-70-3	Dibenzo(a,h)anthracene		45.0	ug/L	0.300	1.00
132-64-9	Dibenzofuran		40.9	ug/L	3.00	10.0
84-66-2	Diethylphthalate		45.2	ug/L	3.00	10.0
131-11-3	Dimethylphthalate		43.9	ug/L	3.00	10.0
88-85-7	Dinoseb	U	3.00	ug/L	3.00	10.0
122-39-4	Diphenylamine		41.5	ug/L	3.00	10.0
206-44-0	Fluoranthene		49.0	ug/L	0.300	1.00
86-73-7	Fluorene		40.7	ug/L	0.300	1.00
118-74-1	Hexachlorobenzene		43.6	ug/L	3.00	10.0
87-68-3	Hexachlorobutadiene		31.1	ug/L	3.00	10.0
77-47-4	Hexachlorocyclopentadiene		19.5	ug/L	3.00	10.0
67-72-1	Hexachloroethane		27.0	ug/L	3.00	10.0
193-39-5	Indeno(1,2,3-cd)pyrene		44.4	ug/L	0.300	1.00
78-59-1	Isophorone		39.1	ug/L	3.50	10.0
62-75-9	N-Methyl-N-nitrosomethylamine		24.0	ug/L	3.00	10.0
924-16-3	N-Nitrosodi-n-butylamine	U	3.00	ug/L	3.00	10.0
55-18-5	N-Nitrosodiethylamine	U	3.00	ug/L	3.00	10.0
621-64-7	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*		40.7	ug/L	3.00	10.0
930-55-2	N-Nitrosopyrrolidine		37.9	ug/L	3.00	10.0
91-20-3	Naphthalene		32.9	ug/L	0.300	1.00
98-95-3	Nitrobenzene		38.9	ug/L	3.00	10.0
608-93-5	Pentachlorobenzene	U	3.00	ug/L	3.00	10.0
87-86-5	Pentachlorophenol		46.6	ug/L	3.00	10.0
85-01-8	Phenanthrene		42.6	ug/L	0.300	1.00
108-95-2	Phenol		14.8	ug/L	3.00	10.0
129-00-0	Pyrene		37.3	ug/L	0.300	1.00
110-86-1	Pyridine		27.5	ug/L	3.00	10.0
108-60-1	bis(2-Chloro-1-methylethyl)ether		39.7	ug/L	3.00	10.0
111-91-1	bis(2-Chloroethoxy)methane		40.9	ug/L	3.00	10.0
111-44-4	bis(2-Chloroethyl) ether		40.5	ug/L	3.00	10.0
117-81-7	bis(2-Ethylhexyl)phthalate		40.6	ug/L	3.00	1.00

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**			**Matrix:**	**WATER**
Lab Sample ID:	**1203969166**				
Client Sample:	**QC for batch 1738267**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**LCS for batch 1738267**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 16:20**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**1000 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1210.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		32.6	ug/L	3.70	10.0
99-09-2	3-Nitroaniline *m-Nitroaniline*		47.3	ug/L	3.00	10.0
95-48-7	o-Cresol		31.9	ug/L	3.00	10.0
88-74-4	2-Nitroaniline *o-Nitroaniline*		39.6	ug/L	3.00	10.0
100-01-6	4-Nitroaniline *p-Nitroaniline*		42.6	ug/L	3.00	10.0

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	88.8	100	ug/L	89	(32%-124%)
2-Fluorobiphenyl	33.7	50.0	ug/L	67	(32%-112%)
2-Fluorophenol	47.9	100	ug/L	48	(15%-88%)
Nitrobenzene-d5	38.1	50.0	ug/L	76	(36%-115%)
Phenol-d5	28.9	100	ug/L	29	(15%-91%)
p-Terphenyl-d14	42.5	50.0	ug/L	85	(36%-121%)

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203969167**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1738267**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81MS**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 19:47**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**450 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1217.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		78.9	ug/L	6.67	22.2
120-82-1	1,2,4-Trichlorobenzene		71.4	ug/L	6.67	22.2
95-50-1	1,2-Dichlorobenzene		70.8	ug/L	6.67	22.2
122-66-7	Azobenzene		85.8	ug/L	6.67	22.2
	1,2-Diphenylhydrazine					
541-73-1	1,3-Dichlorobenzene		69.4	ug/L	6.67	22.2
106-46-7	1,4-Dichlorobenzene		69.4	ug/L	6.67	22.2
123-91-1	1,4-Dioxane		72.5	ug/L	6.67	22.2
90-12-0	1-Methylnaphthalene		74.2	ug/L	0.667	2.22
58-90-2	2,3,4,6-Tetrachlorophenol		67.6	ug/L	6.67	22.2
95-95-4	2,4,5-Trichlorophenol		78.2	ug/L	6.67	22.2
88-06-2	2,4,6-Trichlorophenol		81.6	ug/L	6.67	22.2
120-83-2	2,4-Dichlorophenol		86.4	ug/L	6.67	22.2
105-67-9	2,4-Dimethylphenol		71.0	ug/L	6.67	22.2
51-28-5	2,4-Dinitrophenol		51.3	ug/L	11.1	44.4
121-14-2	2,4-Dinitrotoluene		88.2	ug/L	6.67	22.2
606-20-2	2,6-Dinitrotoluene		88.1	ug/L	6.67	22.2
91-58-7	2-Chloronaphthalene		78.6	ug/L	0.911	2.22
95-57-8	2-Chlorophenol		84.5	ug/L	6.67	22.2
534-52-1	2-Methyl-4,6-dinitrophenol		48.5	ug/L	6.67	22.2
91-57-6	2-Methylnaphthalene		71.4	ug/L	0.667	2.22
88-75-5	2-Nitrophenol		86.8	ug/L	6.67	22.2
91-94-1	3,3'-Dichlorobenzidine		92.2	ug/L	6.67	22.2
101-55-3	4-Bromophenylphenylether		94.4	ug/L	6.67	22.2
59-50-7	Parachlorometa cresol		84.8	ug/L	6.67	22.2
	4-Chloro-3-methylphenol					
106-47-8	4-Chloroaniline		110	ug/L	7.33	22.2
7005-72-3	4-Chlorophenylphenylether		95.7	ug/L	6.67	22.2
100-02-7	4-Nitrophenol		40.8	ug/L	6.67	22.2
83-32-9	Acenaphthene		90.8	ug/L	0.667	2.22
208-96-8	Acenaphthylene		83.2	ug/L	0.667	2.22
62-53-3	Aniline		84.6	ug/L	9.33	22.2
120-12-7	Anthracene		91.7	ug/L	0.667	2.22
1912-24-9	Atrazine		99.2	ug/L	6.67	22.2
92-87-5	Benzidine		217	ug/L	8.67	22.2
56-55-3	Benzo(a)anthracene		91.4	ug/L	0.667	2.22
50-32-8	Benzo(a)pyrene		94.7	ug/L	0.667	2.22
205-99-2	Benzo(b)fluoranthene		93.4	ug/L	0.667	2.22
191-24-2	Benzo(ghi)perylene		81.9	ug/L	0.667	2.22

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203969167**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1738267**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81MS**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 19:47**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**450 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1217.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		96.6	ug/L	0.667	2.22
65-85-0	Benzoic acid		94.8	ug/L	13.3	44.4
100-51-6	Benzyl alcohol		86.5	ug/L	6.67	22.2
85-68-7	Butylbenzylphthalate		94.8	ug/L	6.67	22.2
218-01-9	Chrysene		92.2	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		95.3	ug/L	6.67	22.2
53-70-3	Dibenzo(a,h)anthracene		85.0	ug/L	0.667	2.22
132-64-9	Dibenzofuran		89.4	ug/L	6.67	22.2
84-66-2	Diethylphthalate		96.0	ug/L	6.67	22.2
131-11-3	Dimethylphthalate		93.2	ug/L	6.67	22.2
88-85-7	Dinoseb	U	6.67	ug/L	6.67	22.2
122-39-4	Diphenylamine		88.3	ug/L	6.67	22.2
206-44-0	Fluoranthene		101	ug/L	0.667	2.22
86-73-7	Fluorene		89.8	ug/L	0.667	2.22
118-74-1	Hexachlorobenzene		94.5	ug/L	6.67	22.2
87-68-3	Hexachlorobutadiene		69.5	ug/L	6.67	22.2
77-47-4	Hexachlorocyclopentadiene		24.5	ug/L	6.67	22.2
67-72-1	Hexachloroethane		63.2	ug/L	6.67	22.2
193-39-5	Indeno(1,2,3-cd)pyrene		87.0	ug/L	0.667	2.22
78-59-1	Isophorone		83.7	ug/L	7.78	22.2
62-75-9	N-Methyl-N-nitrosomethylamine		68.6	ug/L	6.67	22.2
924-16-3	N-Nitrosodi-n-butylamine	U	6.67	ug/L	6.67	22.2
55-18-5	N-Nitrosodiethylamine	U	6.67	ug/L	6.67	22.2
621-64-7	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*		92.3	ug/L	6.67	22.2
930-55-2	N-Nitrosopyrrolidine		93.2	ug/L	6.67	22.2
91-20-3	Naphthalene		73.7	ug/L	0.667	2.22
98-95-3	Nitrobenzene		84.5	ug/L	6.67	22.2
608-93-5	Pentachlorobenzene	U	6.67	ug/L	6.67	22.2
87-86-5	Pentachlorophenol		59.6	ug/L	6.67	22.2
85-01-8	Phenanthrene		91.3	ug/L	0.667	2.22
108-95-2	Phenol		55.4	ug/L	6.67	22.2
129-00-0	Pyrene		85.7	ug/L	0.667	2.22
110-86-1	Pyridine		73.2	ug/L	6.67	22.2
108-60-1	bis(2-Chloro-1-methylethyl)ether		88.5	ug/L	6.67	22.2
111-91-1	bis(2-Chloroethoxy)methane		87.5	ug/L	6.67	22.2
111-44-4	bis(2-Chloroethyl) ether		89.0	ug/L	6.67	22.2
117-81-7	bis(2-Ethylhexyl)phthalate		102	ug/L	6.67	2.22

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203969167**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1738267**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81MS**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 19:47**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**450 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1217.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		88.7	ug/L	8.22	22.2
99-09-2	3-Nitroaniline *m-Nitroaniline*		103	ug/L	6.67	22.2
95-48-7	o-Cresol		81.6	ug/L	6.67	22.2
88-74-4	2-Nitroaniline *o-Nitroaniline*		86.6	ug/L	6.67	22.2
100-01-6	4-Nitroaniline *p-Nitroaniline*		85.9	ug/L	6.67	22.2

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	164	222	ug/L	74	(32%-124%)
2-Fluorobiphenyl	79.6	111	ug/L	72	(32%-112%)
2-Fluorophenol	140	222	ug/L	63	(15%-88%)
Nitrobenzene-d5	82.3	111	ug/L	74	(36%-115%)
Phenol-d5	109	222	ug/L	49	(15%-91%)
p-Terphenyl-d14	95.8	111	ug/L	86	(36%-121%)

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203969168**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1738267**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81MSD**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 20:16**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**450 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1218.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
95-94-3	1,2,4,5-Tetrachlorobenzene		72.7	ug/L	6.67	22.2
120-82-1	1,2,4-Trichlorobenzene		63.2	ug/L	6.67	22.2
95-50-1	1,2-Dichlorobenzene		61.2	ug/L	6.67	22.2
122-66-7	Azobenzene		77.8	ug/L	6.67	22.2
	1,2-Diphenylhydrazine					
541-73-1	1,3-Dichlorobenzene		60.2	ug/L	6.67	22.2
106-46-7	1,4-Dichlorobenzene		60.2	ug/L	6.67	22.2
123-91-1	1,4-Dioxane		63.3	ug/L	6.67	22.2
90-12-0	1-Methylnaphthalene		66.4	ug/L	0.667	2.22
58-90-2	2,3,4,6-Tetrachlorophenol		61.5	ug/L	6.67	22.2
95-95-4	2,4,5-Trichlorophenol		70.0	ug/L	6.67	22.2
88-06-2	2,4,6-Trichlorophenol		74.2	ug/L	6.67	22.2
120-83-2	2,4-Dichlorophenol		77.1	ug/L	6.67	22.2
105-67-9	2,4-Dimethylphenol		62.4	ug/L	6.67	22.2
51-28-5	2,4-Dinitrophenol		49.2	ug/L	11.1	44.4
121-14-2	2,4-Dinitrotoluene		78.0	ug/L	6.67	22.2
606-20-2	2,6-Dinitrotoluene		78.6	ug/L	6.67	22.2
91-58-7	2-Chloronaphthalene		71.4	ug/L	0.911	2.22
95-57-8	2-Chlorophenol		73.5	ug/L	6.67	22.2
534-52-1	2-Methyl-4,6-dinitrophenol		47.2	ug/L	6.67	22.2
91-57-6	2-Methylnaphthalene		63.6	ug/L	0.667	2.22
88-75-5	2-Nitrophenol		77.3	ug/L	6.67	22.2
91-94-1	3,3'-Dichlorobenzidine		84.5	ug/L	6.67	22.2
101-55-3	4-Bromophenylphenylether		83.7	ug/L	6.67	22.2
59-50-7	Parachlorometa cresol		75.0	ug/L	6.67	22.2
	4-Chloro-3-methylphenol					
106-47-8	4-Chloroaniline		98.3	ug/L	7.33	22.2
7005-72-3	4-Chlorophenylphenylether		84.4	ug/L	6.67	22.2
100-02-7	4-Nitrophenol		38.2	ug/L	6.67	22.2
83-32-9	Acenaphthene		82.0	ug/L	0.667	2.22
208-96-8	Acenaphthylene		75.0	ug/L	0.667	2.22
62-53-3	Aniline		73.3	ug/L	9.33	22.2
120-12-7	Anthracene		81.9	ug/L	0.667	2.22
1912-24-9	Atrazine		88.6	ug/L	6.67	22.2
92-87-5	Benzidine		164	ug/L	8.67	22.2
56-55-3	Benzo(a)anthracene		82.8	ug/L	0.667	2.22
50-32-8	Benzo(a)pyrene		82.3	ug/L	0.667	2.22
205-99-2	Benzo(b)fluoranthene		80.8	ug/L	0.667	2.22
191-24-2	Benzo(ghi)perylene		82.8	ug/L	0.667	2.22

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203969168**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1738267**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81MSD**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 20:16**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**450 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1218.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
207-08-9	Benzo(k)fluoranthene		82.9	ug/L	0.667	2.22
65-85-0	Benzoic acid		92.2	ug/L	13.3	44.4
100-51-6	Benzyl alcohol		74.7	ug/L	6.67	22.2
85-68-7	Butylbenzylphthalate		85.0	ug/L	6.67	22.2
218-01-9	Chrysene		83.7	ug/L	0.667	2.22
84-74-2	Di-n-butylphthalate		92.1	ug/L	6.67	22.2
117-84-0	Di-n-octylphthalate		84.9	ug/L	6.67	22.2
53-70-3	Dibenzo(a,h)anthracene		84.2	ug/L	0.667	2.22
132-64-9	Dibenzofuran		79.8	ug/L	6.67	22.2
84-66-2	Diethylphthalate		85.2	ug/L	6.67	22.2
131-11-3	Dimethylphthalate		83.3	ug/L	6.67	22.2
88-85-7	Dinoseb	U	6.67	ug/L	6.67	22.2
122-39-4	Diphenylamine		79.0	ug/L	6.67	22.2
206-44-0	Fluoranthene		89.3	ug/L	0.667	2.22
86-73-7	Fluorene		79.2	ug/L	0.667	2.22
118-74-1	Hexachlorobenzene		84.5	ug/L	6.67	22.2
87-68-3	Hexachlorobutadiene		60.2	ug/L	6.67	22.2
77-47-4	Hexachlorocyclopentadiene	J	20.6	ug/L	6.67	22.2
67-72-1	Hexachloroethane		54.1	ug/L	6.67	22.2
193-39-5	Indeno(1,2,3-cd)pyrene		85.9	ug/L	0.667	2.22
78-59-1	Isophorone		74.1	ug/L	7.78	22.2
62-75-9	N-Methyl-N-nitrosomethylamine		58.9	ug/L	6.67	22.2
924-16-3	N-Nitrosodi-n-butylamine	U	6.67	ug/L	6.67	22.2
55-18-5	N-Nitrosodiethylamine	U	6.67	ug/L	6.67	22.2
621-64-7	N-Nitrosodi--n-propylamine *N-Nitrosodipropylamine*		80.1	ug/L	6.67	22.2
930-55-2	N-Nitrosopyrrolidine		82.3	ug/L	6.67	22.2
91-20-3	Naphthalene		65.0	ug/L	0.667	2.22
98-95-3	Nitrobenzene		73.6	ug/L	6.67	22.2
608-93-5	Pentachlorobenzene	U	6.67	ug/L	6.67	22.2
87-86-5	Pentachlorophenol		54.4	ug/L	6.67	22.2
85-01-8	Phenanthrene		80.9	ug/L	0.667	2.22
108-95-2	Phenol		47.7	ug/L	6.67	22.2
129-00-0	Pyrene		77.7	ug/L	0.667	2.22
110-86-1	Pyridine		58.8	ug/L	6.67	22.2
108-60-1	bis(2-Chloro-1-methylethyl)ether		75.7	ug/L	6.67	22.2
111-91-1	bis(2-Chloroethoxy)methane		77.6	ug/L	6.67	22.2
111-44-4	bis(2-Chloroethyl) ether		76.7	ug/L	6.67	22.2
117-81-7	bis(2-Ethylhexyl)phthalate		91.1	ug/L	6.67	2.22

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**2018-1615**	**Date Collected:**	**02/06/2018 11:24**	**Matrix:**	**W**
Lab Sample ID:	**1203969168**	**Date Received:**	**02/08/2018 08:45**		
Client Sample:	**QC for batch 1738267**	**Client:**	**ARSL004**	**Project:**	**QC**
Client ID:	**CAWA-18-81MSD**	**Method:**	**SW846 3510C/8270D**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**1738268**	**Inst:**	**MSD3.I**	**Dilution:**	**1**
Run Date:	**02/12/2018 20:16**	**Analyst:**	**JLD1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/12/2018 09:00**	**Aliquot:**	**450 mL**	**Final Volume:**	**1 mL**
Data File:	**s021218.s\s3b1218.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
65794-96-9	m,p-Cresols		77.7	ug/L	8.22	22.2
99-09-2	3-Nitroaniline *m-Nitroaniline*		90.6	ug/L	6.67	22.2
95-48-7	o-Cresol		71.0	ug/L	6.67	22.2
88-74-4	2-Nitroaniline *o-Nitroaniline*		77.3	ug/L	6.67	22.2
100-01-6	4-Nitroaniline *p-Nitroaniline*		74.4	ug/L	6.67	22.2

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
2,4,6-Tribromophenol	150	222	ug/L	67	(32%-124%)
2-Fluorobiphenyl	75.3	111	ug/L	68	(32%-112%)
2-Fluorophenol	123	222	ug/L	55	(15%-88%)
Nitrobenzene-d5	73.6	111	ug/L	66	(36%-115%)
Phenol-d5	93.9	222	ug/L	42	(15%-91%)
p-Terphenyl-d14	88.9	111	ug/L	80	(36%-121%)

Perchlorates by LCMSMS Analysis

Case Narrative

Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-1615
Work Order #: 443345

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:	1738590
Prep Batch Number:	1738588

Sample Analysis

Sample ID	Client ID
443345002	443345002 (CAWA-18-33)
1203970044	Interference Check Sample (ICS)
1203970018	Method Blank (MB)
1203970019	Laboratory Control Sample (LCS)
1203970020	442852002(CrPZ-1-18-151275) Matrix Spike (MS)
1203970021	442852002(CrPZ-1-18-151275) 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 442852002 (CrPZ-1-18-151275) 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 1203970020 (CrPZ-1-18-151275MS) and 1203970021 (CrPZ-1-18-151275MSD). The non-conforming recoveries are attributed to the background concentration of Perchlorate in the parent sample, 2018-1588 (CrPZ-1-18-151275), and the need to dilute the samples at a 1:10 ratio.

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
Samples 1203970020 (CrPZ-1-18-151275MS) and 1203970021 (CrPZ-1-18-151275MSD) were diluted to bring the over range concentrations within the calibration range.

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: 2018-1615 GEL Work Order: 443345

The Qualifiers in this report are defined as follows:

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

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

Review/Validation

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

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

Signature: Michael A. Penny Jr. **Name: Michael Penny**

Date: 21 FEB 2018 **Title: Group Leader**

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Lab Code: GEL

Instrument: LCMSMS

Method: SW846 6850 Modified

Matrix: WATER

Extraction Batch ID: 1738588

Extraction Type: Filter/DAI

Sample Volume/Weight: 10.0 mL

Concentrated Extract Volume: 10.0

Client Sample No.
CAWA-18-33

Date Received: 08-FEB-18

GEL Job No (SDG): 2018-1615

GEL Sample ID: 443345002

Date Filtered: 12-FEB-18

Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.404	ug/L		1	13-FEB-18 18:58	per0213035a
	Perchlorate Isotope Ratio			2.92			1	13-FEB-18 18:58	per0213035a
14797-73-0	Perchlorate-101	.05	.2	0.430	ug/L		1	13-FEB-18 18:58	per0213035a
	Perchlorate-O(18)			0.539	ug/L		1	13-FEB-18 18:58	per0213035a

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

*Concentration = Instrument Value X $\frac{\text{Concentrated Extract Volume}}{\text{Aliquot}}$ X $\frac{1}{\%\text{Solids}}$

Quality Control Summary

Perchlorate Laboratory Control Sample

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No. (SDG): 2018-1615

Extract Batch Code: 1738588

Date Filtered: 12-FEB-18

Matrix: WATER

Sample ID: 1203970019

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.201	ug/L	101		85 - 115
Perchlorate Isotope Ratio		3.47				-
Perchlorate-101	0.200	.18	ug/L	90		85 - 115
Perchlorate-O(18)		.555	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): 2018-1615

Extract Batch Code: 1738588

Date Extracted: 12-FEB-18

GEL MS/PS ID: 1203970020

Client ID: CrPZ-1-18-151275

GEL MSD/PSD ID: 1203970021

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	10.4	ug/L	10.1	0 *	10.6	103	5	30	75 - 125
Perchlorate Isotope Ratio	0	3.04		3		2.99		0		-
Perchlorate-101	0.200	10.1	ug/L	9.88	0 *	10.4	174 *	5	30	75 - 125
Perchlorate-O(18)	0	4.64	ug/L	4.73		4.62		2		-

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

Quality Control Data

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Lab Code: GEL

Instrument: LCMSMS

Method: EPA 6850 Modified

Matrix: WATER

Extraction Batch ID: 1738588

Extraction Type: Filter/DAI

Sample Volume/Weight: 10.0 mL

Concentrated Extract Volume: 10.0

Client Sample No.
MB

Date Received: 12-FEB-18

GEL Job No (SDG): 2018-1615

GEL Sample ID: 1203970018

Date Filtered: 12-FEB-18

Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.050	ug/L	U	1	13-FEB-18 17:14	per0213022a
	Perchlorate Isotope Ratio						1	13-FEB-18 17:14	per0213022a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	13-FEB-18 17:14	per0213022a
	Perchlorate-O(18)			0.536	ug/L		1	13-FEB-18 17:14	per0213022a

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

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Lab Code: GEL

Instrument: LCMSMS

Method: EPA 6850 Modified

Matrix: WATER

Extraction Batch ID: 1738588

Extraction Type: Filter/DAI

Sample Volume/Weight: 10.0 mL

Concentrated Extract Volume: 10.0

Client Sample No.
LCS

Date Received: 12-FEB-18

GEL Job No (SDG): 2018-1615

GEL Sample ID: 1203970019

Date Filtered: 12-FEB-18

Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.201	ug/L		1	13-FEB-18 17:22	per0213023a
	Perchlorate Isotope Ratio			3.47			1	13-FEB-18 17:22	per0213023a
14797-73-0	Perchlorate-101	.05	.2	0.180	ug/L	J	1	13-FEB-18 17:22	per0213023a
	Perchlorate-O(18)			0.555	ug/L		1	13-FEB-18 17:22	per0213023a

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

*Concentration = Instrument Value X $\frac{\text{Concentrated Extract Volume}}{\text{Aliquot}}$ X $\frac{1}{\%\text{Solids}}$

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Lab Code: GEL

Instrument: LCMSMS

Method: SW846 6850 Modified

Matrix: WATER

Extraction Batch ID: 1738588

Extraction Type: Filter/DAI

Sample Volume/Weight: 10.0 mL

Concentrated Extract Volume: 10.0

Client Sample No.
ICS

Date Received:

GEL Job No (SDG): 2018-1615

GEL Sample ID: 1203970044

Date Filtered: 12-FEB-18

Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.228	ug/L		1	13-FEB-18 17:30	per0213024a
	Perchlorate Isotope Ratio			3.2			1	13-FEB-18 17:30	per0213024a
14797-73-0	Perchlorate-101	.05	.2	0.221	ug/L		1	13-FEB-18 17:30	per0213024a
	Perchlorate-O(18)			0.529	ug/L		1	13-FEB-18 17:30	per0213024a

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

*Concentration = Instrument Value X $\frac{\text{Concentrated Extract Volume}}{\text{Aliquot}}$ X $\frac{1}{\%\text{Solids}}$

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Lab Code: GEL

Instrument: LCMSMS

Method: SW846 6850 Modified

Matrix: WATER

Extraction Batch ID: 1738588

Extraction Type: Filter/DAI

Sample Volume/Weight: 10.0 mL

Concentrated Extract Volume: 10.0

Client Sample No.
CrPZ-1-18-151275MS

Date Received: 01-FEB-18

GEL Job No (SDG): 2018-1615

GEL Sample ID: 1203970020

Date Filtered: 12-FEB-18

Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.5	2	10.1	ug/L		10	16-FEB-18 18:06	per0216014a
	Perchlorate Isotope Ratio			3			10	16-FEB-18 18:06	per0216014a
14797-73-0	Perchlorate-101	.5	2	9.88	ug/L		10	16-FEB-18 18:06	per0216014a
	Perchlorate-O(18)			4.73	ug/L		10	16-FEB-18 18:06	per0216014a

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

*Concentration = Instrument Value X $\frac{\text{Concentrated Extract Volume}}{\text{Aliquot}}$ X $\frac{1}{\%\text{Solids}}$

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Lab Code: GEL

Instrument: LCMSMS

Method: SW846 6850 Modified

Matrix: WATER

Extraction Batch ID: 1738588

Extraction Type: Filter/DAI

Sample Volume/Weight: 10.0 mL

Concentrated Extract Volume: 10.0

Client Sample No.
CrPZ-1-18-151275MSD

Date Received: 01-FEB-18

GEL Job No (SDG): 2018-1615

GEL Sample ID: 1203970021

Date Filtered: 12-FEB-18

Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.5	2	10.6	ug/L		10	16-FEB-18 18:14	per0216015a
	Perchlorate Isotope Ratio			2.99			10	16-FEB-18 18:14	per0216015a
14797-73-0	Perchlorate-101	.5	2	10.4	ug/L		10	16-FEB-18 18:14	per0216015a
	Perchlorate-O(18)			4.62	ug/L		10	16-FEB-18 18:14	per0216015a

^ 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 #: 2018-1615
Work Order #: 443345

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:	1738503
Prep Batch Number:	1738498

Sample Analysis

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

Sample ID	Client ID
443345004	CAWA-18-34
1203969746	Method Blank (MB)
1203969747	Laboratory Control Sample (LCS)
1203969748	443438003(CAWA-18-72) Matrix Spike (MS)
1203969749	443438003(CAWA-18-72) 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 continuing calibration verification standards (CCV) have not met requirements of 80-120% for samples 1203969748 (CAWA-18-72MS) and 1203969749 (CAWA-18-72MSD) in this SDG. Please refer to Form 7 of the data package for a list of recoveries. A LLOQ level standard was analyzed following the biased low CCV with all target analytes meeting acceptance limits. Since the target analytes were not detected in the associated samples, the data are reported.

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 443438003 (CAWA-18-72) 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
1203969748MS and 1203969749MSD (CAWA-18-72)	2, 6-Diamino-4-nitrotoluene	RPD 38* (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 443345004 (CAWA-18-34) 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	443345
	004
RDX	5X

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: 2018-1615 GEL Work Order: 443345

The Qualifiers in this report are defined as follows:

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

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

Review/Validation

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

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

Signature: Michael A. Penny Jr. **Name: Michael Penny**

Date: 22 FEB 2018 **Title: Group Leader**

Sample Data Summary

High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-34

Lab Code: GEL

GEL Job No (SDG) 2018-1615

Matrix: WATER

GEL Sample ID: 443345004

Sample Amount 970 mL

Date Received: 08-FEB-18

Moisture:

Extraction Batch ID: 1738498

Extraction Type Sol Exchange

Date Extracted: 12-FEB-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0215040.wiff

Date Analyzed: 17-FEB-18 02:46

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.0825	U	0.0825	0.258
118-96-7	*2,4,6-Trinitrotoluene*				
121-14-2	2,4-Dinitrotoluene	.0825	U	0.0825	0.258
121-14-2	*2,4-Dinitrotoluene*				
13980-04-6	TNX	.0825	U	0.0825	0.258
13980-04-6	*TNX*				
479-45-8	Tetryl	.0825	U	0.0825	0.515
479-45-8	*Tetryl*				
606-20-2	2,6-Dinitrotoluene	.0825	U	0.0825	0.258
606-20-2	*2,6-Dinitrotoluene*				
80251-29-2	DNX	.0825	U	0.0825	0.258
80251-29-2	*DNX*				
98-95-3	Nitrobenzene	.0825	U	0.0825	0.258
98-95-3	*Nitrobenzene*				
99-08-1	m-Nitrotoluene	.0825	U	0.0825	0.258
99-08-1	*m-Nitrotoluene*				
99-35-4	1,3,5-Trinitrobenzene	.0825	U	0.0825	0.258
99-35-4	*1,3,5-Trinitrobenzene*				
99-65-0	m-Dinitrobenzene	.0825	U	0.0825	0.258
99-65-0	*m-Dinitrobenzene*				
88-72-2	o-Nitrotoluene	.0845	U	0.0845	0.258
88-72-2	*o-Nitrotoluene*				
5755-27-1	MNX	.0852	J	0.0825	0.258
5755-27-1	*MNX*				
78-11-5	PETN	.103	U	0.103	0.515
78-11-5	*PETN*				

High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-34

Lab Code: GEL

GEL Job No (SDG) 2018-1615

Matrix: WATER

GEL Sample ID: 443345004

Sample Amount 970 mL

Date Received: 08-FEB-18

Moisture:

Extraction Batch ID: 1738498

Extraction Type Sol Exchange

Date Extracted: 12-FEB-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-99-0	p-Nitrotoluene	.155	U	0.155	0.515
99-99-0	*p-Nitrotoluene*				
19406-51-0	4-Amino-2,6-dinitrotoluene	.302		0.0825	0.258
19406-51-0	*4-Amino-2,6-dinitrotoluene*				
3058-38-6	TATB	.309	U	0.309	1.03
3058-38-6	*TATB*				
618-87-1	3,5-Dinitroaniline	.309	U	0.309	1.03
618-87-1	*3,5-Dinitroaniline*				
78-30-8	tris(o-cresyl) phosphate	.309	U	0.309	1.03
78-30-8	*tris(o-cresyl) phosphate*				
35572-78-2	2-Amino-4,6-dinitrotoluene	.322		0.0825	0.258
35572-78-2	*2-Amino-4,6-dinitrotoluene*				
59229-75-3	2,6-Diamino-4-nitrotoluene	.515	U	0.515	2.58
59229-75-3	*2,6-Diamino-4-nitrotoluene*				
6629-29-4	2,4-Diamino-6-nitrotoluene	.515	U	0.515	2.58
6629-29-4	*2,4-Diamino-6-nitrotoluene*				
2691-41-0	HMX	1.27		0.0825	0.258
2691-41-0	*HMX*				

High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-34

Lab Code: GEL

GEL Job No (SDG) 2018-1615

Matrix: WATER

GEL Sample ID: 443345004

Sample Amount 970 mL

Date Received: 08-FEB-18

Moisture:

Extraction Batch ID: 1738498

Extraction Type Sol Exchange

Date Extracted: 12-FEB-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0219017.wiff

Date Analyzed: 20-FEB-18 02:17

Dilution Factor: 5

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
121-82-4	RDX	17.6		0.206	0.644
121-82-4	*RDX*				

Quality Control Summary

High Explosives Surrogate Recovery Summary

Lab Name: GEL Laboratories LLC **GEL Job No (SDG):** 2018-1615

Lab Code: GEL **HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
443345004	CAWA-18-34	87	55 - 115	
443345004	CAWA-18-34DL	90	55 - 115	
1203969746	MB for batch 1738498	95	55 - 115	
1203969747	LCS for batch 1738498	88	55 - 115	
1203969748	CAWA-18-72MS	87	55 - 115	
1203969749	CAWA-18-72MSD	88	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) 2018-1615

Extract Batch Code: 1738498

Date Extracted: 12-FEB-18

GEL LCS ID: 1203969747

GEL LCSDUP ID:

Analysis Date/Time: 17-FEB-18 02:10

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
TATB	3	2.52	84								47 - 135
TNX	5	3.71	74								51 - 110
Tetryl	5	4.26	85								55 - 122
m-Dinitrobenzene	5	4.96	99								74 - 117
m-Nitrotoluene	5	4.7	94								66 - 114
o-Nitrotoluene	5	4.63	93								64 - 115
p-Nitrotoluene	5	5.33	107								66 - 127
tris(o-cresyl) phosphate	5	2.91	58								43 - 104
1,3,5-Trinitrobenzene	5	4.83	97								70 - 110
2,4,6-Trinitrotoluene	5	4.9	98								69 - 113
2,4-Diamino-6-nitrotoluene	5	5.58	112								50 - 121
2,4-Dinitrotoluene	5	4.99	100								71 - 110
2,6-Diamino-4-nitrotoluene	5	3.73	75								53 - 127
2,6-Dinitrotoluene	5	4.84	97								72 - 105
2-Amino-4,6-dinitrotoluene	5	4.91	98								70 - 112
3,5-Dinitroaniline	5	4.56	91								70 - 121
4-Amino-2,6-dinitrotoluene	5	4.93	99								74 - 116
DNX	5	3.4	68								65 - 113
HMX	5	4	80								58 - 113
MNX	5	3.78	76								66 - 114
Nitrobenzene	5	4.46	89								64 - 115
PETN	5	4.69	94								57 - 126
RDX	5	3.85	77								64 - 117

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

High Explosives MS/MSD Summary

Lab Name: GEL Laboratories LLC

Client ID: CAWA-18-72

Lab Code: GEL

GEL Job No (SDG) 2018-1615

Extract Batch Code: 1738498

Date Extracted: 12-FEB-18

GEL Spike ID: 1203969748

GEL SpikeDup ID: 1203969749

Analysis Date/Time: 17-FEB-18 06:55

MSD Analysis Date/Time: 17-FEB-18 07:30

Reporting Units: ug/L

QC Type: MS/MSD

Compound	Spike Added	Sample Conc	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Rec Limits
m-Dinitrobenzene	5.49451	0	5.51	100	5.4	103	2	30	74 - 117
m-Nitrotoluene	5.49451	0	5.01	91	4.5	85	11	30	59 - 120
o-Nitrotoluene	5.49451	0	4.7	86	4.48	85	5	30	56 - 119
p-Nitrotoluene	5.49451	0	5.22	95	5.34	101	2	30	61 - 129
tris(o-cresyl) phosphate	5.49451	0	4.51	82	3.87	73	15	30	38 - 105
1,3,5-Trinitrobenzene	5.49451	0	5.48	100	4.78	91	14	30	67 - 111
2,4,6-Trinitrotoluene	5.49451	0	4.75	87	4.48	85	6	30	66 - 112
2,4-Diamino-6-nitrotoluene	5.49451	0	6.47	118	4.98	95	26	30	50 - 121
2,4-Dinitrotoluene	5.49451	0	5.28	96	5.03	96	5	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.49451	0	5.33	97	3.62	69	38 *	30	53 - 127
2,6-Dinitrotoluene	5.49451	0	5.32	97	4.64	88	14	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.49451	0	5.14	94	5.02	95	2	30	67 - 115
3,5-Dinitroaniline	5.49451	0	4.85	88	4.62	88	5	30	70 - 121
4-Amino-2,6-dinitrotoluene	5.49451	0	4.96	90	4.84	92	3	30	65 - 120
DNX	5.49451	0	4.56	83	3.82	73	18	30	53 - 124
HMX	5.49451	0	4.85	88	3.84	73	23	30	44 - 128
MNX	5.49451	0	4.69	85	3.82	73	20	30	60 - 121
Nitrobenzene	5.49451	0	5.24	95	4.97	94	5	30	62 - 116
PETN	5.49451	0	4.6	84	4.1	78	11	30	51 - 131
RDX	5.49451	0	4.81	87	4.27	81	12	30	57 - 125
TATB	3.2967	0	3.36	102	3.03	96	10	30	38 - 149
TNX	5.49451	0	4.6	84	3.52	67	27	30	46 - 120
Tetryl	5.49451	0	4.45	81	3.69	70	19	30	50 - 126

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

Quality Control Data

High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1738498

Lab Code: GEL

GEL Job No (SDG) 2018-1615

Matrix: WATER

GEL Sample ID: 1203969746

Sample Amount 1000 mL

Date Received: 08-FEB-18

Moisture:

Extraction Batch ID: 1738498

Extraction Type Sol Exchange

Date Extracted: 12-FEB-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0215038.wiff

Date Analyzed: 17-FEB-18 01:35

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
118-96-7	*2,4,6-Trinitrotoluene*				
121-14-2	2,4-Dinitrotoluene	.08	U	0.080	0.250
121-14-2	*2,4-Dinitrotoluene*				
121-82-4	RDX	.08	U	0.080	0.250
121-82-4	*RDX*				
13980-04-6	TNX	.08	U	0.080	0.250
13980-04-6	*TNX*				
19406-51-0	4-Amino-2,6-dinitrotoluene	.08	U	0.080	0.250
19406-51-0	*4-Amino-2,6-dinitrotoluene*				
2691-41-0	HMX	.08	U	0.080	0.250
2691-41-0	*HMX*				
35572-78-2	2-Amino-4,6-dinitrotoluene	.08	U	0.080	0.250
35572-78-2	*2-Amino-4,6-dinitrotoluene*				
479-45-8	Tetryl	.08	U	0.080	0.500
479-45-8	*Tetryl*				
5755-27-1	MNX	.08	U	0.080	0.250
5755-27-1	*MNX*				
606-20-2	2,6-Dinitrotoluene	.08	U	0.080	0.250
606-20-2	*2,6-Dinitrotoluene*				
80251-29-2	DNX	.08	U	0.080	0.250
80251-29-2	*DNX*				
98-95-3	Nitrobenzene	.08	U	0.080	0.250
98-95-3	*Nitrobenzene*				
99-08-1	m-Nitrotoluene	.08	U	0.080	0.250
99-08-1	*m-Nitrotoluene*				

High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1738498

Lab Code: GEL

GEL Job No (SDG) 2018-1615

Matrix: WATER

GEL Sample ID: 1203969746

Sample Amount 1000 mL

Date Received: 08-FEB-18

Moisture:

Extraction Batch ID: 1738498

Extraction Type Sol Exchange

Date Extracted: 12-FEB-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

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

High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1738498

Lab Code: GEL

GEL Job No (SDG) 2018-1615

Matrix: WATER

GEL Sample ID: 1203969747

Sample Amount 1000 mL

Date Received: 08-FEB-18

Moisture:

Extraction Batch ID: 1738498

Extraction Type Sol Exchange

Date Extracted: 12-FEB-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0215039.wiff

Date Analyzed: 17-FEB-18 02:10

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	2.52		0.300	1.00
3058-38-6	*TATB*				
78-30-8	tris(o-cresyl) phosphate	2.91		0.300	1.00
78-30-8	*tris(o-cresyl) phosphate*				
80251-29-2	DNX	3.4		0.080	0.250
80251-29-2	*DNX*				
13980-04-6	TNX	3.71		0.080	0.250
13980-04-6	*TNX*				
59229-75-3	2,6-Diamino-4-nitrotoluene	3.73		0.500	2.50
59229-75-3	*2,6-Diamino-4-nitrotoluene*				
5755-27-1	MNX	3.78		0.080	0.250
5755-27-1	*MNX*				
121-82-4	RDX	3.85		0.080	0.250
121-82-4	*RDX*				
2691-41-0	HMX	4		0.080	0.250
2691-41-0	*HMX*				
479-45-8	Tetryl	4.26		0.080	0.500
479-45-8	*Tetryl*				
98-95-3	Nitrobenzene	4.46		0.080	0.250
98-95-3	*Nitrobenzene*				
618-87-1	3,5-Dinitroaniline	4.56		0.300	1.00
618-87-1	*3,5-Dinitroaniline*				
88-72-2	o-Nitrotoluene	4.63		0.082	0.250
88-72-2	*o-Nitrotoluene*				
78-11-5	PETN	4.69		0.100	0.500
78-11-5	*PETN*				

High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1738498

Lab Code: GEL

GEL Job No (SDG) 2018-1615

Matrix: WATER

GEL Sample ID: 1203969747

Sample Amount 1000 mL

Date Received: 08-FEB-18

Moisture:

Extraction Batch ID: 1738498

Extraction Type Sol Exchange

Date Extracted: 12-FEB-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-08-1 *99-08-1*	m-Nitrotoluene *m-Nitrotoluene*	4.7		0.080	0.250
99-35-4 *99-35-4*	1,3,5-Trinitrobenzene *1,3,5-Trinitrobenzene*	4.83		0.080	0.250
606-20-2 *606-20-2*	2,6-Dinitrotoluene *2,6-Dinitrotoluene*	4.84		0.080	0.250
118-96-7 *118-96-7*	2,4,6-Trinitrotoluene *2,4,6-Trinitrotoluene*	4.9		0.080	0.250
35572-78-2 *35572-78-2*	2-Amino-4,6-dinitrotoluene *2-Amino-4,6-dinitrotoluene*	4.91		0.080	0.250
19406-51-0 *19406-51-0*	4-Amino-2,6-dinitrotoluene *4-Amino-2,6-dinitrotoluene*	4.93		0.080	0.250
99-65-0 *99-65-0*	m-Dinitrobenzene *m-Dinitrobenzene*	4.96		0.080	0.250
121-14-2 *121-14-2*	2,4-Dinitrotoluene *2,4-Dinitrotoluene*	4.99		0.080	0.250
99-99-0 *99-99-0*	p-Nitrotoluene *p-Nitrotoluene*	5.33		0.150	0.500
6629-29-4 *6629-29-4*	2,4-Diamino-6-nitrotoluene *2,4-Diamino-6-nitrotoluene*	5.58		0.500	2.50

High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-72(443438003MS)MS

Lab Code: GEL

GEL Job No (SDG) 2018-1615

Matrix: WATER

GEL Sample ID: 1203969748

Sample Amount 910 mL

Date Received: 08-FEB-18

Moisture:

Extraction Batch ID: 1738498

Extraction Type Sol Exchange

Date Extracted: 12-FEB-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0215047.wiff

Date Analyzed: 17-FEB-18 06:55

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	3.36		0.330	1.10
3058-38-6	*TATB*				
479-45-8	Tetryl	4.45		0.0879	0.549
479-45-8	*Tetryl*				
78-30-8	tris(o-cresyl) phosphate	4.51		0.330	1.10
78-30-8	*tris(o-cresyl) phosphate*				
80251-29-2	DNX	4.56		0.0879	0.275
80251-29-2	*DNX*				
13980-04-6	TNX	4.6		0.0879	0.275
13980-04-6	*TNX*				
78-11-5	PETN	4.6		0.110	0.549
78-11-5	*PETN*				
5755-27-1	MNX	4.69		0.0879	0.275
5755-27-1	*MNX*				
88-72-2	o-Nitrotoluene	4.7		0.0901	0.275
88-72-2	*o-Nitrotoluene*				
118-96-7	2,4,6-Trinitrotoluene	4.75		0.0879	0.275
118-96-7	*2,4,6-Trinitrotoluene*				
121-82-4	RDX	4.81		0.0879	0.275
121-82-4	*RDX*				
2691-41-0	HMX	4.85		0.0879	0.275
2691-41-0	*HMX*				
618-87-1	3,5-Dinitroaniline	4.85		0.330	1.10
618-87-1	*3,5-Dinitroaniline*				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.96		0.0879	0.275
19406-51-0	*4-Amino-2,6-dinitrotoluene*				

High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-72(443438003MS)MS

Lab Code: GEL

GEL Job No (SDG) 2018-1615

Matrix: WATER

GEL Sample ID: 1203969748

Sample Amount 910 mL

Date Received: 08-FEB-18

Moisture:

Extraction Batch ID: 1738498

Extraction Type Sol Exchange

Date Extracted: 12-FEB-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-08-1	m-Nitrotoluene	5.01		0.0879	0.275
99-08-1	*m-Nitrotoluene*				
35572-78-2	2-Amino-4,6-dinitrotoluene	5.14		0.0879	0.275
35572-78-2	*2-Amino-4,6-dinitrotoluene*				
99-99-0	p-Nitrotoluene	5.22		0.165	0.549
99-99-0	*p-Nitrotoluene*				
98-95-3	Nitrobenzene	5.24		0.0879	0.275
98-95-3	*Nitrobenzene*				
121-14-2	2,4-Dinitrotoluene	5.28		0.0879	0.275
121-14-2	*2,4-Dinitrotoluene*				
606-20-2	2,6-Dinitrotoluene	5.32		0.0879	0.275
606-20-2	*2,6-Dinitrotoluene*				
59229-75-3	2,6-Diamino-4-nitrotoluene	5.33		0.549	2.75
59229-75-3	*2,6-Diamino-4-nitrotoluene*				
99-35-4	1,3,5-Trinitrobenzene	5.48		0.0879	0.275
99-35-4	*1,3,5-Trinitrobenzene*				
99-65-0	m-Dinitrobenzene	5.51		0.0879	0.275
99-65-0	*m-Dinitrobenzene*				
6629-29-4	2,4-Diamino-6-nitrotoluene	6.47		0.549	2.75
6629-29-4	*2,4-Diamino-6-nitrotoluene*				

High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-72(443438003MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2018-1615

Matrix: WATER

GEL Sample ID: 1203969749

Sample Amount 950 mL

Date Received: 08-FEB-18

Moisture:

Extraction Batch ID: 1738498

Extraction Type Sol Exchange

Date Extracted: 12-FEB-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0215048.wiff

Date Analyzed: 17-FEB-18 07:30

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	3.03		0.316	1.05
3058-38-6	*TATB*				
13980-04-6	TNX	3.52		0.0842	0.263
13980-04-6	*TNX*				
59229-75-3	2,6-Diamino-4-nitrotoluene	3.62		0.526	2.63
59229-75-3	*2,6-Diamino-4-nitrotoluene*				
479-45-8	Tetryl	3.69		0.0842	0.526
479-45-8	*Tetryl*				
5755-27-1	MNX	3.82		0.0842	0.263
5755-27-1	*MNX*				
80251-29-2	DNX	3.82		0.0842	0.263
80251-29-2	*DNX*				
2691-41-0	HMX	3.84		0.0842	0.263
2691-41-0	*HMX*				
78-30-8	tris(o-cresyl) phosphate	3.87		0.316	1.05
78-30-8	*tris(o-cresyl) phosphate*				
78-11-5	PETN	4.1		0.105	0.526
78-11-5	*PETN*				
121-82-4	RDX	4.27		0.0842	0.263
121-82-4	*RDX*				
118-96-7	2,4,6-Trinitrotoluene	4.48		0.0842	0.263
118-96-7	*2,4,6-Trinitrotoluene*				
88-72-2	o-Nitrotoluene	4.48		0.0863	0.263
88-72-2	*o-Nitrotoluene*				
99-08-1	m-Nitrotoluene	4.5		0.0842	0.263
99-08-1	*m-Nitrotoluene*				

High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-18-72(443438003MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2018-1615

Matrix: WATER

GEL Sample ID: 1203969749

Sample Amount 950 mL

Date Received: 08-FEB-18

Moisture:

Extraction Batch ID: 1738498

Extraction Type Sol Exchange

Date Extracted: 12-FEB-18

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
618-87-1	3,5-Dinitroaniline	4.62		0.316	1.05
618-87-1	*3,5-Dinitroaniline*				
606-20-2	2,6-Dinitrotoluene	4.64		0.0842	0.263
606-20-2	*2,6-Dinitrotoluene*				
99-35-4	1,3,5-Trinitrobenzene	4.78		0.0842	0.263
99-35-4	*1,3,5-Trinitrobenzene*				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.84		0.0842	0.263
19406-51-0	*4-Amino-2,6-dinitrotoluene*				
98-95-3	Nitrobenzene	4.97		0.0842	0.263
98-95-3	*Nitrobenzene*				
6629-29-4	2,4-Diamino-6-nitrotoluene	4.98		0.526	2.63
6629-29-4	*2,4-Diamino-6-nitrotoluene*				
35572-78-2	2-Amino-4,6-dinitrotoluene	5.02		0.0842	0.263
35572-78-2	*2-Amino-4,6-dinitrotoluene*				
121-14-2	2,4-Dinitrotoluene	5.03		0.0842	0.263
121-14-2	*2,4-Dinitrotoluene*				
99-99-0	p-Nitrotoluene	5.34		0.158	0.526
99-99-0	*p-Nitrotoluene*				
99-65-0	m-Dinitrobenzene	5.4		0.0842	0.263
99-65-0	*m-Dinitrobenzene*				

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1615

Lab Code: GEL

Lab Sample ID: XIBLK01

Analysis Date: 15-FEB-18 18:40

GEL Data File: EXP0215001.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1615

Lab Code: GEL

Lab Sample ID: XIBLK01

Analysis Date: 15-FEB-18 19:15

GEL Data File: EXP0215002.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

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1615

Lab Code: GEL

Lab Sample ID: XIBLK01

Analysis Date: 19-FEB-18 16:48

GEL Data File: EXP0219001.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2018-1615

Lab Code: GEL

Lab Sample ID: XIBLK01

Analysis Date: 19-FEB-18 17:24

GEL Data File: EXP0219002.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): 2018-1615
Lab Code: GEL
Lab Sample ID: XIBLK02
Analysis Date: 16-FEB-18 00:00
GEL Data File: EXP0215010.wiff
Instrument ID: LCMSMS5
Column: 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
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC **GEL Job No(SDG):** 2018-1615

Lab Code: GEL **Lab Sample ID:** XIBLK03

Analysis Date: 16-FEB-18 02:22 **GEL Data File:** EXP0215014.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):** 2018-1615

Lab Code: GEL **Lab Sample ID:** XIBLK04

Analysis Date: 16-FEB-18 12:33 **GEL Data File:** EXP0215016.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):** 2018-1615

Lab Code: GEL **Lab Sample ID:** XIBLK05

Analysis Date: 16-FEB-18 13:09 **GEL Data File:** EXP0215017.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):** 2018-1615

Lab Code: GEL **Lab Sample ID:** XIBLK06

Analysis Date: 16-FEB-18 14:20 **GEL Data File:** EXP0215019.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): 2018-1615
Lab Code: GEL
Lab Sample ID: XIBLK07
Analysis Date: 16-FEB-18 20:51
GEL Data File: EXP0215030.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):** 2018-1615

Lab Code: GEL **Lab Sample ID:** XIBLK08

Analysis Date: 16-FEB-18 22:02 **GEL Data File:** EXP0215032.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):** 2018-1615

Lab Code: GEL **Lab Sample ID:** XIBLK09

Analysis Date: 17-FEB-18 00:59 **GEL Data File:** EXP0215037.wiff

Instrument ID: LCMSMS5 **Column:** Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC **GEL Job No(SDG):** 2018-1615

Lab Code: GEL **Lab Sample ID:** XIBLK10

Analysis Date: 17-FEB-18 03:57 **GEL Data File:** EXP0215042.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):** 2018-1615

Lab Code: GEL **Lab Sample ID:** XIBLK11

Analysis Date: 17-FEB-18 05:08 **GEL Data File:** EXP0215044.wiff

Instrument ID: LCMSMS5 **Column:** Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC **GEL Job No(SDG):** 2018-1615

Lab Code: GEL **Lab Sample ID:** XIBLK12

Analysis Date: 17-FEB-18 11:03 **GEL Data File:** EXP0215054.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):** 2018-1615

Lab Code: GEL **Lab Sample ID:** XIBLK13

Analysis Date: 17-FEB-18 12:14 **GEL Data File:** EXP0215056.wiff

Instrument ID: LCMSMS5 **Column:** 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
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC
GEL Job No(SDG): 2018-1615
Lab Code: GEL
Lab Sample ID: XIBLK02
Analysis Date: 19-FEB-18 22:08
GEL Data File: EXP0219010.wiff
Instrument ID: LCMSMS5
Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
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
m-Nitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC **GEL Job No(SDG):** 2018-1615

Lab Code: GEL **Lab Sample ID:** XIBLK03

Analysis Date: 20-FEB-18 00:30 **GEL Data File:** EXP0219014.wiff

Instrument ID: LCMSMS5 **Column:** Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0
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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC **GEL Job No(SDG):** 2018-1615

Lab Code: GEL **Lab Sample ID:** XIBLK04

Analysis Date: 20-FEB-18 04:03 **GEL Data File:** EXP0219020.wiff

Instrument ID: LCMSMS5 **Column:** Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
Nitrobenzene	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	0
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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC **GEL Job No(SDG):** 2018-1615

Lab Code: GEL **Lab Sample ID:** XIBLK05

Analysis Date: 20-FEB-18 05:15 **GEL Data File:** EXP0219022.wiff

Instrument ID: LCMSMS5 **Column:** Ultracarb Phenomenex 5u ODS (20)

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

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-1615
Work Order #: 443345

Sample ID	Client ID
443345002	CAWA-18-33
443345003	CAWA-18-34
1203968032	Method Blank (MB)**ICP**
1203968033	Laboratory Control Sample (LCS)
1203968036	443345002(CAWA-18-33L) Serial Dilution (SD)
1203968034	443345002(CAWA-18-33D) Sample Duplicate (DUP)
1203968035	443345002(CAWA-18-33S) Matrix Spike (MS)
1203968048	Method Blank (MB)**ICP-MS**
1203968049	Laboratory Control Sample (LCS)
1203968052	443345002(CAWA-18-33L) Serial Dilution (SD)
1203968050	443345002(CAWA-18-33D) Sample Duplicate (DUP)
1203968051	443345002(CAWA-18-33S) Matrix Spike (MS)
1203968776	Method Blank (MB)**CVAA**
1203968777	Laboratory Control Sample (LCS)
1203968780	443360002(CAWA-18-80L) Serial Dilution (SD)
1203968778	443360002(CAWA-18-80D) Sample Duplicate (DUP)
1203968779	443360002(CAWA-18-80S) Matrix Spike (MS)

Sample Analysis

Samples 443345002 and 003 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1737862, 1737866, 1738152 and 1744377
Prep Batch :	1737861, 1737865 and 1738151
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: 443345002 (CAWA-18-33)-ICP and ICP-MS and 443360002 (CAWA-18-80)-CVAA.

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

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

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

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

Technical Information

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

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

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

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

Miscellaneous Information

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

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

Hardness = 2.497 (Ca) + 4.118 (Mg)

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

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

Client SDG: 2018-1615 GEL Work Order: 443345

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

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

Date: 05 MAR 2018 **Title: Data Validator**

Sample Data Summary

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−1615 **CONTRACT:** ESHL00114 **METHOD TYPE:** EPA

SAMPLE ID: 443345002 **BASIS:** As Received **DATE COLLECTED** 06−FEB−18

CLIENT ID: CAWA−18−33 **LEVEL:** Low **DATE RECEIVED** 08−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	02/12/18 10:59	021218W1−3	1738152

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−1615 **CONTRACT:** ESHL00114 **METHOD TYPE:** SW846

SAMPLE ID: 443345002 **BASIS:** As Received **DATE COLLECTED** 06−FEB−18

CLIENT ID: CAWA−18−33 **LEVEL:** Low **DATE RECEIVED** 08−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	68	ug/L	U	68	200	200	1	P	HSC	03/02/18 09:13	030218−1	1737862
7440−36−0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	02/09/18 21:30	180209−2	1737866
7440−38−2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	02/09/18 21:30	180209−2	1737866
7440−39−3	Barium	5.15	ug/L		1	5	5	1	P	HSC	03/02/18 09:13	030218−1	1737862
7440−41−7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	03/02/18 09:13	030218−1	1737862
7440−42−8	Boron	15	ug/L	U	15	50	50	1	P	HSC	03/02/18 09:13	030218−1	1737862
7440−43−9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	02/09/18 21:30	180209−2	1737866
7440−70−2	Calcium	14000	ug/L		50	200	200	1	P	HSC	03/02/18 09:13	030218−1	1737862
7440−47−3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	02/09/18 21:30	180209−2	1737866
7440−48−4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	03/02/18 09:13	030218−1	1737862
7440−50−8	Copper	3	ug/L	U	3	10	10	1	P	HSC	03/02/18 09:13	030218−1	1737862
7439−89−6	Iron	30	ug/L	U	30	100	100	1	P	HSC	03/02/18 09:13	030218−1	1737862
7439−92−1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	02/09/18 21:30	180209−2	1737866
7439−95−4	Magnesium	4540	ug/L		110	300	300	1	P	HSC	03/02/18 09:13	030218−1	1737862
7439−96−5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	03/02/18 09:13	030218−1	1737862
7439−98−7	Molybdenum	0.912	ug/L		0.2	0.5	0.5	1	MS	BAJ	02/09/18 21:30	180209−2	1737866
7440−02−0	Nickel	0.70	ug/L	J	0.6	2	2	1	MS	BAJ	02/09/18 21:30	180209−2	1737866
7440−09−7	Potassium	1870	ug/L		50	150	150	1	P	HSC	03/02/18 09:13	030218−1	1737862
7782−49−2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	02/09/18 21:30	180209−2	1737866
7631−86−9	Silica	46000	ug/L		53	213	213	1	P	HSC	03/02/18 09:13	030218−1	1737862
7440−22−4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	02/09/18 21:30	180209−2	1737866
7440−23−5	Sodium	13600	ug/L		100	300	300	1	P	HSC	03/02/18 09:13	030218−1	1737862
7440−24−6	Strontium	91.1	ug/L		1	5	5	1	P	HSC	03/02/18 09:13	030218−1	1737862
7440−28−0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	02/09/18 21:30	180209−2	1737866
7440−31−5	Tin	2.5	ug/L	U	2.5	10	10	1	P	HSC	03/02/18 09:13	030218−1	1737862
7440−61−1	Uranium	0.720	ug/L		0.067	0.2	0.2	1	MS	BAJ	02/09/18 21:30	180209−2	1737866
7440−62−2	Vanadium	2.18	ug/L	J	1	5	5	1	P	HSC	03/02/18 09:13	030218−1	1737862
7440−66−6	Zinc	3.49	ug/L	J	3.3	10	10	1	P	HSC	03/02/18 09:13	030218−1	1737862

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−1615 **CONTRACT:** ESHL00114 **METHOD TYPE:**

SAMPLE ID: 443345002 **BASIS:** As Received **DATE COLLECTED** 06−FEB−18

CLIENT ID: CAWA−18−33 **LEVEL:** Low **DATE RECEIVED** 08−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	53.7	mg/L		0.453	1.24	1.24	1		TXT1	03/05/18 15:11		1744377

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1737862	1737861	SW846 3005A	50	mL	50	mL	02/08/18	JXM8
1737866	1737865	SW846 3005A	50	mL	50	mL	02/08/18	JXM8
1738152	1738151	EPA 245.1/245.2 Prep	20	mL	20	mL	02/09/18	AXS5

***Analytical Methods:**

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

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2018−1615 **CONTRACT:** ESHL00114 **METHOD TYPE:** EPA

SAMPLE ID: 443345003 **BASIS:** As Received **DATE COLLECTED** 06−FEB−18

CLIENT ID: CAWA−18−34 **LEVEL:** Low **DATE RECEIVED** 08−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	02/12/18 11:01	021218W1−3	1738152

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1738152	1738151	EPA 245.1/245.2 Prep	20	mL	20	mL	02/09/18	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
−3b−
PREPARATION BLANK SUMMARY

SDG NO. 2018−1615
Contract: ESHL00114
Matrix: W

Sample ID	Analyte	Result	Units	Acceptance Window	Conc Qual	M*	MDL	RDL
1203968032								
	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
1203968048								
	Antimony	1	ug/L	+/−3	U	MS	1	3
	Arsenic	2	ug/L	+/−5	U	MS	2	5
	Cadmium	0.3	ug/L	+/−1	U	MS	0.3	1
	Chromium	3	ug/L	+/−10	U	MS	3	10
	Lead	0.5	ug/L	+/−2	U	MS	0.5	2
	Molybdenum	0.2	ug/L	+/−0.5	U	MS	0.2	0.5
	Nickel	0.6	ug/L	+/−2	U	MS	0.6	2
	Selenium	2	ug/L	+/−5	U	MS	2	5
	Silver	0.3	ug/L	+/−1	U	MS	0.3	1
	Thallium	0.6	ug/L	+/−2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/−0.2	U	MS	0.067	0.2
1203968776								
	Mercury	0.067	ug/L	+/−1	U	AV	0.067	1

***Analytical Methods:**

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

METALS
−5a−

Matrix Spike Summary

SDG NO. 2018−1615 **Client ID** CAWA−18−33S

Contract: ESHL00114 **Level:** Low

Matrix: WATER **% Solids:**

Sample ID: 443345002 **Spike ID:** 1203968035

Analyte	Units	Acceptance Limit	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M*
Aluminum	ug/L	75−125	4740		68	U	5000	94.8		P
Barium	ug/L	75−125	465		5.15		500	91.9		P
Beryllium	ug/L	75−125	461		1	U	500	92.2		P
Boron	ug/L	75−125	470		15	U	500	93.8		P
Calcium	ug/L	75−125	18300		14000		5000	84.9		P
Cobalt	ug/L	75−125	460		1	U	500	92		P
Copper	ug/L	75−125	478		3	U	500	95.6		P
Iron	ug/L	75−125	4470		30	U	5000	89.2		P
Magnesium	ug/L	75−125	8890		4540		5000	87		P
Manganese	ug/L	75−125	470		2	U	500	93.9		P
Potassium	ug/L	75−125	6480		1870		5000	92.1		P
Silica	ug/L		54700		46000		10700	81.2	N/A	P
Sodium	ug/L	75−125	17500		13600		5000	77.8		P
Strontium	ug/L	75−125	554		91.1		500	92.5		P
Tin	ug/L	75−125	469		2.5	U	500	93.8		P
Vanadium	ug/L	75−125	476		2.18	J	500	94.8		P
Zinc	ug/L	75−125	459		3.49	J	500	91.1		P

***Analytical Methods:**

P **SW846 3005A/6010C**

METALS
−5a−

Matrix Spike Summary

SDG NO. 2018−1615 **Client ID** CAWA−18−33S

Contract: ESHL00114 **Level:** Low

Matrix: WATER **% Solids:**

Sample ID: 443345002 **Spike ID:** 1203968051

Analyte	Units	Acceptance Limit	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M*
Antimony	ug/L	75−125	50.6		1	U	50	100		MS
Arsenic	ug/L	75−125	51.6		2	U	50	101		MS
Cadmium	ug/L	75−125	52.3		0.3	U	50	105		MS
Chromium	ug/L	75−125	53.1		3	U	50	104		MS
Lead	ug/L	75−125	49.9		0.5	U	50	99.8		MS
Molybdenum	ug/L	75−125	54.7		0.912		50	108		MS
Nickel	ug/L	75−125	53.5		0.7	J	50	106		MS
Selenium	ug/L	75−125	50.4		2	U	50	101		MS
Silver	ug/L	75−125	51.7		0.3	U	50	103		MS
Thallium	ug/L	75−125	49.4		0.6	U	50	98.9		MS
Uranium	ug/L	75−125	50.4		0.72		50	99.4		MS

***Analytical Methods:**

MS SW846 3005A/6020A

METALS
−5a−

Matrix Spike Summary

SDG NO. 2018−1615 **Client ID** CAWA−18−80S

Contract: ESHL00114 **Level:** Low

Matrix: WATER **% Solids:**

Sample ID: 443360002 **Spike ID:** 1203968779

Analyte	Units	Acceptance Limit	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M*
Mercury	ug/L	75−125	2.08		0.067	U	2	104		AV

***Analytical Methods:**

AV **EPA 245.1/245.2**

Metals
−6−
Duplicate Sample Summary

SDG No.: 2018−1615 **Lab Code:** GEL

Contract: ESHL00114 **Client ID:** CAWA−18−33D

Matrix: WATER **Level:** Low

Sample ID: 443345002 **Duplicate ID:** 1203968034 **Percent Solids for Dup:** N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68	U	68	U			P
Barium	ug/L	+/−5	5.15		5.26		2.17		P
Beryllium	ug/L		1	U	1	U			P
Boron	ug/L		15	U	15	U			P
Calcium	ug/L	+/−20%	14000		14400		2.83		P
Cobalt	ug/L		1	U	1	U			P
Copper	ug/L		3	U	3	U			P
Iron	ug/L		30	U	30	U			P
Magnesium	ug/L	+/−20%	4540		4610		1.61		P
Manganese	ug/L		2	U	2	U			P
Potassium	ug/L	+/−20%	1870		1940		3.71		P
Silica	ug/L	+/−20%	46000		46900		1.91		P
Sodium	ug/L	+/−20%	13600		14000		2.57		P
Strontium	ug/L	+/−20%	91.1		94.1		3.24		P
Tin	ug/L		2.5	U	2.5	U			P
Vanadium	ug/L	+/−5	2.18	J	1.74	J	22.7		P
Zinc	ug/L	+/−10	3.49	J	6.96	J	66.4		P

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

Metals
−6−
Duplicate Sample Summary

SDG No.: 2018−1615 **Lab Code:** GEL

Contract: ESHL00114 **Client ID:** CAWA−18−33D

Matrix: WATER **Level:** Low

Sample ID: 443345002 **Duplicate ID:** 1203968050 **Percent Solids for Dup:** N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1	U	1	U			MS
Arsenic	ug/L		2	U	2	U			MS
Cadmium	ug/L		0.3	U	0.3	U			MS
Chromium	ug/L		3	U	3	U			MS
Lead	ug/L		0.5	U	0.5	U			MS
Molybdenum	ug/L	+/−.5	0.912		0.894		1.99		MS
Nickel	ug/L	+/−2	0.7	J	0.756	J	7.69		MS
Selenium	ug/L		2	U	2	U			MS
Silver	ug/L		0.3	U	0.3	U			MS
Thallium	ug/L		0.6	U	0.6	U			MS
Uranium	ug/L	+/−.2	0.72		0.703		2.39		MS

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

Metals
−6−
Duplicate Sample Summary

SDG No.: 2018−1615 **Lab Code:** GEL

Contract: ESHL00114 **Client ID:** CAWA−18−80D

Matrix: WATER **Level:** Low

Sample ID: 443360002 **Duplicate ID:** 1203968778 **Percent Solids for Dup:** N/A

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

***Analytical Methods:**
AV EPA 245.1/245.2

METALS
−7−
Laboratory Control Sample Summary

SDG NO. 2018−1615

Contract: ESHL00114

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

Sample ID	Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limit	M*
1203968033								
	Aluminum	ug/L	5000	4870		97.5	80−120	P
	Barium	ug/L	500	475		94.9	80−120	P
	Beryllium	ug/L	500	466		93.2	80−120	P
	Boron	ug/L	500	474		94.9	80−120	P
	Calcium	ug/L	5000	4710		94.1	80−120	P
	Cobalt	ug/L	500	474		94.8	80−120	P
	Copper	ug/L	500	486		97.2	80−120	P
	Iron	ug/L	5000	4590		91.7	80−120	P
	Magnesium	ug/L	5000	4700		93.9	80−120	P
	Manganese	ug/L	500	488		97.7	80−120	P
	Potassium	ug/L	5000	4780		95.5	80−120	P
	Silica	ug/L	10700	10100		94.3	80−120	P
	Sodium	ug/L	5000	4630		92.7	80−120	P
	Strontium	ug/L	500	486		97.1	80−120	P
	Tin	ug/L	500	478		95.6	80−120	P
	Vanadium	ug/L	500	485		97	80−120	P
	Zinc	ug/L	500	468		93.5	80−120	P

***Analytical Methods:**

P **SW846 3005A/6010C**

METALS
−7−
Laboratory Control Sample Summary

SDG NO. 2018−1615

Contract: ESHL00114

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

Sample ID	Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limit	M*
1203968049								
	Antimony	ug/L	50	49		98.1	80−120	MS
	Arsenic	ug/L	50	50.4		101	80−120	MS
	Cadmium	ug/L	50	50.8		102	80−120	MS
	Chromium	ug/L	50	49.8		99.7	80−120	MS
	Lead	ug/L	50	50		100	80−120	MS
	Molybdenum	ug/L	50	51		102	80−120	MS
	Nickel	ug/L	50	52.6		105	80−120	MS
	Selenium	ug/L	50	49.6		99.1	80−120	MS
	Silver	ug/L	50	51.5		103	80−120	MS
	Thallium	ug/L	50	48		95.9	80−120	MS
	Uranium	ug/L	50	48		96	80−120	MS

***Analytical Methods:**

MS **SW846 3005A/6020A**

METALS
−7−
Laboratory Control Sample Summary

SDG NO. 2018−1615

Contract: ESHL00114

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

Sample ID	Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limit	M*
1203968777								
	Mercury	ug/L	2	2.09		104	85−115	AV

***Analytical Methods:**

AV **EPA 245.1/245.2**

METALS
−9−
Serial Dilution Sample Summary

SDG NO. 2018−1615 **Client ID** CAWA−18−33L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 443345002 **Serial Dilution ID:** 1203968036

Analyte	Initial Value ug/L	C	Serial Value ug/L	C	% Difference	Qual	Acceptance Limit	M*
Aluminum	68	U	340	U				P
Barium	5.15		5.42	J	5.253			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	14000		14200		1.28		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	4540		4610		1.644			P
Manganese	2	U	10	U				P
Potassium	1870		1660		11.338			P
Silica	46000		45000		2.321		10	P
Sodium	13600		13800		1.182		10	P
Strontium	91.1		91.5		.363		10	P
Tin	2.5	U	12.5	U				P
Vanadium	2.18	J	5	U	35.691			P
Zinc	3.49	J	16.5	U	351.842			P

***Analytical Methods:**

P **SW846 3005A/6010C**

METALS
−9−
Serial Dilution Sample Summary

SDG NO. 2018−1615 **Client ID** CAWA−18−33L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 443345002 **Serial Dilution ID:** 1203968052

Analyte	Initial Value ug/L	C	Serial Value ug/L	C	% Difference	Qual	Acceptance Limit	M*
Antimony	1	U	5	U				MS
Arsenic	2	U	10	U				MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	.912		1.07	J	17.325			MS
Nickel	.7	J	3	U	.714			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.72		.745	J	3.472			MS

***Analytical Methods:**

MS **SW846 3005A/6020A**

METALS
−9−
Serial Dilution Sample Summary

SDG NO. 2018−1615 **Client ID** CAWA−18−80L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 443360002 **Serial Dilution ID:** 1203968780

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

***Analytical Methods:**

AV **EPA 245.1/245.2**

General Chem Analysis

Case Narrative

General Chemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2018-1615
Work Order #: 443345

Method/Analysis Information

Product:	**Carbon and Total Organic**		
Analytical Batch:	1738436	**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
443345003	CAWA-18-34
1203969627	Method Blank (MB)
1203969628	Laboratory Control Sample (LCS)
1203969630	443345003(CAWA-18-34) Sample Duplicate (DUP)
1203969633	443345003(CAWA-18-34) 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 443345003 (CAWA-18-34) was selected for QC analysis.

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

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

Technical Information

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

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

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

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

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

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

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

Method/Analysis Information

Product:	**Cyanide and Total**		
Analytical Batch:	1737905	**Method:**	WSP-CN(T)
Prep Batch :	1737904	**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
443345003	CAWA-18-34
1203968143	Method Blank (MB)
1203968144	Laboratory Control Sample (LCS)
1203968145	443345003(CAWA-18-34) Sample Duplicate (DUP)
1203968934	443434001(NonSDG) Sample Duplicate (DUP)
1203968146	443345003(CAWA-18-34) Matrix Spike (MS)
1203968935	443434001(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-095 REV# 21.

Preparation/Analytical Method Verification

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

Calibration Information

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

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

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

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

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

Quality Control (QC) Information

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

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

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

Quality Control (QC) Designation
Samples 443345003 (CAWA-18-34) and 443434001 (NonSDG) were selected for QC analysis.

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

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

Technical Information

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

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

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

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

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

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

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

Method/Analysis Information

Product:	**Ion Chromatography**		
Analytical Batch:	1738628	**Method:**	WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
443345002	CAWA-18-33
1203970118	Method Blank (MB)
1203970119	Laboratory Control Sample (LCS)
1203970120	443360002(CAWA-18-80) Sample Duplicate (DUP)
1203970121	443360002(CAWA-18-80) 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 443360002 (CAWA-18-80) was selected for QC analysis.

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

Analyte	Sample	Value
Fluoride	1203970121 (CAWA-18-80PS)	126* (75%-125%)
Sulfate	1203970121 (CAWA-18-80PS)	146* (75%-125%)

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 443345002 (CAWA-18-33) 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	443345 002
Chloride	2X

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

Miscellaneous Information

Manual Integrations
Samples 1203970120 (CAWA-18-80DUP), 1203970121 (CAWA-18-80PS) and 443345002 (CAWA-18-33) were manually integrated to correctly position the baseline as set in the calibration standards.

Additional Comments
Additional comments were not required for this SDG.

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

Method/Analysis Information

Product:	**Ammonia Nitrogen**		
Analytical Batch:	1737833	**Method:**	NH3
Prep Batch :	1737831	**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
443345002	CAWA-18-33
1203967963	Method Blank (MB)
1203967964	Laboratory Control Sample (LCS)
1203967965	443343002(CrPZ-2-18-151289) Sample Duplicate (DUP)
1203967966	443343002(CrPZ-2-18-151289) Matrix Spike (MS)

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

SOP Reference
Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-106 REV# 10.

Preparation/Analytical Method Verification

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

Calibration Information

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

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

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

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

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

acceptance limits.

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

Quality Control (QC) Information

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

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

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

Quality Control (QC) Designation
Sample 443343002 (CrPZ-2-18-151289) was selected for QC analysis.

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

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

Technical Information

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

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

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

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

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

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

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

Method/Analysis Information

Product:	**Total Kjeldahl Nitrogen**		
Analytical Batch:	1738103	**Method:**	TKN
Prep Batch :	1738102	**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
443345003	CAWA-18-34
1203968650	Method Blank (MB)
1203968651	Laboratory Control Sample (LCS)
1203968652	443345003(CAWA-18-34) Sample Duplicate (DUP)
1203968653	443345003(CAWA-18-34) Matrix Spike (MS)

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

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

Preparation/Analytical Method Verification

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

Calibration Information

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

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

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

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

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

acceptance limits.

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

Quality Control (QC) Information

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

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

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

Quality Control (QC) Designation
Sample 443345003 (CAWA-18-34) 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:	**Nitrate Nitrite by Cadmium Reduction**		
Analytical Batch:	1737615	**Method:**	NO3NO2

Sample Analysis

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

Sample ID	Client ID
443345002	CAWA-18-33
1203967396	Method Blank (MB)
1203967397	Laboratory Control Sample (LCS)
1203968156	443360002(CAWA-18-80) Sample Duplicate (DUP)
1203968157	443360002(CAWA-18-80) 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 443360002 (CAWA-18-80) was selected for QC analysis.

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

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

Technical Information

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

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

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

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

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

Electronic Packaging Comment
This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:
Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are

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

Method/Analysis Information

Product:	**Total Phosphorus**		
Analytical Batch:	1737836	**Method:**	PO4
Prep Batch :	1737834	**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
443345002	CAWA-18-33
1203967971	Method Blank (MB)
1203967972	Laboratory Control Sample (LCS)
1203968186	443343002(CrPZ-2-18-151289) Sample Duplicate (DUP)
1203968187	443343002(CrPZ-2-18-151289) 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 443343002 (CrPZ-2-18-151289) was selected for QC analysis.

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

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

Technical Information

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

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

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

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

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

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

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

Method/Analysis Information

Product:	**Solids and Total Dissolved**		
Analytical Batch:	1738394	**Method:**	TDS

Sample Analysis

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

Sample ID	Client ID
443345002	CAWA-18-33
1203969493	Method Blank (MB)
1203969494	Laboratory Control Sample (LCS)
1203969495	443345002(CAWA-18-33) 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 443345002 (CAWA-18-33) 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:	1738543	**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
443345002	CAWA-18-33
1203970773	Laboratory Control Sample (LCS)
1203969858	443105002(CrPZ-2-18-151284) 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

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 443105002 (CrPZ-2-18-151284) 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: 1737969 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
443345002	CAWA-18-33
1203968359	Laboratory Control Sample (LCS)
1203968361	443360002(CAWA-18-80) 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 443360002 (CAWA-18-80) 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
1203968361 (CAWA-18-80DUP)	pH	Received 08-FEB-18, out of holding 06-FEB-18
443345002 (CAWA-18-33)	pH	Received 08-FEB-18, out of holding 06-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:	1737964	**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
443345002	CAWA-18-33
1203968350	Laboratory Control Sample (LCS)
1203968352	443360002(CAWA-18-80) Sample Duplicate (DUP)
1203968356	443360002(CAWA-18-80) 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 443360002 (CAWA-18-80) was selected for QC analysis.

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

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

Technical Information

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

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

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

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

Miscellaneous Information

Additional Comments
Additional comments were not required for this SDG.

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

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

Client SDG: 2018-1615 GEL Work Order: 443345

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: Kristen Mizzell **Name: Kristen Mizzell**

Date: 01 MAR 2018 **Title: Team Leader**

Sample Data Summary

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

Certificate of Analysis

Report Date: March 1, 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: 2018-1615

Client Sample ID: CAWA-18-33
Sample ID: 443345002
Matrix: W
Collect Date: 06-FEB-18 12:20
Receive Date: 08-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	0.134	0.067	0.200	mg/L		1	MAR1	02/12/18	1824	1738628	1
Fluoride		0.177	0.033	0.100	mg/L		1					
Sulfate		7.19	0.133	0.400	mg/L		1					
Chloride		12.6	0.134	0.400	mg/L		2	MAR1	02/14/18	0254	1738628	2
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0632	0.017	0.050	mg/L	1.00	1	KLP1	02/09/18	1012	1737833	3
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.962	0.017	0.050	mg/L		1	AXH3	02/09/18	0918	1737615	4
PO4 "As Received"												
Phosphorus, Total as P		0.0522	0.020	0.050	mg/L	1.00	1	KLP1	02/09/18	1557	1737836	5
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		147	3.40	14.3	mg/L			KLP1	02/13/18	1227	1738394	6
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		62.8	1.45	4.00	mg/L			RXB5	02/10/18	1215	1737964	7
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		188	1.00	1.00	umhos/cm		1	VH1	02/13/18	1032	1738543	8
PH "As Received"												
pH at Temp 14.2C	H	7.29	0.010	0.100	SU		1	RXB5	02/10/18	1212	1737969	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	02/09/18	0738	1737831
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	02/09/18	1000	1737834

GEL LABORATORIES LLC
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Certificate of Analysis

Report Date: March 1, 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: 2018-1615

Client Sample ID: CAWA-18-33
Sample ID: 443345002

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

Certificate of Analysis

Report Date: March 1, 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: 2018-1615

Client Sample ID: CAWA-18-34
Sample ID: 443345003
Matrix: W
Collect Date: 06-FEB-18 12:20
Receive Date: 08-FEB-18
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.842	0.330	1.00	mg/L		1	TSM	02/20/18	1931	1738436	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	02/12/18	0718	1737905	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	J	0.0371	0.033	0.100	mg/L	1.00	1	KLP1	02/09/18	1359	1738103	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	02/12/18	0712	1737904
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	02/09/18	1000	1738102

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

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

Quality Control Summary

QC Summary

Report Date: March 1, 2018

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

Contact: **Ms. Nita Patel**

Workorder: **443345**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Carbon Analysis										
Batch 1738436										
QC1203969630 443345003 DUP										
Total Organic Carbon Average	J	0.842	J	0.803	mg/L	4.74 ^		(+/-1.00)	TSM	02/20/18 20:11
QC1203969628 LCS										
Total Organic Carbon Average	10.0			10.7	mg/L		107	(80%-120%)		02/20/18 17:32
QC1203969627 MB										
Total Organic Carbon Average			U	ND	mg/L					02/20/18 17:22
QC1203969633 443345003 PS										
Total Organic Carbon Average	10.0 J	0.842		13.3	mg/L		125	(75%-125%)		02/20/18 20:50
Flow Injection Analysis										
Batch 1737905										
QC1203968145 443345003 DUP										
Cyanide, Total	U	ND	U	ND	ug/L	N/A			AXH3	02/12/18 07:19
QC1203968934 443434001 DUP										
Cyanide, Total	U	ND	U	ND	ug/L	N/A				02/12/18 07:33
QC1203968144 LCS										
Cyanide, Total	50.0			49.9	ug/L		99.8	(90%-110%)		02/12/18 07:17
QC1203968143 MB										
Cyanide, Total			U	ND	ug/L					02/12/18 07:16
QC1203968146 443345003 MS										
Cyanide, Total	100 U	ND		107	ug/L		107	(90%-110%)		02/12/18 07:20
QC1203968935 443434001 MS										
Cyanide, Total	100 U	ND		105	ug/L		105	(90%-110%)		02/12/18 07:34

QC Summary

Workorder: **443345**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography											
Batch 1738628											
QC1203970120 443360002 DUP											
Bromide		U	ND	U	ND	mg/L	N/A			MAR1	02/12/18 19:26
Chloride			1.43		1.43	mg/L	0.112		(0%-20%)		
Fluoride			0.133		0.146	mg/L	9.9 ^		(+/-0.100)		
Sulfate			2.74		2.75	mg/L	0.35		(0%-20%)		
QC1203970119 LCS											
Bromide	1.25				1.28	mg/L		102	(80%-120%)		02/12/18 17:53
Chloride	5.00				4.53	mg/L		90.6	(80%-120%)		
Fluoride	2.50				2.35	mg/L		94.1	(80%-120%)		
Sulfate	10.0				9.39	mg/L		93.9	(80%-120%)		
QC1203970118 MB											
Bromide				U	ND	mg/L					02/12/18 17:22
Chloride				U	ND	mg/L					
Fluoride				U	ND	mg/L					
Sulfate				U	ND	mg/L					
QC1203970121 443360002 PS											
Bromide	1.25	U	ND		1.51	mg/L		117	(75%-125%)		02/12/18 19:57
Chloride	5.00		1.43		7.29	mg/L		117	(75%-125%)		

QC Summary

Workorder: **443345**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography										
Batch 1738628										
Fluoride	2.50	0.133		3.27	mg/L		126*	(75%-125%)	MAR1	02/12/18 19:57
Sulfate	10.0	2.74		17.4	mg/L		146*	(75%-125%)		
Nutrient Analysis										
Batch 1737615										
QC1203968156 443360002 DUP										
Nitrogen, Nitrate/Nitrite		0.593		0.593	mg/L	0		(0%-20%)	AXH3	02/09/18 09:20
QC1203967397 LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.05	mg/L		105	(90%-110%)		02/09/18 08:44
QC1203967396 MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					02/09/18 08:43
QC1203968157 443360002 PS										
Nitrogen, Nitrate/Nitrite	1.00	0.593		1.54	mg/L		94.7	(90%-110%)		02/09/18 09:21
Batch 1737833										
QC1203967965 443343002 DUP										
Nitrogen, Ammonia		0.0789	J	0.0404	mg/L	64.5 ^		(+/-0.050)	KLP1	02/09/18 10:11
QC1203967964 LCS										
Nitrogen, Ammonia	1.00			0.995	mg/L		99.5	(90%-110%)		02/09/18 10:00
QC1203967963 MB										
Nitrogen, Ammonia			U	ND	mg/L					02/09/18 09:59
QC1203967966 443343002 MS										
Nitrogen, Ammonia	1.00	0.0789		1.06	mg/L		98.1	(90%-110%)		02/09/18 10:11
Batch 1737836										
QC1203968186 443343002 DUP										
Phosphorus, Total as P		0.213		0.227	mg/L	6.36 ^		(+/-0.050)	KLP1	02/09/18 15:51

QC Summary

Workorder: **443345**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Nutrient Analysis											
Batch 1737836											
QC1203967972 LCS											
Phosphorus, Total as P	1.00				1.04	mg/L		104	(80%-124%)	KLP1	02/09/18 15:38
QC1203967971 MB											
Phosphorus, Total as P				U	ND	mg/L					02/09/18 15:37
QC1203968187 443343002 MS											
Phosphorus, Total as P	1.00		0.213		1.25	mg/L		104	(63%-139%)		02/09/18 15:51
Batch 1738103											
QC1203968652 443345003 DUP											
Nitrogen, Total Kjeldahl		J	0.0371	U	ND	mg/L	200 ^			KLP1	02/09/18 14:00
QC1203968651 LCS											
Nitrogen, Total Kjeldahl	1.00				0.961	mg/L		96.1	(90%-110%)		02/09/18 13:58
QC1203968650 MB											
Nitrogen, Total Kjeldahl				U	ND	mg/L					02/09/18 13:58
QC1203968653 443345003 MS											
Nitrogen, Total Kjeldahl	1.00	J	0.0371		0.981	mg/L		94.4	(90%-110%)		02/09/18 14:01
Solids Analysis											
Batch 1738394											
QC1203969495 443345002 DUP											
Total Dissolved Solids			147		150	mg/L	1.92		(0%-5%)	KLP1	02/13/18 12:27
QC1203969494 LCS											
Total Dissolved Solids	300				293	mg/L		97.6	(95%-105%)		02/13/18 12:27
QC1203969493 MB											
Total Dissolved Solids				U	ND	mg/L					02/13/18 12:27

QC Summary

Workorder: **443345**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Titration and Ion Analysis										
Batch 1737964										
QC1203968352 443360002 DUP										
Alkalinity, Total as CaCO3		52.6		53.4	mg/L	1.51		(0%-20%)	RXB5	02/10/18 12:23
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A				
QC1203968350 LCS										
Alkalinity, Total as CaCO3	100			107	mg/L		107	(90%-110%)		02/10/18 11:26
QC1203968356 443360002 MS										
Alkalinity, Total as CaCO3	100	52.6		158	mg/L		106	(80%-120%)		02/10/18 12:23
Batch 1737969										
QC1203968361 443360002 DUP										
pH	H	7.74	H	7.79	SU	0.644		(0%-5%)	RXB5	02/10/18 12:18
QC1203968359 LCS										
pH	7.00			7.04	SU		101	(99%-101%)		02/10/18 11:17
Batch 1738543										
QC1203969858 443105002 DUP										
Conductivity		594		593	umhos/cm	0.185		(0%-10%)	VH1	02/13/18 10:26
QC1203970773 LCS										
Conductivity	1410			1420	umhos/cm		101	(95%-105%)		02/13/18 10:24

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

QC Summary

Workorder: **443345**

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 #: 2018-1615
Work Order #: 443345

Method/Analysis Information

Product:	**Alphaspec Am241 Liquid**
Analytical Method:	HASL-300:AM-241
Analytical Batch Number:	1737914

Sample ID	Client ID
443345003	CAWA-18-34
1203968158	Method Blank (MB)
1203968160	Laboratory Control Sample (LCS)
1203968159	443360003(CAWA-18-81) 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 1203968158 (MB) and 1203968160 (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: 443360003 (CAWA-18-81). The QC was from ARSL work order 443360.

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:	1737915

Sample ID	Client ID
443345003	CAWA-18-34
1203968161	Method Blank (MB)
1203968163	Laboratory Control Sample (LCS)
1203968162	443360003(CAWA-18-81) 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 1203968161 (MB) and 1203968163 (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: 443360003 (CAWA-18-81). The QC was from ARSL work order 443360.

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:	1737916

Sample ID	Client ID
443345003	CAWA-18-34
1203968164	Method Blank (MB)

1203968166	Laboratory Control Sample (LCS)
1203968165	443360003(CAWA-18-81) 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 1203968164 (MB) and 1203968166 (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: 443360003 (CAWA-18-81). The QC was from ARSL work order 443360.

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

RDL Met
The method RDL has been met.

Technical Information:

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

Negative > 3 sigma TPU
Sample result are not more negative than three sigma TPU.

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

Recounts
Sample 1203968166 (LCS) was recounted due to high carrier/tracer yield. The recount is reported.

Miscellaneous Information:

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

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

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

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	**Gammaspec**
Analytical Method:	EPA:901.1
Analytical Batch Number:	1738193

Sample ID	Client ID
443345003	CAWA-18-34
1203968984	Method Blank (MB)
1203968986	Laboratory Control Sample (LCS)
1203968985	443345003(CAWA-18-34) 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, July 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 (See Below) result is greater than 1.65 times the CSU but less than the MDC.

Sample	Analyte	Value
1203968984 (MB)	Neptunium-237	Blank result > 1.65 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: 443345003 (CAWA-18-34). The QC was from ARSL work order 443345.

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:	1738564

Sample ID	Client ID
443345003	CAWA-18-34
1203969932	Method Blank (MB)
1203969935	Laboratory Control Sample (LCS)
1203969933	443345003(CAWA-18-34) Sample Duplicate (DUP)
1203969934	443345003(CAWA-18-34) 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 1203969932 (MB) and 1203969935 (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: 443345003 (CAWA-18-34). The QC was from ARSL work order 443345.

Matrix Spike (MS) Recovery
The MS spike recoveries met acceptance limits.

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

Sample	Analyte	Value
1203969933 (CAWA-18-34DUP)	Strontium-90	RPD 0 N/A RER 1.39* (0-1)

RDL Met
The method RDL has been met.

Technical Information:

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

Negative > 3 sigma TPU
Sample result are not more negative than three sigma TPU.

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

Recounts
Sample 443345003 (CAWA-18-34) was recounted due to results more negative than the three sigma TPU. The second count is reported.

Miscellaneous Information:

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

Additional Comments
The matrix spike, 1203969934 (CAWA-18-34MS), 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:	1738567

Sample ID	Client ID
443345003	CAWA-18-34
1203969942	Method Blank (MB)
1203969946	Laboratory Control Sample (LCS)
1203969943	443549002(CAWA-18-4) Sample Duplicate (DUP)
1203969944	443549002(CAWA-18-4) Matrix Spike (MS)
1203969945	443549002(CAWA-18-4) 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 1203969942 (MB) and 1203969946 (LCS) were changed to 1.0 per client request.

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

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

Sample	Analyte	Value
1203969942 (MB)	BETA	Blank result > 1.65 CSU

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

Sample	Analyte	Value
1203969942 (MB)	ALPHA and BETA	Blank result > DL

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

Designated QC
The following sample was used for QC: 443549002 (CAWA-18-4). The QC was from ARSL work order 443549.

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
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 and matrix spike duplicate, 1203969944 (CAWA-18-4MS) and 1203969945 (CAWA-18-4MSD), 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

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: 2018-1615 GEL Work Order: 443345

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: Heather McCarty **Name: Heather McCarty**

Date: 01 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
Report Date: March 1, 2018
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client Sample ID: CAWA-18-34
Sample ID: 443345003
Matrix: W
Collect Date: 06-FEB-18
Receive Date: 08-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.
Rad Alpha Spec Analysis															
Alphaspec Am241 Liquid "As Received"															
Americium-241	U	0.00316	+/-0.00387	0.0267	0.0112	+/-0.00388	0.050	pCi/L			EXC2	02/12/18	1529	1737914	1
ISOPU "As Received"															
Plutonium-238	U	0.0162	+/-0.007	0.0351	0.0148	+/-0.00703	0.050	pCi/L			EXC2	02/12/18	1629	1737915	2
Plutonium-239/240	U	0.0101	+/-0.00534	0.0283	0.0114	+/-0.00536	0.050	pCi/L							
IsoU "As Received"															
Uranium-234		0.590	+/-0.0393	0.116	0.0546	+/-0.0489	1.00	pCi/L			EXC2	02/13/18	1340	1737916	3
Uranium-235/236	U	0.0339	+/-0.0141	0.0645	0.0281	+/-0.0142	1.00	pCi/L							
Uranium-238		0.264	+/-0.0269	0.0586	0.0259	+/-0.0298	0.500	pCi/L							
Rad Gamma Spec Analysis															
Gammaspec "As Received"															
Cesium-137	U	1.60	+/-1.82	6.42	2.88	+/-1.86	8.00	pCi/L			MJH1	02/09/18	1217	1738193	4
Cobalt-60	U	-0.706	+/-1.94	7.33	3.16	+/-1.94	8.00	pCi/L							
Neptunium-237	U	1.20	+/-4.26	15.0	7.05	+/-4.27		pCi/L							
Potassium-40	U	-1.86	+/-21.4	82.3	36.1	+/-21.4		pCi/L							
Sodium-22	U	-2.26	+/-1.70	5.95	2.49	+/-1.78		pCi/L							
Rad Gas Flow Proportional Counting															
GFPC, Sr90, liquid "As Received"															
Strontium-90	U	-0.326	+/-0.118	0.493	0.225	+/-0.118	0.500	pCi/L			LXB3	02/20/18	1141	1738564	5
WSP-GrossA/B "As Received"															
Beta	U	-0.021	+/-0.482	1.85	0.792	+/-0.482	3.00	pCi/L			BXG2	02/22/18	1644	1738567	6
Alpha		2.01	+/-0.822	1.99	0.590	+/-0.840	3.00	pCi/L			BXG2	02/23/18	1107	1738567	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"	1737914	104	(50%-105%)
Plutonium-242 Tracer	ISOPU "As Received"	1737915	86.3	(50%-105%)
Uranium-232 Tracer	IsoU "As Received"	1737916	73.4	(50%-105%)

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
Report Date: March 1, 2018
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client Sample ID: CAWA-18-34
Sample ID: 443345003
Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery		**Test**										**Batch ID**	**Recovery%**	**Acceptable Limits**	
Strontium Carrier		GFPC, Sr90, liquid "As Received"										1738564	105	(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

QC Summary

Client : **Los Alamos National Laboratory**
TA-00, SM1237, Rm104C
Los Alamos, New Mexico
Contact: **Ms. Nita Patel**
Workorder: **443345**

Report Date: March 1, 2018

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1737914										
QC1203968159 443360003 DUP										
Americium-241	U	-0.00486	U	0.00	pCi/L	0.17		(0-1)	EXC2	02/12/18 15:29
	Uncert:	+/-0.00538		+/-0.00892						
	TPU:	+/-0.00538		+/-0.00892						
**Americium-243 Tracer	2.62	2.67		2.74	pCi/L		105	(50%-105%)		
	Uncert:	+/-0.065		+/-0.0704						
	TPU:	+/-0.127		+/-0.133						
QC1203968160 LCS										
Americium-241	1.97			1.79	pCi/L		91.1	(80%-120%)	EXC2	02/12/18 15:29
	Uncert:			+/-0.0518						
	TPU:			+/-0.0926						
**Americium-243 Tracer	2.10			2.08	pCi/L		99.2	(50%-105%)		
	Uncert:			+/-0.0558						
	TPU:			+/-0.106						
QC1203968158 MB										
Americium-241			U	0.00413	pCi/L				EXC2	02/12/18 15:29
	Uncert:			+/-0.00791						
	TPU:			+/-0.00791						
**Americium-243 Tracer	2.10			1.97	pCi/L		94.1	(50%-105%)		
	Uncert:			+/-0.0539						
	TPU:			+/-0.104						
Batch 1737915										
QC1203968162 443360003 DUP										
Plutonium-238	U	0.00519	U	0.00224	pCi/L	0.105		(0-1)	EXC2	02/12/18 16:29
	Uncert:	+/-0.0082		+/-0.00591						
	TPU:	+/-0.00821		+/-0.00592						
Plutonium-239/240	U	0.00259	U	0.00894	pCi/L	0.204		(0-1)		
	Uncert:	+/-0.00778		+/-0.00774						
	TPU:	+/-0.00778		+/-0.00775						
**Plutonium-242 Tracer	2.47	1.92		2.27	pCi/L		92	(50%-105%)		
	Uncert:	+/-0.0805		+/-0.0747						
	TPU:	+/-0.133		+/-0.126						
QC1203968163 LCS										
Plutonium-238			U	0.0111	pCi/L			(80%-120%)	EXC2	02/12/18 16:29
	Uncert:			+/-0.00882						
	TPU:			+/-0.00883						
Plutonium-239/240	1.98			1.72	pCi/L		86.9	(80%-120%)		
	Uncert:			+/-0.0527						
	TPU:			+/-0.0869						
**Plutonium-242 Tracer	1.97			1.79	pCi/L		90.8	(50%-105%)		
	Uncert:			+/-0.0566						
	TPU:			+/-0.0974						

QC Summary

Workorder: **443345**

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1737915										
QC1203968161 MB										
Plutonium-238			U	0.00515	pCi/L				EXC2	02/12/18 16:29
Uncert:				+/-0.00454						
TPU:				+/-0.00455						
Plutonium-239/240			U	0.00172	pCi/L					
Uncert:				+/-0.00619						
TPU:				+/-0.00619						
**Plutonium-242 Tracer	1.97			1.66	pCi/L		84.2	(50%-105%)		
Uncert:				+/-0.0586						
TPU:				+/-0.0997						
Batch 1737916										
QC1203968165 443360003 DUP										
Uranium-234		0.333		0.402	pCi/L	0.429		(0-1)	EXC2	02/13/18 13:33
Uncert:		+/-0.0347		+/-0.0365						
TPU:		+/-0.0388		+/-0.042						
Uranium-235/236	U	0.0226	U	0.0292	pCi/L	0.141		(0-1)		
Uncert:		+/-0.0106		+/-0.0126						
TPU:		+/-0.0107		+/-0.0127						
Uranium-238		0.207		0.165	pCi/L	0.38		(0-1)		
Uncert:		+/-0.0269		+/-0.0247						
TPU:		+/-0.0289		+/-0.0261						
**Uranium-232 Tracer	2.61	1.94		1.94	pCi/L		74.4	(50%-105%)		
Uncert:		+/-0.090		+/-0.0887						
TPU:		+/-0.160		+/-0.159						
QC1203968166 LCS										
Uranium-234				2.55	pCi/L				EXC2	02/22/18 13:52
Uncert:				+/-0.0675						
TPU:				+/-0.139						
Uranium-235/236				0.224	pCi/L					
Uncert:				+/-0.0225						
TPU:				+/-0.0249						
Uranium-238	2.70			2.63	pCi/L		97.5	(80%-120%)		
Uncert:				+/-0.0684						
TPU:				+/-0.142						
**Uranium-232 Tracer	2.09			1.69	pCi/L		80.9	(50%-105%)		
Uncert:				+/-0.0616						
TPU:				+/-0.117						
QC1203968164 MB										
Uranium-234			U	0.0158	pCi/L				EXC2	02/13/18 13:33
Uncert:				+/-0.0167						
TPU:				+/-0.0168						
Uranium-235/236			U	0.0139	pCi/L					
Uncert:				+/-0.0139						
TPU:				+/-0.0139						
Uranium-238			U	0.015	pCi/L					
Uncert:				+/-0.0118						
TPU:				+/-0.0119						

QC Summary

Workorder: 443345

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1737916										
**Uranium-232 Tracer	2.09			1.14	pCi/L		54.5	(50%-105%)		
	Uncert:			+/-0.0905						
	TPU:			+/-0.150						
Rad Gamma Spec										
Batch 1738193										
QC1203968985 443345003 DUP										
Cesium-137	U	1.60	U	-0.176	pCi/L	0.257		(0-1)	MJH1	02/09/18 15:03
	Uncert:	+/-1.82		+/-1.58						
	TPU:	+/-1.86		+/-1.59						
Cobalt-60	U	-0.706	U	-0.402	pCi/L	0.047		(0-1)		
	Uncert:	+/-1.94		+/-1.28						
	TPU:	+/-1.94		+/-1.29						
Neptunium-237	U	1.20	U	0.773	pCi/L	0.0294		(0-1)		
	Uncert:	+/-4.26		+/-2.99						
	TPU:	+/-4.27		+/-2.99						
Potassium-40	U	-1.86	U	-15.9	pCi/L	0.174		(0-1)		
	Uncert:	+/-21.4		+/-18.5						
	TPU:	+/-21.4		+/-18.9						
Sodium-22	U	-2.26	U	1.22	pCi/L	0.558		(0-1)		
	Uncert:	+/-1.70		+/-1.30						
	TPU:	+/-1.78		+/-1.34						
QC1203968986 LCS										
Americium-241	34300			37500	pCi/L		109	(80%-120%)	MJH1	02/09/18 13:59
	Uncert:			+/-726						
	TPU:			+/-2400						
Cesium-137	12900			13100	pCi/L		101	(80%-120%)		
	Uncert:			+/-169						
	TPU:			+/-592						
Cobalt-60	10900			11500	pCi/L		105	(80%-120%)		
	Uncert:			+/-200						
	TPU:			+/-568						
Neptunium-237			U	10.8	pCi/L					
	Uncert:			+/-68.8						
	TPU:			+/-68.8						
Potassium-40			U	-128	pCi/L					
	Uncert:			+/-155						
	TPU:			+/-158						
Sodium-22			U	11.9	pCi/L					
	Uncert:			+/-22.7						
	TPU:			+/-22.9						
QC1203968984 MB										
Cesium-137			U	1.01	pCi/L				MJH1	02/09/18 12:17
	Uncert:			+/-1.31						
	TPU:			+/-1.33						
Cobalt-60			U	0.915	pCi/L					
	Uncert:			+/-1.18						

QC Summary

Workorder: 443345

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 1738193										
	TPU:			+/-1.20						
Neptunium-237			U	3.72	pCi/L					
	Uncert:			+/-2.05						
	TPU:			+/-2.23						
Potassium-40			U	-7.63	pCi/L					
	Uncert:			+/-14.0						
	TPU:			+/-14.1						
Sodium-22			U	-0.00132	pCi/L					
	Uncert:			+/-1.21						
	TPU:			+/-1.21						
Rad Gas Flow										
Batch 1738564										
QC1203969933 443345003 DUP										
Strontium-90	U	-0.326	U	0.216	pCi/L	1.39		(0-1)	LXB3	02/19/18 16:18
	Uncert:	+/-0.118		+/-0.0751						
	TPU:	+/-0.118		+/-0.0771						
**Strontium Carrier	4.30	4.50		4.50	mg		105	(50%-105%)		
QC1203969935 LCS										
Strontium-90	23.5			25.6	pCi/L		109	(80%-120%)	LXB3	02/19/18 16:18
	Uncert:			+/-0.703						
	TPU:			+/-2.16						
**Strontium Carrier	4.30			4.10	mg		95.3	(50%-105%)		
QC1203969932 MB										
Strontium-90			U	-0.00829	pCi/L				LXB3	02/19/18 16:18
	Uncert:			+/-0.0368						
	TPU:			+/-0.0368						
**Strontium Carrier	4.30			4.10	mg		95.3	(50%-105%)		
QC1203969934 443345003 MS										
Strontium-90	471 U	-0.326		463	pCi/L		98.3	(75%-125%)	LXB3	02/19/18 16:18
	Uncert:	+/-0.118		+/-12.8						
	TPU:	+/-0.118		+/-39.2						
**Strontium Carrier	4.30	4.50		4.30	mg		100	(50%-105%)		
Batch 1738567										
QC1203969943 443549002 DUP										
Alpha	U	0.239	U	0.451	pCi/L	0.104		(0-1)	BXG2	02/23/18 11:08
	Uncert:	+/-0.511		+/-0.508						
	TPU:	+/-0.511		+/-0.509						
Beta	U	0.190	U	2.00	pCi/L	0.616		(0-1)		02/22/18 16:44
	Uncert:	+/-0.574		+/-0.882						
	TPU:	+/-0.574		+/-0.899						
QC1203969946 LCS										
Alpha	12.1			11.0	pCi/L		91.4	(80%-120%)	BXG2	02/23/18 11:08
	Uncert:			+/-0.552						
	TPU:			+/-1.10						
Beta	47.1			51.1	pCi/L		109	(80%-120%)		02/22/18 18:27

QC Summary

Workorder: **443345**

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Gas Flow										
Batch 1738567										
	Uncert:			+/-0.917						
	TPU:			+/-4.48						
QC1203969942 MB										
Alpha			U	0.133	pCi/L				BXG2	02/23/1811:08
	Uncert:			+/-0.099						
	TPU:			+/-0.0996						
Beta			U	0.346	pCi/L					02/22/1816:44
	Uncert:			+/-0.148						
	TPU:			+/-0.151						
QC1203969944 443549002 MS										
Alpha	483 U	0.239		471	pCi/L		97.4	(75%-125%)	BXG2	02/23/1811:08
	Uncert:	+/-0.511		+/-24.1						
	TPU:	+/-0.511		+/-46.6						
Beta	1880 U	0.190		1970	pCi/L		105	(75%-125%)		02/22/1818:27
	Uncert:	+/-0.574		+/-35.6						
	TPU:	+/-0.574		+/-170						
QC1203969945 443549002 MSD										
Alpha	483 U	0.239		439	pCi/L	0.175	90.8	(0-1)	BXG2	02/23/1811:08
	Uncert:	+/-0.511		+/-22.4						
	TPU:	+/-0.511		+/-44.0						
Beta	1880 U	0.190		1850	pCi/L	0.181	98.4	(0-1)		02/22/1818:27
	Uncert:	+/-0.574		+/-34.1						
	TPU:	+/-0.574		+/-158						

Notes:

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

The Qualifiers in this report are defined as follows:

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

QC Summary

Workorder: **443345**

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 acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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