

The order of this data package is as follows:

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

Comments:

General Engineering

Charleston SC

Chain of Custody/Analysis Request

COC/Lab Request #:

2017-2751

Page 1 of 1

Client Contact:

Lab Agreement #:

Site Name:

Los Alamos National Laboratory

Project Number:

A DEP

Analysis Turnaround Time:

24 Hour -

☐

Other -

☐

7 Days -

☐

14 Days -

☐

21 Days -

☐

28 Days -

☒

Rad Screening Info:

Yes, Below

Background

Loc-
No

Lab Reporting Limit Type:

Sample Quantitation

Limit MDC

Field Sample ID

Sample
DateSample
TimeSample
Matrix

MSGP-Hg

WSP-8260B-VOA

WSP-8330B-NMED HEXMOD

WSP-All Metals

WSP-CN(T)

WSP-GENINORG+PerChlorate

WSP-NH3+NO3/NO2+PO4

WSP-TKN+TOC

CAWA-17-142887

Sep 11 2017

14:44

W

1

1

1

CAWA-17-142922

Sep 11 2017

14:44

W

1

2

3

1

1

CAWA-17-143036

Sep 11 2017

14:44

W

21

1

1

1

CAWA-17-143050

Sep 11 2017

14:44

W

1

2

3

1

1

1

CAWA-17-143054

Sep 11 2017

14:44

W

1

2

3

1

1

Special Instructions:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11390

EVENT NAME: Water/CdV (TA16 260) Q4 MY2017

SAMPLE ID: CAWA-17-142887

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	09/11/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1444	OK	MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-63		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:	↓	↓	SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): T. Benson D. Hughes

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 9/11/17 1555	RECEIVED BY (Printed Name) (Signature)	Date/Time 9/11/17 1555
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 08/24/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11390

EVENT NAME: Water/CdV (TA16 260) Q4 MY2017

SAMPLE ID: CAWA-17-142922

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	09/11/2017	ck	FIELD MATRIX:	WG	ck
TIME COLLECTED (HH:MM):	1444	ck	MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	65P	
LOCATION ID:	R-63		FIELD PREP:	UF	
LOCATION TYPE:	UA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
UA	MSGP-Hg	1000 500 ML POLY TV 9-11-17	1	HNO3	Y	NA
	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8330B-NMED HEXMOD	1 LITER AMBER GLASS	3	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: He spot test is negative

LOCATION COMMENTS: Sampled 50 ft from running diesel generator

FIELD PARAMETERS:

Sample Time	NA	HH:MM	Dissolved Oxygen	5.66	Flow (in gpm)	7.31
Oxidation-Reduction Potential	175.0		pH	7.33	Specific Conductance	105.7
Temperature	14.4		Turbidity	0.68		

COLLECTED BY (PRINT): T. Bonham D. Hughes

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 9/11/17 1555	RECEIVED BY (Printed Name) (Signature)	Date/Time 9/11/17 1555
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11390

EVENT NAME: Water/CdV (TA16 260) Q4 MY2017

SAMPLE ID: CAWA-17-143036

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	09/11/2017	ck	FIELD MATRIX:	WG	ck
TIME COLLECTED (HH:MM):	1444	ck	MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	DL	
LOCATION ID:	R-63		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	1/2 9-11-17	HCL		

SAMPLE COMMENTS: sma personnel apraes FTB

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): T. Bonham D. Hughes

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 9/11/17 1555	RECEIVED BY (Printed Name) (Signature)	Date/Time 9/11/17 1555
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 08/24/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11390

EVENT NAME: Water/CdV (TA16 260) Q4 MY2017

SAMPLE ID: CAWA-17-143050

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	09/11/2017	ck	FIELD MATRIX:	WG	ck
TIME COLLECTED (HH:MM):	1444	ck	MEDIA:	UA	
PRS ID:	af		SAMPLE TECH CODE:	6SP	
LOCATION ID:	R-63		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	FD	
TOP DEPTH:	↓		SAMPLE USAGE:	QC	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT):

T. Benham D. Huxler

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 9/11/17 1555	RECEIVED BY (Printed Name) (Signature)	Date/Time 9/11/17 1555
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 08/24/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11390

EVENT NAME: Water/CdV (TA16 260) Q4 MY2017

SAMPLE ID: CAWA-17-143054

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	09/11/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1444	OK	MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-63		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	FD	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	1000 TV 9-11-17 500-ML POLY	1	HNO3	Y	NA
	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8330B-NMED HEXMOD	1 LITER AMBER GLASS	3	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): T. Barham D. Hughes

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 9/11/17 1555	RECEIVED BY (Printed Name) (Signature)	Date/Time 9/11/17 1555
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

coc: 2017-2751

TEST - Field Screen		YES	NO	NA
The sample has field screening measurements of alpha activity and beta activity.			X	
Activity (dpm/100cm ²)	Sampled Location			
Alpha detectable and < 20,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49			X
Alpha > 125 and < 20,000	other locations			X
Beta > 1,500 and < 100,000	any location			X
Alpha activity ≥ 20,000 dpm/100cm ² and beta activity ≥ 100,000 dpm/100cm ² and ≥ 0.5 mR/hr on the external surface of the package.				X
The sample is tentatively identified as DOT hazard Class 7 (Radioactive). The shipment is labeled <i>Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910</i> , based on field screening measurements of alpha and beta activity.				X

TEST - Location		YES	NO	NA
Prior analytical measurements of radioactive isotopes are available.		X		
Activity (pCi/g)	Sampled Location			
<ul style="list-style-type: none"> Am-241 > 27 and < 27,000 Cs-137 > 270 and < 270,000 Pu-238 > 27 and < 27,000 Pu-239/240 > 27 and < 27,000 Th-228 > 27 and < 27,000 U-238 > 270 and < 270,000 H-3 > 27,000,000 and < 27,000,000,000 	The sampling location is within TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, Sediment/Soil from Effluent Canyon, Mortandad Canyon from Effluent Canyon to the Soil Contamination Area near the sediment traps, Bayo Canyon at TA-10, TA-15, TA-35, TA-36, TA-39, TA-48 or TA-49.		X	
<ul style="list-style-type: none"> Am-241, Pu-238, Pu-239/240, or Th-228 ≥ 27,000 U-238 ≥ 270,000 H-3 ≥ 27,000,000,000 			X	
The sample is tentatively identified as DOT hazard Class 7 (Radioactive). The shipment is labeled <i>Radioactive Material, Excepted Package - Limited Quantity of Material - UN2910</i> , based on prior analytical measurements of radioactive isotopes.			X	

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

HOLD SAMPLES FOR ANALYSIS
The sampling location within TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, Sediment/Soil from Effluent Canyon, Mortandad Canyon from Effluent Canyon to the Soil Contamination Area near the sediment traps, Bayo Canyon at TA-10, TA-35, TA-15, TA-36, TA-39, TA-48 or TA-49 AND does not have usable field screening measurements of alpha and beta activity available AND the sampling location or related sampling location(s) do not have prior reliable analytical measurements of radioactive isotopes available AND knowledge of the sample is not acceptable to identify appropriate labeling.

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

Hazard Assessment Completed By:	Date/Time
(Printed Name) Sherr: Sherwood	9/12/17
(Signature) Sher Sherwood	3pm

DATA VALIDATION REPORT

Chain Of Custody No. 2017-2751

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
432594	EPA:120.1	1	1			
432594	EPA:150.1	1	1			
432594	EPA:160.1	1	1			
432594	EPA:170.0	2	2	1		
432594	EPA:245.2	2	2			
432594	EPA:300.0	1	1			
432594	EPA:310.1	1	1			
432594	EPA:335.4	1	1			
432594	EPA:350.1	1	1			
432594	EPA:351.2	1	1			
432594	EPA:353.2	1	1			
432594	EPA:365.4	1	1			
432594	SM:A2340B	1	1			
432594	SW-846:6010C	1	1			
432594	SW-846:6020	1	1			
432594	SW-846:6850	1	1			
432594	SW-846:8260B	1	1	1		
432594	SW-846:8330B	1	1			
432594	SW-846:9060	1	1			

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	
432594	EPA:120.1	1705527	1705527	1	1									1			1					
432594	EPA:150.1	1700639	1700639		1									1			1					
432594	EPA:150.1	1701903	1701903	1										1			2					
432594	EPA:160.1	1700497	1700497	1	1				1					1			1					
432594	EPA:170.0	NA	NA	2	2	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
432594	EPA:245.2	1702521	1702509	2	2				1	1				1				1			
432594	EPA:300.0	1700336	1700336	1					1					1				1			
432594	EPA:300.0	1703207	1703207		1				1					1				1			
432594	EPA:310.1	1700638	1700638		1					1				1				1			
432594	EPA:310.1	1701895	1701895	1						1				1				1			
432594	EPA:335.4	1700209	1700208	1	1				1	1	1			1				1			
432594	EPA:350.1	1700465	1700464	1	1				1	1				1				1			
432594	EPA:351.2	1700469	1700468	1	1				1	1				1				1			
432594	EPA:353.2	1700478	1700478	1	1				1					1				1			
432594	EPA:365.4	1700471	1700470	1	1				1	1				1				1			
432594	SM:A2340B	1705736	1705736	1	1																
432594	SW-846:6010C	1700104	1700103	1	1				1	1				1				1			
432594	SW-846:6020	1700115	1700114	1	1				1	1				1				1			
432594	SW-846:6850	1702207	1702204	1	1				1	1	1			1							
432594	SW-846:8260B	1701572	1701572	1	1	1			1					2							
432594	SW-846:8330B	1700506	1700504	1	1				1	1	1			1							
432594	SW-846:9060	1701620	1701620	1	1				1					1				1			

2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAWA-17-142887	1203886676	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAWA-17-142887	432594001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAWA-17-143050	432594004	FD	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203886675	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-142856	1203878364	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-142879	1203878365	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-142887	432594001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-143050	1203875001	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-143050	432594004	FD	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203875000	LCS	0	0	1	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:150.1	GENERAL CHEMISTRY	LCS	1203878363	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-17-142887	1203874648	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-17-142887	432594001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-17-143050	432594004	FD	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203874647	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203874646	MB	1	0	0	0
EPA:170.0	VOC	CAWA-17-142887	432594001	REG	1	0	0	0
EPA:170.0	VOC	CAWA-17-142922	432594002	REG	1	0	0	0
EPA:170.0	VOC	CAWA-17-143036	432594003	FTB	1	0	0	0
EPA:170.0	VOC	CAWA-17-143050	432594004	FD	1	0	0	0
EPA:170.0	VOC	CAWA-17-143054	432594005	FD	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-142866	1203879601	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-142866	1203879603	MS	0	0	1	0
EPA:245.2	INORGANIC	CAWA-17-142887	432594001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-142922	432594002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-143050	432594004	FD	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-143054	432594005	FD	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203879600	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203879599	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-17-142886	1203874286	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-17-142887	432594001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-17-143050	1203881302	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-17-143050	432594004	FD	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203874285	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203881301	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203874284	MB	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203881300	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-142856	1203878343	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-142856	1203878345	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-142887	432594001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-143050	1203874998	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-143050	1203874999	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-143050	432594004	FD	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203874996	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203878342	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-142891	1203874001	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-142891	1203874002	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-142891	1203874805	MSD	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-142922	432594002	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-143054	432594005	FD	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:335.4	GENERAL CHEMISTRY	LCS	1203874000	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203873999	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-142856	1203874557	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-142856	1203874558	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-142887	432594001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-143050	432594004	FD	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203874556	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203874555	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-142891	1203874561	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-142891	1203874563	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-142922	432594002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-143054	432594005	FD	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203874560	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203874559	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-17-142856	1203874590	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-17-142887	432594001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-17-143050	432594004	FD	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203874586	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203874585	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-142856	1203874567	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-142856	1203874570	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-142887	432594001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-143050	432594004	FD	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203874566	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203874565	MB	1	0	0	0
SM:A2340B	INORGANIC	CAWA-17-142887	432594001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAWA-17-143050	432594004	FD	1	0	0	0
SW-846:6010C	INORGANIC	CAWA-17-142856	1203873773	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAWA-17-142856	1203873774	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAWA-17-142887	432594001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAWA-17-143050	432594004	FD	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203873772	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203873771	MB	17	0	0	0
SW-846:6020	INORGANIC	CAWA-17-142856	1203873790	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAWA-17-142856	1203873791	MS	0	0	11	0
SW-846:6020	INORGANIC	CAWA-17-142887	432594001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAWA-17-143050	432594004	FD	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203873789	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203873788	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-142856	1203878945	MS	0	0	1	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-142856	1203878946	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-142887	432594001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-143050	432594004	FD	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203878944	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203878943	MB	1	0	0	0
SW-846:8260B	VOC	CAWA-17-142922	432594002	REG	80	3	0	0
SW-846:8260B	VOC	CAWA-17-143036	432594003	FTB	80	3	0	0
SW-846:8260B	VOC	CAWA-17-143054	432594005	FD	80	3	0	0
SW-846:8260B	VOC	LCS	1203878617	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203878618	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203878616	MB	80	3	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-142901	1203874662	MS	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-142901	1203874663	MSD	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-142922	432594002	REG	23	1	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-143054	432594005	FD	23	1	0	0
SW-846:8330B	LCMS/MS HIGH	LCS	1203874661	LCS	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	MB	1203874660	MB	23	1	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-17-142891	1203877659	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-17-142922	432594002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-17-143054	432594005	FD	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203877658	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203877657	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

DATA VALIDATION REPORT

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203873771	METHOD BLANK	SW-846:6010C	W	Potassium	91.5	J	ug/L	150
MB	1203873771	METHOD BLANK	SW-846:6010C	W	Sodium	143	J	ug/L	300
CAWA-17-143036	432594003	TRIP BLANK	EPA:170.0	W	Temperature	3		Deg C	

No.

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?

DATA VALIDATION REPORT

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

None.

Reason Code

Description

J_LAB

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

NQ

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

U_LAB

The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-17-142887	R-63	REG	EPA:120.1	0	1
CAWA-17-142887	R-63	REG	EPA:150.1	0	1
CAWA-17-142887	R-63	REG	EPA:160.1	0	1
CAWA-17-142887	R-63	REG	EPA:170.0	0	1
CAWA-17-142887	R-63	REG	EPA:245.2	0	1
CAWA-17-142887	R-63	REG	EPA:300.0	0	4
CAWA-17-142887	R-63	REG	EPA:310.1	0	2
CAWA-17-142887	R-63	REG	EPA:350.1	0	1
CAWA-17-142887	R-63	REG	EPA:353.2	0	1
CAWA-17-142887	R-63	REG	EPA:365.4	0	1
CAWA-17-142887	R-63	REG	SM:A2340B	0	1
CAWA-17-142887	R-63	REG	SW-846:6010C	0	17
CAWA-17-142887	R-63	REG	SW-846:6020	0	11
CAWA-17-142887	R-63	REG	SW-846:6850	0	1
CAWA-17-142922	R-63	REG	EPA:170.0	0	1
CAWA-17-142922	R-63	REG	EPA:245.2	0	1
CAWA-17-142922	R-63	REG	EPA:335.4	0	1
CAWA-17-142922	R-63	REG	EPA:351.2	0	1
CAWA-17-142922	R-63	REG	SW-846:8260B	0	80
CAWA-17-142922	R-63	REG	SW-846:8330B	0	23

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-17-142922	R-63	REG	SW-846:9060	0	1
CAWA-17-143036	R-63	FTB	EPA:170.0	0	1
CAWA-17-143036	R-63	FTB	SW-846:8260B	0	80
CAWA-17-143050	R-63	FD	EPA:120.1	0	1
CAWA-17-143050	R-63	FD	EPA:150.1	0	1
CAWA-17-143050	R-63	FD	EPA:160.1	0	1
CAWA-17-143050	R-63	FD	EPA:170.0	0	1
CAWA-17-143050	R-63	FD	EPA:245.2	0	1
CAWA-17-143050	R-63	FD	EPA:300.0	0	4
CAWA-17-143050	R-63	FD	EPA:310.1	0	2
CAWA-17-143050	R-63	FD	EPA:350.1	0	1
CAWA-17-143050	R-63	FD	EPA:353.2	0	1
CAWA-17-143050	R-63	FD	EPA:365.4	0	1
CAWA-17-143050	R-63	FD	SM:A2340B	0	1
CAWA-17-143050	R-63	FD	SW-846:6010C	0	17
CAWA-17-143050	R-63	FD	SW-846:6020	0	11
CAWA-17-143050	R-63	FD	SW-846:6850	0	1
CAWA-17-143054	R-63	FD	EPA:170.0	0	1
CAWA-17-143054	R-63	FD	EPA:245.2	0	1
CAWA-17-143054	R-63	FD	EPA:335.4	0	1
CAWA-17-143054	R-63	FD	EPA:351.2	0	1
CAWA-17-143054	R-63	FD	SW-846:8260B	0	80
CAWA-17-143054	R-63	FD	SW-846:8330B	0	23
CAWA-17-143054	R-63	FD	SW-846:9060	0	1

September 25, 2017

gel.com

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

Re: LANL- WQH Water Samples
Work Order: 432594
SDG: 2017-2751

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on September 13, 2017, and analyzed for Explosives by LCMSMS, GC/MS Volatile, General Chemistry, Metals and Perchlorates by LCMSMS. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,



Katrina Hiott for
Valerie Davis
Project Manager

Chain of Custody: 2017-2751
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 432594
SDG: 2017-2751

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 432594
SDG # : 2017-2751**

September 25, 2017

Laboratory Identification:

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

Summary

Sample receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on September 13, 2017 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperatures were checked, documented, and within specifications. Shipping container temperature was within specification (0 - 6C). There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
432594001	CAWA-17-142887
432594002	CAWA-17-142922
432594003	CAWA-17-143036
432594004	CAWA-17-143050
432594005	CAWA-17-143054

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 Volatile, General Chemistry, Metals and Perchlorates by LCMSMS.

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


Katrina Hiott for
Valerie Davis
Project Manager

List of current GEL Certifications as of 25 September 2017

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-23
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Chain of Custody and Supporting Documentation

Chain of Custody/Analysis Request

[illegible]

Special Instructions:

Relinquished by: <i>Denevord</i>	Print Name: <i>Denevord</i>	Date/Time: <i>3pm</i>	Received by: <i>3</i>	Print Name: <i>Each Worslem</i>	Date/Time: <i>9/13/95</i>
Relinquished by:	Print Name:	Date/Time:	Received by:	Print Name:	Date/Time:
Relinquished by:	Print Name:	Date/Time:	Received by:	Print Name:	Date/Time:

COC: 2017-2751

TEST – Field Screen		YES	NO	NA
The sample has field screening measurements of alpha activity and beta activity.			X	
Activity (dpm/100cm ²)	Sampled Location			
Alpha detectable and < 20,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49			X
Alpha > 125 and < 20,000	other locations			X
Beta > 1,500 and < 100,000	any location			X
Alpha activity \geq 20,000 dpm/100cm ² and beta activity \geq 100,000 dpm/100cm ² and \geq 0.5 mR/hr on the external surface of the package.				X
The sample is tentatively identified as DOT hazard Class 7 (Radioactive). The shipment is labeled <i>Radioactive Material, Excepted Package – Limited Quantity of Material – UN2910</i> , based on field screening measurements of alpha and beta activity.				X

TEST – Location		YES	NO	NA
Prior analytical measurements of radioactive isotopes are available.		X		
Activity (pCi/g)	Sampled Location			
<ul style="list-style-type: none"> Am-241 > 27 and < 27,000 Cs-137 > 270 and < 270,000 Pu-238 > 27 and < 27,000 Pu-239/240 > 27 and < 27,000 Th-228 > 27 and < 27,000, U-238 > 270 and < 270,000, H-3 > 27,000,000 and < 27,000,000,000 	The sampling location is within TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, Sediment/Soil from Effluent Canyon, Mortandad Canyon from Effluent Canyon to the Soil Contamination Area near the sediment traps, Bayo Canyon at TA-10, TA-15, TA-35, TA-36, TA-39, TA-48 or TA-49.		X	
<ul style="list-style-type: none"> Am-241, Pu-238, Pu-239/240, or Th-228 \geq 27,000 U-238 \geq 270,000 H-3 \geq 27,000,000,000 			X	
The sample is tentatively identified as DOT hazard Class 7 (Radioactive). The shipment is labeled <i>Radioactive Material, Excepted Package – Limited Quantity of Material – UN2910</i> , based on prior analytical measurements of radioactive isotopes.			X	

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

HOLD SAMPLES FOR ANALYSIS
The sampling location within TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, Sediment/Soil from Effluent Canyon, Mortandad Canyon from Effluent Canyon to the Soil Contamination Area near the sediment traps, Bayo Canyon at TA-10, TA-35, TA-15, TA-36, TA-39, TA-48 or TA-49 AND does not have usable field screening measurements of alpha and beta activity available AND the sampling location or related sampling location(s) do not have prior reliable analytical measurements of radioactive isotopes available AND knowledge of the sample is not acceptable to identify appropriate labeling.

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

Hazard Assessment Completed By:	Date/Time
(Printed Name) Sherri Sherwood	9/12/17
(Signature) Sherri Sherwood	3pm

ORIGIN ID:SAFA (505) 665-9966
KEITH GREENE
LOS ALAMOS NATL LAB.
TA00 BLDG 1237 DPU 03
LOS ALAMOS, NM 87545
UNITED STATES US

TO VALERIE DAVIS
GENERAL ENGINEER
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWEO



FedEx
Express

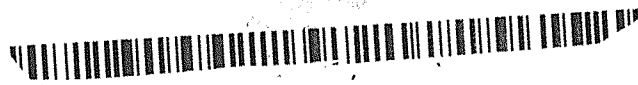


1 of 2
TRK# 5908 1782 7122
0201
MASTER

X7 RBWA

WED - 13 SEP 10:30A
PRIORITY OVERNIGHT

29407
SC-US CHS



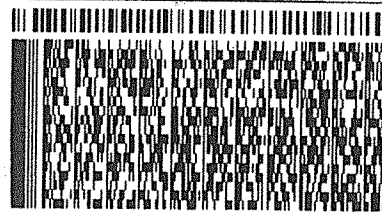
ORIGIN ID:SAFA (505) 665-9966
KEITH GREENE
LOS ALAMOS NATL LAB.
TA00 BLDG 1237 DPU 03
LOS ALAMOS, NM 87545
UNITED STATES US

TO VIS
ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRAE20DF6X00



FedEx
Express



TRK# 5908 1782 7144
0201

X7 RBWA

WED - 13 SEP 10:30A
PRIORITY OVERNIGHT

29407
SC-US CHS



ORIGIN ID:SAFA (505) 665-9966
KEITH GREENE
LOS ALAMOS NATL LAB.
TA00 BLDG 1237 DPU 03
LOS ALAMOS, NM 87545
UNITED STATES US

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWEO



FedEx
Express



2 of 2
MPS# 5908 1782 7133
0263
Mstr# 5908 1782 7122

X7 RBWA

WED - 13 SEP 10:30A
PRIORITY OVERNIGHT

294
SC-US CHS



SAMPLE RECEIPT & REVIEW FORM

Client: <u>ESHL</u>		SDG/AR/COC/Work Order: <u>432594</u>	
Received By: <u>ZKW</u>		Date Received: <u>9/13/17</u>	
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>5908 1782 7133-4°C</u> <u>5908 1782 7144-3°C</u> <u>5908 1782 7122-5°C</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM/mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet Ice <input checked="" type="checkbox"/> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: <u>See Above</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR3-16</u> Secondary Temperature Device Serial # (If Applicable):
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#:
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No ___ N/A ___ Sample ID's and containers affected:
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected: <u>No Collected Date/Time on -142901 or -143028</u>
11 Number of containers received match number indicated on COC?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected: <u>We only rec'd one cont. for -143842</u>
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials ZKW

Date 9/13/17

Page 1 of 1

Data Review Qualifier Flag Definition Sheet

Data Review Qualifier Definitions

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

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

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

Volatile Analysis

Case Narrative

**GC/MS Volatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2751
Work Order #: 432594**

Method/Analysis Information

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

Analytical Method: SW-846:8260B

Analytical Batch
Number: 1701572

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
432594002	CAWA-17-142922
432594003	CAWA-17-143036
432594005	CAWA-17-143054
1203877503	432587002(CAWA-17-142901) Post Spike (PS)
1203877504	432587002(CAWA-17-142901) Post Spike (PS)
1203877505	432587002(CAWA-17-142901) Post Spike Duplicate (PSD)
1203877506	432587002(CAWA-17-142901) Post Spike Duplicate (PSD)
1203878616	Method Blank (MB)
1203878617	Laboratory Control Sample (LCS)
1203878618	Laboratory Control Sample (LCS)

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

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

SOP Reference

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

Calibration Information

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

Initial Calibration

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

Continuing Calibration Verification Requirements

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

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

The blanks analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 432587002 (CAWA-17-142901) was designated for spike analysis.

Matrix Spike/Matrix Spike Duplicate Recovery Statement

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

Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information**Holding Time Specifications**

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

Sample Preservation and Integrity

All samples met the sample preservation and integrity requirements.

Sample Dilutions/Methanol Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information**Manual Integrations**

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

TIC Comment

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

with the sample raw data.

Additional Comments

Additional comments were not required for this SDG.

Residual Chlorine

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

Electronic Package Comment

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

System Configuration

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOAA.I	Agilent 7890/5975 GC/MS w/ OI Eclipse/Archon Autosampler	HP7890A/HP5975C	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: 2017-2751 GEL Work Order: 432594

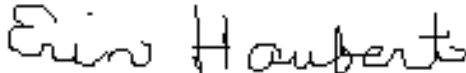
The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Erin Haubert

Date: 10 OCT 2017

Title: Data Validator

Sample Data Summary

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2751

Lab Sample ID: 432594002

Date Collected: 09/11/2017 14:44

Date Received: 09/13/2017 09:20

Matrix: W

Client ID: CAWA-17-142922

Batch ID: 1701572

Run Date: 09/19/2017 19:06

Prep Date: 09/19/2017 19:06

Data File: 091917\AA214.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOAA.I

Analyst: VXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2751

Lab Sample ID: 432594002

Date Collected: 09/11/2017 14:44

Date Received: 09/13/2017 09:20

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1701572

Inst: VOAA.I

Dilution: 1

Run Date: 09/19/2017 19:06

Analyst: VXY1

Purge Vol: 5 mL

Prep Date: 09/19/2017 19:06

Data File: 091917\AA214.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: 2017-2751
Lab Sample ID: 432594002

Client ID: CAWA-17-142922
Batch ID: 1701572
Run Date: 09/19/2017 19:06
Prep Date: 09/19/2017 19:06
Data File: 091917\AA214.D

Date Collected: 09/11/2017 14:44
Date Received: 09/13/2017 09:20
Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: VXY1

Column: DB-624

Matrix: W

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	56.8	50.0	ug/L 114	(71%-134%)
Bromofluorobenzene	51.1	50.0	ug/L 102	(70%-131%)
Toluene-d8	53.1	50.0	ug/L 106	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.413	8.81	ug/L	0	J
	unknown	3.493	12.3	ug/L	0	J

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2751

Lab Sample ID: 432594003

Date Collected: 09/11/2017 14:44

Date Received: 09/13/2017 09:20

Matrix: W

Client ID: CAWA-17-143036

Batch ID: 1701572

Run Date: 09/19/2017 19:29

Prep Date: 09/19/2017 19:29

Data File: 091917\AA215.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOAA.I

Analyst: VXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2751

Lab Sample ID: 432594003

Date Collected: 09/11/2017 14:44

Date Received: 09/13/2017 09:20

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1701572

Inst: VOAA.I

Dilution: 1

Run Date: 09/19/2017 19:29

Analyst: VXY1

Purge Vol: 5 mL

Prep Date: 09/19/2017 19:29

Data File: 091917\AA215.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: 2017-2751
Lab Sample ID: 432594003

Client ID: CAWA-17-143036
Batch ID: 1701572
Run Date: 09/19/2017 19:29
Prep Date: 09/19/2017 19:29
Data File: 091917\AA215.D

Date Collected: 09/11/2017 14:44
Date Received: 09/13/2017 09:20
Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: VXY1

Column: DB-624

Matrix: W

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	55.4	50.0	ug/L 111	(71%-134%)
Bromofluorobenzene	50.3	50.0	ug/L 101	(70%-131%)
Toluene-d8	52.2	50.0	ug/L 104	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.413	16.8	ug/L	0	J

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2751

Lab Sample ID: 432594005

Date Collected: 09/11/2017 14:44

Date Received: 09/13/2017 09:20

Matrix: W

Client ID: CAWA-17-143054

Batch ID: 1701572

Run Date: 09/19/2017 19:53

Prep Date: 09/19/2017 19:53

Data File: 091917\AA216.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOAA.I

Analyst: VXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2751

Lab Sample ID: 432594005

Date Collected: 09/11/2017 14:44

Date Received: 09/13/2017 09:20

Matrix: W

Client ID: CAWA-17-143054

Batch ID: 1701572

Run Date: 09/19/2017 19:53

Prep Date: 09/19/2017 19:53

Data File: 091917\AA216.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOAA.I

Analyst: VXY1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2751
Lab Sample ID: 432594005

Client ID: CAWA-17-143054
Batch ID: 1701572
Run Date: 09/19/2017 19:53
Prep Date: 09/19/2017 19:53
Data File: 091917\AA216.D

Date Collected: 09/11/2017 14:44
Date Received: 09/13/2017 09:20
Client: ARSL004
Method: SW-846:8260B
Inst: VOAA.I
Analyst: VXY1

Column: DB-624

Matrix: W

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	56.9	50.0	ug/L 114	(71%-134%)
Bromofluorobenzene	50.1	50.0	ug/L 100	(70%-131%)
Toluene-d8	52.5	50.0	ug/L 105	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.473	25	ug/L	0	J

Quality Control Summary

Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2017-2751**Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203878617	LCS for batch 1701572	108	99	96
1203878618	LCS for batch 1701572	105	103	98
1203878616	MB for batch 1701572	110	104	101
1203877503	CAWA-17-142901PS	107	100	97
1203877505	CAWA-17-142901PSD	110	103	98
1203877504	CAWA-17-142901PS	108	105	100
1203877506	CAWA-17-142901PSD	106	101	97
432594002	CAWA-17-142922	114	106	102
432594003	CAWA-17-143036	111	104	101
432594005	CAWA-17-143054	114	105	100

Surrogate**Acceptance Limits**

DCED4 = 1,2-Dichloroethane-d4

(71%-134%)

TOL = Toluene-d8

(74%-124%)

BFB = Bromofluorobenzene

(70%-131%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 8

SDG Number: 2017-2751

Sample Type: Post Spike

Client ID: CAWA-17-142901PS

Matrix: W

Lab Sample ID 1203877503

Instrument: VOAA.I

Analysis Date: 09/19/2017 16:20

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

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	104	104	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1300	104	56-131
67-64-1	PS Acetone	250	0.00 U	157	63	25-155
74-88-4	PS Iodomethane	250	0.00 U	263	105	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	277	111	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	275	110	48-133
78-93-3	PS 2-Butanone	250	0.00 U	202	81	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	261	104	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	231	92	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	33.2	66	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	44.8	90	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	51.8	104	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	42.9	86	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	50.2	100	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	52.2	104	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	53.5	107	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	55.3	111	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	52.9	106	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	58.5	117	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	57.1	114	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	56.4	113	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	54.6	109	69-127

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 8

SDG Number: 2017-2751

Sample Type: Post Spike

Client ID: CAWA-17-142901PS

Matrix: W

Lab Sample ID 1203877503

Instrument: VOAA.I

Analysis Date: 09/19/2017 16:20

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
594-20-7	PS 2,2-Dichloropropane	50.0	0.00 U	63.2	126	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	53.2	106	71-130
67-66-3	PS Chloroform	50.0	0.00 U	53.9	108	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	54.8	110	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	52.6	105	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	57.4	115	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	55.1	110	69-130
71-43-2	PS Benzene	50.0	0.00 U	52.7	105	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	54.3	109	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	54.8	110	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	53.9	108	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	57.8	116	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	58.3	117	70-134
108-88-3	PS Toluene	50.0	0.00 U	51.4	103	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	59.8	120	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	52.6	105	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	51.9	104	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	50.9	102	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	49.7	99	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	54.3	109	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	51.1	102	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	51.6	103	61-130

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 8

SDG Number: 2017-2751

Sample Type: Post Spike

Client ID: CAWA-17-142901PS

Matrix: W

Lab Sample ID 1203877503

Instrument: VOAA.I

Analysis Date: 09/19/2017 16:20

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

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	51.4	103	62-131
100-42-5	PS Styrene	50.0	0.00 U	52.5	105	59-135
75-25-2	PS Bromoform	50.0	0.00 U	61.2	122	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	51.4	103	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	53.0	106	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	52.0	104	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	51.5	103	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	52.0	104	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	52.7	105	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	51.8	104	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	51.5	103	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	51.3	103	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	52.7	105	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	52.7	105	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	53.3	107	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	51.4	103	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	51.6	103	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	53.8	108	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	57.9	116	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	51.7	103	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	50.8	102	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	51.5	103	52-135

Volatile
Quality Control Summary
Spike Recovery Report

Page 4 of 8

SDG Number: 2017-2751

Sample Type: Post Spike

Client ID: CAWA-17-142901PS

Matrix: W

Lab Sample ID 1203877503

Instrument: VOAA.I

Analysis Date: 09/19/2017 16:20

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

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	52.4	105	50-133
630-20-6	PS 1,1,1,2-Tetrachloroethane	50.0	0.00 U	57.6	115	71-133
95-50-1	PS 1,2-Dichlorobenzene	50.0	0.00 U	50.8	102	60-125
71-36-3	PS n-Butyl alcohol	5000	0.00 U	5220	104	60-140

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2751

Sample Type: Post Spike Duplicate

Client ID: CAWA-17-142901PSD

Matrix: W

Lab Sample ID 1203877505

Instrument: VOAA.I

Analysis Date: 09/19/2017 16:43

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

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	105	105	59-132	1	0-20
75-05-8	PSD Acetonitrile	1250	0.00 U	1350	108	56-131	4	0-20
67-64-1	PSD Acetone	250	0.00 U	163	65	25-155	4	0-20
74-88-4	PSD Iodomethane	250	0.00 U	268	107	66-133	2	0-20
75-15-0	PSD Carbon disulfide	250	0.00 U	285	114	61-141	3	0-20
108-05-4	PSD Vinyl acetate	250	0.00 U	273	109	48-133	1	0-20
78-93-3	PSD 2-Butanone	250	0.00 U	210	84	25-143	4	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00 U	270	108	61-127	4	0-20
591-78-6	PSD 2-Hexanone	250	0.00 U	238	95	33-138	3	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00 U	32.9	66	33-164	1	0-20
74-87-3	PSD Chloromethane	50.0	0.00 U	47.0	94	53-139	5	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00 U	51.2	102	58-140	1	0-20
74-83-9	PSD Bromomethane	50.0	0.00 U	42.1	84	59-146	2	0-20
75-00-3	PSD Chloroethane	50.0	0.00 U	50.1	100	65-129	0	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00 U	52.2	104	65-141	0	0-20
60-29-7	PSD Ethyl ether	50.0	0.00 U	52.7	105	69-127	2	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00 U	56.4	113	59-130	2	0-20
75-09-2	PSD Methylene chloride	50.0	0.00 U	53.6	107	62-123	1	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00 U	59.0	118	69-132	1	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00 U	58.1	116	65-127	2	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00 U	57.0	114	67-127	1	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00 U	54.8	110	69-127	0	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2751

Sample Type: Post Spike Duplicate

Client ID: CAWA-17-142901PSD

Matrix: W

Lab Sample ID 1203877505

Instrument: VOAA.I

Analysis Date: 09/19/2017 16:43

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
594-20-7	PSD 2,2-Dichloropropane	50.0	0.00 U	64.5	129	66-137	2	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00 U	53.3	107	71-130	0	0-20
67-66-3	PSD Chloroform	50.0	0.00 U	54.3	109	71-129	1	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00 U	56.3	113	69-139	3	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00 U	53.6	107	67-130	2	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00 U	59.2	118	66-143	3	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00 U	55.0	110	69-130	0	0-20
71-43-2	PSD Benzene	50.0	0.00 U	53.3	107	66-125	1	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00 U	55.4	111	65-131	2	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00 U	54.9	110	67-127	0	0-20
74-95-3	PSD Dibromomethane	50.0	0.00 U	54.4	109	72-129	1	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00 U	58.0	116	70-138	0	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00 U	58.1	116	70-134	0	0-20
108-88-3	PSD Toluene	50.0	0.00 U	52.2	104	60-126	2	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00 U	59.7	119	69-135	0	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00 U	52.7	105	66-125	0	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00 U	51.9	104	67-124	0	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00 U	52.1	104	60-130	2	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00 U	49.8	100	68-143	0	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00 U	54.9	110	71-127	1	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00 U	51.7	103	64-124	1	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00 U	52.4	105	61-130	2	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2751

Sample Type: Post Spike Duplicate

Client ID: CAWA-17-142901PSD

Matrix: W

Lab Sample ID 1203877505

Instrument: VOAA.I

Analysis Date: 09/19/2017 16:43

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

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	52.1	104	62-131	1	0-20
100-42-5	PSD Styrene	50.0	0.00 U	52.6	105	59-135	0	0-20
75-25-2	PSD Bromoform	50.0	0.00 U	61.5	123	64-138	0	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00 U	51.9	104	55-133	1	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00 U	53.8	108	62-129	2	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00 U	52.8	106	70-124	1	0-20
108-86-1	PSD Bromobenzene	50.0	0.00 U	51.0	102	62-124	1	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00 U	52.3	105	50-133	1	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00 U	53.1	106	53-135	1	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00 U	51.8	104	56-128	0	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00 U	51.5	103	53-130	0	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00 U	51.8	104	55-135	1	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00 U	52.9	106	53-132	0	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00 U	53.3	107	50-138	1	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00 U	53.6	107	49-138	1	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00 U	51.6	103	56-126	0	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00 U	51.8	104	55-125	0	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00 U	54.3	109	43-142	1	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00 U	60.2	120	62-141	4	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00 U	52.5	105	40-147	2	0-20
91-20-3	PSD Naphthalene	50.0	0.00 U	52.5	105	62-134	3	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00 U	51.9	104	52-135	1	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2751

Sample Type: Post Spike Duplicate

Client ID: CAWA-17-142901PSD

Matrix: W

Lab Sample ID 1203877505

Instrument: VOAA.I

Analysis Date: 09/19/2017 16:43

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

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	52.9	106	50-133	1	0-20
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00 U	58.4	117	71-133	1	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00 U	50.8	102	60-125	0	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00 U	5500	110	60-140	5	0-20

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2017-2751

Sample Type: Post Spike

Client ID: CAWA-17-142901PS

Matrix: W

Lab Sample ID 1203877504

Instrument: VOAA.I

Analysis Date: 09/19/2017 17:07

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

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	296	119	49-141
76-13-1	PS	Trichlorotrifluoroethane	250	0.00	U	264	106	57-149
107-05-1	PS	Allyl chloride	250	0.00	U	251	100	54-128
107-13-1	PS	Acrylonitrile	250	0.00	U	238	95	59-129
107-12-0	PS	Propionitrile	250	0.00	U	229	92	58-131
126-98-7	PS	Methacrylonitrile	250	0.00	U	238	95	59-134
80-62-6	PS	Methyl methacrylate	250	0.00	U	241	97	62-135
97-63-2	PS	Ethyl methacrylate	250	0.00	U	244	97	60-136
78-83-1	PS	Isobutyl alcohol	2500	0.00	U	2610	105	60-143
126-99-8	PS	2-Chloro-1,3-butadiene	50.0	0.00	U	45.9	92	63-146

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2017-2751

Sample Type: Post Spike Duplicate

Client ID: CAWA-17-142901PSD

Matrix: W

Lab Sample ID 1203877506

Instrument: VOAA.I

Analysis Date: 09/19/2017 17:31

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	U	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
107-02-8	PSD Acrolein	250	0.00	U	307	123	49-141	3	0-20
76-13-1	PSD Trichlorotrifluoroethane	250	0.00	U	266	106	57-149	0	0-20
107-05-1	PSD Allyl chloride	250	0.00	U	259	104	54-128	3	0-20
107-13-1	PSD Acrylonitrile	250	0.00	U	258	103	59-129	8	0-20
107-12-0	PSD Propionitrile	250	0.00	U	248	99	58-131	8	0-20
126-98-7	PSD Methacrylonitrile	250	0.00	U	255	102	59-134	7	0-20
80-62-6	PSD Methyl methacrylate	250	0.00	U	260	104	62-135	7	0-20
97-63-2	PSD Ethyl methacrylate	250	0.00	U	256	102	60-136	5	0-20
78-83-1	PSD Isobutyl alcohol	2500	0.00	U	2860	114	60-143	9	0-20
126-99-8	PSD 2-Chloro-1,3-butadiene	50.0	0.00	U	47.0	94	63-146	2	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2751

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1701572

Matrix: WATER

Lab Sample ID 1203878617

Instrument: VOAA.I

Analysis Date: 09/19/2017 14:44

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

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	106	106	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1370	110	61-125
67-64-1	LCS Acetone	250	0.0	355	142	48-157
74-88-4	LCS Iodomethane	250	0.0	273	109	72-128
75-15-0	LCS Carbon disulfide	250	0.0	291	116	69-138
108-05-4	LCS Vinyl acetate	250	0.0	276	111	67-125
78-93-3	LCS 2-Butanone	250	0.0	312	125	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	276	110	66-124
591-78-6	LCS 2-Hexanone	250	0.0	333	133	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	31.9	64	40-160
74-87-3	LCS Chloromethane	50.0	0.0	48.0	96	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	51.4	103	65-137
74-83-9	LCS Bromomethane	50.0	0.0	40.7	81	63-137
75-00-3	LCS Chloroethane	50.0	0.0	51.0	102	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	52.0	104	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	53.1	106	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	58.3	117	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	54.9	110	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	60.6	121	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	58.9	118	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	57.9	116	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	55.4	111	75-123

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2751

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1701572

Matrix: WATER

Lab Sample ID 1203878617

Instrument: VOAA.I

Analysis Date: 09/19/2017 14:44

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

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	65.8	132	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	53.7	107	76-125
67-66-3	LCS Chloroform	50.0	0.0	55.1	110	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	57.7	115	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	54.5	109	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	60.3	121	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	55.4	111	74-122
71-43-2	LCS Benzene	50.0	0.0	54.0	108	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	56.0	112	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	55.6	111	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	54.7	109	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	58.7	117	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	58.8	118	78-131
108-88-3	LCS Toluene	50.0	0.0	52.1	104	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	60.3	121	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	53.1	106	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	52.0	104	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	52.0	104	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	50.3	101	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	54.9	110	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	51.7	103	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	52.7	105	73-125

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2751

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1701572

Matrix: WATER

Lab Sample ID 1203878617

Instrument: VOAA.I

Analysis Date: 09/19/2017 14:44

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
95-47-6	LCS o-Xylene	50.0	0.0	52.4	105	74-126
100-42-5	LCS Styrene	50.0	0.0	54.3	109	72-130
75-25-2	LCS Bromoform	50.0	0.0	61.1	122	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	51.6	103	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	53.1	106	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	52.3	105	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	50.8	102	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	52.2	104	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	53.0	106	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	51.7	103	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	51.4	103	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	51.3	103	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	52.9	106	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	53.0	106	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	53.5	107	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	51.1	102	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	51.3	103	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	54.0	108	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	59.5	119	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	50.9	102	72-136
91-20-3	LCS Naphthalene	50.0	0.0	51.1	102	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	50.8	102	70-130

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2751

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1701572

Matrix: WATER

Lab Sample ID 1203878617

Instrument: VOAA.I

Analysis Date: 09/19/2017 14:44

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

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	51.9	104	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	58.8	118	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	50.3	101	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5560	111	63-138

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2751

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1701572

Matrix: WATER

Lab Sample ID 1203878618

Instrument: VOAA.I

Analysis Date: 09/19/2017 15:32

Dilution: 1

Analyst: VXY1

Purge Vol: 5 mL

Batch ID: 1701572

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	307	123	60-140
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	289	116	61-148
107-05-1	LCS Allyl chloride	250	0.0	270	108	59-125
107-13-1	LCS Acrylonitrile	250	0.0	255	102	65-122
107-12-0	LCS Propionitrile	250	0.0	244	98	64-124
126-98-7	LCS Methacrylonitrile	250	0.0	255	102	64-126
80-62-6	LCS Methyl methacrylate	250	0.0	259	103	69-127
97-63-2	LCS Ethyl methacrylate	250	0.0	261	105	66-130
78-83-1	LCS Isobutyl alcohol	2500	0.0	2790	112	65-135
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	49.6	99	66-147

Method Blank Summary

Page 1 of 1

SDG Number:	2017-2751	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1701572	Instrument ID:	VOAA.I	Data File:	091917\AA206.D
Lab Sample ID:	1203878616	Prep Date:	09/19/2017 15:56	Analyzed:	09/19/17 15:56
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 1701572	1203878617	091917\AA203L.D	09/19/17	1444
02 LCS for batch 1701572	1203878618	091917\AA205.D	09/19/17	1532
03 CAWA-17-142901PS	1203877503	091917\AA207.D	09/19/17	1620
04 CAWA-17-142901PSD	1203877505	091917\AA208.D	09/19/17	1643
05 CAWA-17-142901PS	1203877504	091917\AA209.D	09/19/17	1707
06 CAWA-17-142901PSD	1203877506	091917\AA210.D	09/19/17	1731
07 CAWA-17-142922	432594002	091917\AA214.D	09/19/17	1906
08 CAWA-17-143036	432594003	091917\AA215.D	09/19/17	1929
09 CAWA-17-143054	432594005	091917\AA216.D	09/19/17	1953

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2751	Date Collected: 09/08/2017 13:32	Matrix: W
Lab Sample ID: 1203877503	Date Received: 09/13/2017 09:20	
Client Sample: QC for batch 1701572	Client: ARSL004	Project: QC
Client ID: CAWA-17-142901PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution: 1
Run Date: 09/19/2017 16:20	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/19/2017 16:20		
Data File: 091917\AA207.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		57.6	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		54.8	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		53.0	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		52.6	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		56.4	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		55.3	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		52.6	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		51.5	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		52.0	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		52.4	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		52.7	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		57.9	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		54.3	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		50.8	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		55.1	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		54.8	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		52.7	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		51.4	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		51.9	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		51.6	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		63.2	ug/L	0.300	1.00
78-93-3	2-Butanone		202	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		51.8	ug/L	0.300	1.00
591-78-6	2-Hexanone		231	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		51.5	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		53.3	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		261	ug/L	1.50	5.00
67-64-1	Acetone		157	ug/L	1.50	10.0
75-05-8	Acetonitrile		1300	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		52.7	ug/L	0.300	1.00
108-86-1	Bromobenzene		51.5	ug/L	0.300	1.00
74-97-5	Bromochloromethane		53.2	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		57.8	ug/L	0.300	1.00
75-25-2	Bromoform		61.2	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2751	Date Collected: 09/08/2017 13:32	Matrix: W
Lab Sample ID: 1203877503	Date Received: 09/13/2017 09:20	
Client Sample: QC for batch 1701572	Client: ARSL004	Project: QC
Client ID: CAWA-17-142901PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution: 1
Run Date: 09/19/2017 16:20	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/19/2017 16:20		
Data File: 091917\AA207.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		42.9	ug/L	0.300	1.00
75-15-0	Carbon disulfide		277	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		57.4	ug/L	0.300	1.00
108-90-7	Chlorobenzene		51.1	ug/L	0.300	1.00
75-00-3	Chloroethane		50.2	ug/L	0.300	1.00
67-66-3	Chloroform		53.9	ug/L	0.300	1.00
74-87-3	Chloromethane		44.8	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		49.7	ug/L	0.300	1.00
74-95-3	Dibromomethane		53.9	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		33.2	ug/L	0.300	1.00
60-29-7	Ethyl ether		53.5	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		51.6	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		51.7	ug/L	0.300	1.00
74-88-4	Iodomethane		263	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		51.4	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		52.9	ug/L	1.00	10.0
91-20-3	Naphthalene		50.8	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		52.5	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		50.9	ug/L	0.300	1.00
108-88-3	Toluene		51.4	ug/L	0.300	1.00
79-01-6	Trichloroethylene		54.3	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		52.2	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		275	ug/L	1.50	5.00
75-01-4	Vinyl chloride		51.8	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		58.3	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		104	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5220	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		53.8	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		52.0	ug/L	0.300	1.00
95-47-6	o-Xylene		51.4	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		52.7	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2751	Date Collected: 09/08/2017 13:32	Matrix: W
Lab Sample ID: 1203877503	Date Received: 09/13/2017 09:20	
Client Sample: QC for batch 1701572	Client: ARSL004	Project: QC
Client ID: CAWA-17-142901PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution: 1
Run Date: 09/19/2017 16:20	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/19/2017 16:20		
Data File: 091917\AA207.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		58.5	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		51.3	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		57.1	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		59.8	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.6	50.0	107	(71%-134%)
Bromofluorobenzene	48.5	50.0	97	(70%-131%)
Toluene-d8	50.2	50.0	100	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2751	Date Collected: 09/08/2017 13:32	Matrix: W
Lab Sample ID: 1203877504	Date Received: 09/13/2017 09:20	
Client Sample: QC for batch 1701572	Client: ARSL004	Project: QC
Client ID: CAWA-17-142901PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution: 1
Run Date: 09/19/2017 17:07	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/19/2017 17:07		
Data File: 091917\AA209.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		45.9	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		296	ug/L	1.50	5.00
107-13-1	Acrylonitrile		238	ug/L	1.50	5.00
107-05-1	Allyl chloride		251	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: 2017-2751	Date Collected: 09/08/2017 13:32	Matrix: W
Lab Sample ID: 1203877504	Date Received: 09/13/2017 09:20	
Client Sample: QC for batch 1701572	Client: ARSL004	Project: QC
Client ID: CAWA-17-142901PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution: 1
Run Date: 09/19/2017 17:07	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/19/2017 17:07		
Data File: 091917\AA209.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		244	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		2610	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		238	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		241	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		229	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		264	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: 2017-2751	Date Collected: 09/08/2017 13:32	Matrix: W
Lab Sample ID: 1203877504	Date Received: 09/13/2017 09:20	
Client Sample: QC for batch 1701572	Client: ARSL004	Project: QC
Client ID: CAWA-17-142901PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution: 1
Run Date: 09/19/2017 17:07	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/19/2017 17:07		
Data File: 091917\AA209.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	54.1	50.0	ug/L 108	(71%-134%)
Bromofluorobenzene	50.1	50.0	ug/L 100	(70%-131%)
Toluene-d8	52.5	50.0	ug/L 105	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2751	Date Collected: 09/08/2017 13:32	Matrix: W
Lab Sample ID: 1203877505	Date Received: 09/13/2017 09:20	
Client Sample: QC for batch 1701572	Client: ARSL004	Project: QC
Client ID: CAWA-17-142901PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution: 1
Run Date: 09/19/2017 16:43	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/19/2017 16:43		
Data File: 091917\AA208.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		58.4	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		56.3	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		53.8	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		52.7	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		57.0	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		56.4	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		53.6	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		51.9	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		52.8	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		52.9	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		52.9	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		60.2	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		54.9	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		50.8	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		55.0	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		54.9	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		53.1	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		51.6	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		51.9	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		51.8	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		64.5	ug/L	0.300	1.00
78-93-3	2-Butanone		210	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		51.8	ug/L	0.300	1.00
591-78-6	2-Hexanone		238	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		51.5	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		53.6	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		270	ug/L	1.50	5.00
67-64-1	Acetone		163	ug/L	1.50	10.0
75-05-8	Acetonitrile		1350	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		53.3	ug/L	0.300	1.00
108-86-1	Bromobenzene		51.0	ug/L	0.300	1.00
74-97-5	Bromochloromethane		53.3	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		58.0	ug/L	0.300	1.00
75-25-2	Bromoform		61.5	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2751	Date Collected: 09/08/2017 13:32	Matrix: W
Lab Sample ID: 1203877505	Date Received: 09/13/2017 09:20	
Client Sample: QC for batch 1701572	Client: ARSL004	Project: QC
Client ID: CAWA-17-142901PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution: 1
Run Date: 09/19/2017 16:43	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/19/2017 16:43		
Data File: 091917\AA208.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		42.1	ug/L	0.300	1.00
75-15-0	Carbon disulfide		285	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		59.2	ug/L	0.300	1.00
108-90-7	Chlorobenzene		51.7	ug/L	0.300	1.00
75-00-3	Chloroethane		50.1	ug/L	0.300	1.00
67-66-3	Chloroform		54.3	ug/L	0.300	1.00
74-87-3	Chloromethane		47.0	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		49.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		54.4	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		32.9	ug/L	0.300	1.00
60-29-7	Ethyl ether		52.7	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		52.4	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		52.5	ug/L	0.300	1.00
74-88-4	Iodomethane		268	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		51.9	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		53.6	ug/L	1.00	10.0
91-20-3	Naphthalene		52.5	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		52.6	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		52.1	ug/L	0.300	1.00
108-88-3	Toluene		52.2	ug/L	0.300	1.00
79-01-6	Trichloroethylene		55.4	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		52.2	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		273	ug/L	1.50	5.00
75-01-4	Vinyl chloride		51.2	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		54.8	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		58.1	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		105	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5500	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		54.3	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		52.3	ug/L	0.300	1.00
95-47-6	o-Xylene		52.1	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		53.3	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2751	Date Collected: 09/08/2017 13:32	Matrix: W
Lab Sample ID: 1203877505	Date Received: 09/13/2017 09:20	
Client Sample: QC for batch 1701572	Client: ARSL004	Project: QC
Client ID: CAWA-17-142901PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution: 1
Run Date: 09/19/2017 16:43	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/19/2017 16:43		
Data File: 091917\AA208.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		59.0	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		51.8	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		58.1	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		59.7	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	54.8	50.0	ug/L 110	(71%-134%)
Bromofluorobenzene	49.0	50.0	ug/L 98	(70%-131%)
Toluene-d8	51.4	50.0	ug/L 103	(74%-124%)

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2751	Date Collected:	09/08/2017 13:32	Matrix:	W
Lab Sample ID:	1203877506	Date Received:	09/13/2017 09:20		
Client Sample:	QC for batch 1701572	Client:	ARSL004	Project:	QC
Client ID:	CAWA-17-142901PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1701572	Inst:	VOAA.I	Dilution:	1
Run Date:	09/19/2017 17:31	Analyst:	VXY1	Purge Vol:	5 mL
Prep Date:	09/19/2017 17:31				
Data File:	091917\AA210.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		47.0	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		307	ug/L	1.50	5.00
107-13-1	Acrylonitrile		258	ug/L	1.50	5.00
107-05-1	Allyl chloride		259	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: 2017-2751	Date Collected: 09/08/2017 13:32	Matrix: W
Lab Sample ID: 1203877506	Date Received: 09/13/2017 09:20	
Client Sample: QC for batch 1701572	Client: ARSL004	Project: QC
Client ID: CAWA-17-142901PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution: 1
Run Date: 09/19/2017 17:31	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/19/2017 17:31		
Data File: 091917\AA210.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		256	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		2860	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		255	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		260	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		248	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		266	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: 2017-2751	Date Collected: 09/08/2017 13:32	Matrix: W
Lab Sample ID: 1203877506	Date Received: 09/13/2017 09:20	
Client Sample: QC for batch 1701572	Client: ARSL004	Project: QC
Client ID: CAWA-17-142901PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution: 1
Run Date: 09/19/2017 17:31	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/19/2017 17:31		
Data File: 091917\AA210.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	52.9	50.0	106	(71%-134%)
Bromofluorobenzene	48.7	50.0	97	(70%-131%)
Toluene-d8	50.7	50.0	101	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: 2017-2751

Lab Sample ID: 1203878616

Client Sample: QC for batch 1701572

Client ID: MB for batch 1701572

Batch ID: 1701572

Run Date: 09/19/2017 15:56

Prep Date: 09/19/2017 15:56

Data File: 091917\AA206.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOAA.I

Analyst: VXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2751	Matrix:	WATER
Lab Sample ID:	1203878616		
Client Sample:	QC for batch 1701572	Client:	ARSL004
Client ID:	MB for batch 1701572	Method:	SW-846:8260B
Batch ID:	1701572	Inst:	VOAA.I
Run Date:	09/19/2017 15:56	Analyst:	VXY1
Prep Date:	09/19/2017 15:56	Purge Vol:	5 mL
Data File:	091917\AA206.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: 2017-2751		Matrix: WATER
Lab Sample ID: 1203878616		
Client Sample: QC for batch 1701572	Client: ARSL004	Project: QC
Client ID: MB for batch 1701572	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution: 1
Run Date: 09/19/2017 15:56	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/19/2017 15:56		
Data File: 091917\AA206.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	54.8	50.0	ug/L 110	(71%-134%)
Bromofluorobenzene	50.3	50.0	ug/L 101	(70%-131%)
Toluene-d8	52.1	50.0	ug/L 104	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.423	5.62	ug/L	0	J
	unknown	3.493	5.77	ug/L	0	J

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2017-2751

Lab Sample ID: 1203878617

Client Sample: QC for batch 1701572

Client ID: LCS for batch 1701572

Batch ID: 1701572

Run Date: 09/19/2017 14:44

Prep Date: 09/19/2017 14:44

Data File: 091917\AA203L.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOAA.I

Analyst: VXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		58.8	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		57.7	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		53.1	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		53.1	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		57.9	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		58.3	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		54.5	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene		50.8	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		52.3	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		51.9	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		52.9	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		59.5	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		54.9	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		50.3	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		55.6	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		53.0	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		51.1	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		52.0	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		51.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		65.8	ug/L	0.300	1.00
78-93-3	2-Butanone		312	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		51.7	ug/L	0.300	1.00
591-78-6	2-Hexanone		333	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		51.4	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		53.5	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		276	ug/L	1.50	5.00
67-64-1	Acetone		355	ug/L	1.50	10.0
75-05-8	Acetonitrile		1370	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		54.0	ug/L	0.300	1.00
108-86-1	Bromobenzene		50.8	ug/L	0.300	1.00
74-97-5	Bromochloromethane		53.7	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		58.7	ug/L	0.300	1.00
75-25-2	Bromoform		61.1	ug/L	0.300	1.00

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2751

Lab Sample ID: 1203878617

Client Sample: QC for batch 1701572

Client ID: LCS for batch 1701572

Batch ID: 1701572

Run Date: 09/19/2017 14:44

Prep Date: 09/19/2017 14:44

Data File: 091917\AA203L.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOAA.I

Analyst: VXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		40.7	ug/L	0.300	1.00
75-15-0	Carbon disulfide		291	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		60.3	ug/L	0.300	1.00
108-90-7	Chlorobenzene		51.7	ug/L	0.300	1.00
75-00-3	Chloroethane		51.0	ug/L	0.300	1.00
67-66-3	Chloroform		55.1	ug/L	0.300	1.00
74-87-3	Chloromethane		48.0	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		50.3	ug/L	0.300	1.00
74-95-3	Dibromomethane		54.7	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		31.9	ug/L	0.300	1.00
60-29-7	Ethyl ether		53.1	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		52.7	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene		50.9	ug/L	0.300	1.00
74-88-4	Iodomethane		273	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		51.6	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		54.9	ug/L	1.00	10.0
91-20-3	Naphthalene		51.1	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		54.3	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		52.0	ug/L	0.300	1.00
108-88-3	Toluene		52.1	ug/L	0.300	1.00
79-01-6	Trichloroethylene		56.0	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		52.0	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		276	ug/L	1.50	5.00
75-01-4	Vinyl chloride		51.4	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		55.4	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		58.8	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		106	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5560	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		54.0	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		52.2	ug/L	0.300	1.00
95-47-6	o-Xylene		52.4	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		53.0	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2751
Lab Sample ID: 1203878617
Client Sample: QC for batch 1701572
Client ID: LCS for batch 1701572
Batch ID: 1701572
Run Date: 09/19/2017 14:44
Prep Date: 09/19/2017 14:44
Data File: 091917\AA203L.D

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

Column: DB-624

Matrix: WATER

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

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		60.6	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		51.3	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		58.9	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		60.3	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.9	50.0	108	(71%-134%)
Bromofluorobenzene	47.9	50.0	96	(70%-131%)
Toluene-d8	49.7	50.0	99	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 3

SDG Number: 2017-2751

Lab Sample ID: 1203878618

Client Sample: QC for batch 1701572

Client ID: LCS for batch 1701572

Batch ID: 1701572

Run Date: 09/19/2017 15:32

Prep Date: 09/19/2017 15:32

Data File: 091917\AA205.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOAA.I

Analyst: VXY1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		49.6	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		307	ug/L	1.50	5.00
107-13-1	Acrylonitrile		255	ug/L	1.50	5.00
107-05-1	Allyl chloride		270	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: 2017-2751		Matrix:	WATER
Lab Sample ID: 1203878618			
Client Sample: QC for batch 1701572	Client: ARSL004	Project:	QC
Client ID: LCS for batch 1701572	Method: SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution:	1
Run Date: 09/19/2017 15:32	Analyst: VXY1	Purge Vol:	5 mL
Prep Date: 09/19/2017 15:32			
Data File: 091917\AA205.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		261	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		2790	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		255	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		259	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		244	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		289	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: 2017-2751		Matrix: WATER
Lab Sample ID: 1203878618		
Client Sample: QC for batch 1701572	Client: ARSL004	Project: QC
Client ID: LCS for batch 1701572	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1701572	Inst: VOAA.I	Dilution: 1
Run Date: 09/19/2017 15:32	Analyst: VXY1	Purge Vol: 5 mL
Prep Date: 09/19/2017 15:32		
Data File: 091917\AA205.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	52.6	50.0	ug/L 105	(71%-134%)
Bromofluorobenzene	49.2	50.0	ug/L 98	(70%-131%)
Toluene-d8	51.4	50.0	ug/L 103	(74%-124%)

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2751
Work Order #: 432594**

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: 1702207

Prep Batch Number: 1702204

Sample Analysis

Sample ID	Client ID
432594001	432594001 (CAWA-17-142887)
432594004	432594004 (CAWA-17-143050)
1203878947	Interference Check Sample (ICS)
1203878943	Method Blank (MB)
1203878944	Laboratory Control Sample (LCS)
1203878945	432570001(CAWA-17-142856) Matrix Spike (MS)
1203878946	432570001(CAWA-17-142856) 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 432570001 (CAWA-17-142856) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

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

Internal Standard Area Acceptance

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

Retention Time

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Manual Integrations

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

Method Comments

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

Additional Comments

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

Perchlorate Isotope Ratio

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

System Configuration

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

Electronic Packaging Comment

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

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

Chromatographic Columns

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

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

Dionex: IonPac AG-16 2 x 50 mm.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2017-2751 GEL Work Order: 432594

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 25 SEP 2017

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1702204Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-142887Date Received: 13-SEP-17GEL Job No (SDG): 2017-2751GEL Sample ID: 432594001Date Filtered: 20-SEP-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.233	ug/L		1	20-SEP-17 19:55	per0920020a
	Perchlorate Isotope Ratio			2.84			1	20-SEP-17 19:55	per0920020a
14797-73-0	Perchlorate-101	.05	.2	0.233	ug/L		1	20-SEP-17 19:55	per0920020a
	Perchlorate-O(18)			0.511	ug/L		1	20-SEP-17 19:55	per0920020a

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

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1702204Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-143050Date Received: 13-SEP-17GEL Job No (SDG): 2017-2751GEL Sample ID: 432594004Date Filtered: 20-SEP-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.246	ug/L		1	20-SEP-17 20:06	per0920021a
	Perchlorate Isotope Ratio			3.02			1	20-SEP-17 20:06	per0920021a
14797-73-0	Perchlorate-101	.05	.2	0.232	ug/L		1	20-SEP-17 20:06	per0920021a
	Perchlorate-O(18)			0.525	ug/L		1	20-SEP-17 20:06	per0920021a

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

*Concentration =

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

Quality Control Summary

Perchlorate Laboratory Control Sample

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No. (SDG): 2017-2751

Extract Batch Code: 1702204

Date Filtered: 20-SEP-17

Matrix: WATER

Sample ID: 1203878944

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.202	ug/L	101		85 - 115
Perchlorate Isotope Ratio		2.75				-
Perchlorate-101	0.200	.209	ug/L	104		85 - 115
Perchlorate-O(18)		.523	ug/L			-

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

Perchlorate Spike/Spike Duplicate Summary

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No (SDG): 2017-2751

Extract Batch Code: 1702204

Date Extracted: 20-SEP-17

GEL MS/PS ID: 1203878945

Client ID: CAWA-17-142856

GEL MSD/PSD ID: 1203878946

QC Type: MS

Compound^	Spike Added	Sample Conc	Units	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Recovery Limit
Perchlorate	0.200	0.0173	ug/L	0.215	99	.222	103	4	30	75 - 125
Perchlorate Isotope Ratio	0	3.26		2.81		3.02		7		-
Perchlorate-101	0.200	0.0151	ug/L	0.217	101	.209	97	4	30	75 - 125
Perchlorate-O(18)	0	0.521	ug/L	0.516		.522		1		-

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

Quality Control Data

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1702204Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 20-SEP-17GEL Job No (SDG): 2017-2751GEL Sample ID: 1203878943Date Filtered: 20-SEP-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.050	ug/L	U	1	20-SEP-17 18:39	per0920013a
	Perchlorate Isotope Ratio						1	20-SEP-17 18:39	per0920013a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	20-SEP-17 18:39	per0920013a
	Perchlorate-O(18)			0.553	ug/L		1	20-SEP-17 18:39	per0920013a

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

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1702204Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 20-SEP-17GEL Job No (SDG): 2017-2751GEL Sample ID: 1203878944Date Filtered: 20-SEP-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.202	ug/L		1	20-SEP-17 18:50	per0920014a
	Perchlorate Isotope Ratio			2.75			1	20-SEP-17 18:50	per0920014a
14797-73-0	Perchlorate-101	.05	.2	0.209	ug/L		1	20-SEP-17 18:50	per0920014a
	Perchlorate-O(18)			0.523	ug/L		1	20-SEP-17 18:50	per0920014a

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

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1702204Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-2751GEL Sample ID: 1203878947Date Filtered: 20-SEP-17Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.224	ug/L		1	20-SEP-17 19:01	per0920015a
	Perchlorate Isotope Ratio			2.65			1	20-SEP-17 19:01	per0920015a
14797-73-0	Perchlorate-101	.05	.2	0.240	ug/L		1	20-SEP-17 19:01	per0920015a
	Perchlorate-O(18)			0.522	ug/L		1	20-SEP-17 19:01	per0920015a

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

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1702204Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-142856MSDate Received: 13-SEP-17GEL Job No (SDG): 2017-2751GEL Sample ID: 1203878945Date Filtered: 20-SEP-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.215	ug/L		1	20-SEP-17 19:22	per0920017a
	Perchlorate Isotope Ratio			2.81			1	20-SEP-17 19:22	per0920017a
14797-73-0	Perchlorate-101	.05	.2	0.217	ug/L		1	20-SEP-17 19:22	per0920017a
	Perchlorate-O(18)			0.516	ug/L		1	20-SEP-17 19:22	per0920017a

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

*Concentration =

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

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1702204Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-142856MSDDate Received: 13-SEP-17GEL Job No (SDG): 2017-2751GEL Sample ID: 1203878946Date Filtered: 20-SEP-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.222	ug/L		1	20-SEP-17 19:33	per0920018a
	Perchlorate Isotope Ratio			3.02			1	20-SEP-17 19:33	per0920018a
14797-73-0	Perchlorate-101	.05	.2	0.209	ug/L		1	20-SEP-17 19:33	per0920018a
	Perchlorate-O(18)			0.522	ug/L		1	20-SEP-17 19:33	per0920018a

^ 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 #: 2017-2751
Work Order #: 432594**

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: 1700506

Prep Batch Number: 1700504

Sample Analysis

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

Sample ID	Client ID
432594002	CAWA-17-142922
432594005	CAWA-17-143054
1203874660	Method Blank (MB)
1203874661	Laboratory Control Sample (LCS)
1203874662	432587002(CAWA-17-142901) Matrix Spike (MS)
1203874663	432587002(CAWA-17-142901) 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 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 analyte was 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 432587002 (CAWA-17-142901) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS and/or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. Because the recoveries were biased high and target analytes were not detected in the associated samples, the data were reported.

Sample	Analyte	Value
1203874662 (CAWA-17-142901MS)	TATB	178* (38%-149%)
1203874663 (CAWA-17-142901MSD)	TATB	164* (38%-149%)

MS/MSD Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

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

Sample Re-extraction/Re-analysis

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

Miscellaneous Information**Manual Integrations**

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

Additional Comments

Due to software limitations, all initial calibration blanks must be designated as XIB001 in order for the forms to be correct. Due to software limitations, file extensions such as DL, RE, etc. may not appear on the generated forms and/or raw data. Relative Retention Time (RRT) is used by the laboratory to establish peak identity. The RRT of each target analyte is calculated using the retention time of the corresponding internal standard. The RRT of each analyte in a sample must be within 0.1 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: 2017-2751 GEL Work Order: 432594

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 26 SEP 2017

Title: Group Leader

Sample Data Summary

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-142922

Lab Code: GEL

GEL Job No (SDG) 2017-2751

Matrix: WATER

GEL Sample ID: 432594002

Sample Amount 940 mL

Date Received: 13-SEP-17

Moisture: .

Extraction Batch ID: 1700504

Extraction Type Sol Exchange

Date Extracted: 14-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0913049.wiff

Date Analyzed: 14-SEP-17 22:08

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.0851	U	0.0851	0.266
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.0851	U	0.0851	0.266
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
13980-04-6	TNX	.0851	U	0.0851	0.266
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.0851	U	0.0851	0.266
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.0851	U	0.0851	0.266
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.0851	U	0.0851	0.266
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.0851	U	0.0851	0.532
<i>479-45-8</i>	<i>Tetryl</i>				
5755-27-1	MNX	.0851	U	0.0851	0.266
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.0851	U	0.0851	0.266
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.0851	U	0.0851	0.266
<i>80251-29-2</i>	<i>DNX</i>				
98-95-3	Nitrobenzene	.0851	U	0.0851	0.266
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.0851	U	0.0851	0.266
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.0851	U	0.0851	0.266
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-142922

Lab Code: GEL

GEL Job No (SDG) 2017-2751

Matrix: WATER

GEL Sample ID: 432594002

Sample Amount 940 mL

Date Received: 13-SEP-17

Moisture: .

Extraction Batch ID: 1700504

Extraction Type Sol Exchange

Date Extracted: 14-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-65-0	m-Dinitrobenzene	.0851	U	0.0851	0.266
99-65-0	<i>m-Dinitrobenzene</i>				
88-72-2	o-Nitrotoluene	.0872	U	0.0872	0.266
88-72-2	<i>o-Nitrotoluene</i>				
78-11-5	PETN	.106	U	0.106	0.532
78-11-5	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.16	U	0.160	0.532
99-99-0	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	.319	U	0.319	1.06
3058-38-6	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	.319	U	0.319	1.06
618-87-1	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	.319	U	0.319	1.06
78-30-8	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	.532	U	0.532	2.66
59229-75-3	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	.532	U	0.532	2.66
6629-29-4	<i>2,4-Diamino-6-nitrotoluene</i>				
121-82-4	RDX	1.9		0.0851	0.266
121-82-4	<i>RDX</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-143054

Lab Code: GEL

GEL Job No (SDG) 2017-2751

Matrix: WATER

GEL Sample ID: 432594005

Sample Amount 950 mL

Date Received: 13-SEP-17

Moisture: .

Extraction Batch ID: 1700504

Extraction Type Sol Exchange

Date Extracted: 14-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0913050.wiff

Date Analyzed: 14-SEP-17 22:43

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.0842	U	0.0842	0.263
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.0842	U	0.0842	0.263
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
13980-04-6	TNX	.0842	U	0.0842	0.263
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.0842	U	0.0842	0.263
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.0842	U	0.0842	0.263
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.0842	U	0.0842	0.263
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.0842	U	0.0842	0.526
<i>479-45-8</i>	<i>Tetryl</i>				
5755-27-1	MNX	.0842	U	0.0842	0.263
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.0842	U	0.0842	0.263
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.0842	U	0.0842	0.263
<i>80251-29-2</i>	<i>DNX</i>				
98-95-3	Nitrobenzene	.0842	U	0.0842	0.263
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.0842	U	0.0842	0.263
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.0842	U	0.0842	0.263
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-143054

Lab Code: GEL

GEL Job No (SDG) 2017-2751

Matrix: WATER

GEL Sample ID: 432594005

Sample Amount 950 mL

Date Received: 13-SEP-17

Moisture: .

Extraction Batch ID: 1700504

Extraction Type Sol Exchange

Date Extracted: 14-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-65-0	m-Dinitrobenzene	.0842	U	0.0842	0.263
99-65-0	<i>m-Dinitrobenzene</i>				
88-72-2	o-Nitrotoluene	.0863	U	0.0863	0.263
88-72-2	<i>o-Nitrotoluene</i>				
78-11-5	PETN	.105	U	0.105	0.526
78-11-5	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.158	U	0.158	0.526
99-99-0	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	.316	U	0.316	1.05
3058-38-6	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	.316	U	0.316	1.05
618-87-1	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	.316	U	0.316	1.05
78-30-8	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	.526	U	0.526	2.63
59229-75-3	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	.526	U	0.526	2.63
6629-29-4	<i>2,4-Diamino-6-nitrotoluene</i>				
121-82-4	RDX	1.93		0.0842	0.263
121-82-4	<i>RDX</i>				

Quality Control Summary

High Explosives Surrogate Recovery Summary**Lab Name:** GEL Laboratories LLC**GEL Job No (SDG):** 2017-2751**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
432594002	CAWA-17-142922	85	55 - 115	
432594005	CAWA-17-143054	95	55 - 115	
1203874660	MB for batch 1700504	100	55 - 115	
1203874661	LCS for batch 1700504	80	55 - 115	
1203874662	CAWA-17-142901MS	91	55 - 115	
1203874663	CAWA-17-142901MSD	91	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) 2017-2751

Extract Batch Code: 1700504

Date Extracted: 14-SEP-17

GEL LCS ID: 1203874661

GEL LCSDUP ID: .

Analysis Date/Time: 14-SEP-17 19:10

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
1,3,5-Trinitrobenzene	5	4.29	86					70 - 110
2,4,6-Trinitrotoluene	5	4.38	88					69 - 113
2,4-Diamino-6-nitrotoluene	5	4.27	85					50 - 121
2,4-Dinitrotoluene	5	4.21	84					71 - 110
2,6-Diamino-4-nitrotoluene	5	4.51	90					53 - 127
2,6-Dinitrotoluene	5	4.18	84					72 - 105
2-Amino-4,6-dinitrotoluene	5	4.11	82					70 - 112
3,5-Dinitroaniline	5	4.41	88					70 - 121
4-Amino-2,6-dinitrotoluene	5	4.27	85					74 - 116
DNX	.5	.485	97					65 - 113
HMX	5	4.26	85					58 - 113
MNX	.5	.501	100					66 - 114
Nitrobenzene	5	3.98	80					64 - 115
PETN	5	4.42	88					57 - 126
RDX	5	4.62	92					64 - 117
TATB	1.25	1.56	124					47 - 135
TNX	.5	.447	89					51 - 110
Tetryl	5	4.36	87					55 - 122
m-Dinitrobenzene	5	4.43	89					74 - 117
m-Nitrotoluene	5	4.25	85					66 - 114
o-Nitrotoluene	5	4.1	82					64 - 115
p-Nitrotoluene	5	4.53	91					66 - 127
tris(o-cresyl) phosphate	5	2.97	59					43 - 104

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

* Values outside of QC limits

3
High Explosives MS/MSD Summary

Lab Name: GEL Laboratories LLC

Client ID: CAWA-17-142901

Lab Code: GEL

GEL Job No (SDG) 2017-2751

Extract Batch Code: 1700504

Date Extracted: 14-SEP-17

GEL Spike ID: 1203874662

GEL SpikeDup ID: 1203874663

Analysis Date/Time: 14-SEP-17 20:57

MSD Analysis Date/Time: 14-SEP-17 21:32

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
o-Nitrotoluene	5.31915	0	4.51	85	5.03	93	11	30	56 - 119
p-Nitrotoluene	5.31915	0	4.63	87	4.88	90	5	30	61 - 129
tris(o-cresyl) phosphate	5.31915	0	2.8	53	3.12	57	11	30	38 - 105
1,3,5-Trinitrobenzene	5.31915	0	5.17	97	4.82	89	7	30	67 - 111
2,4,6-Trinitrotoluene	5.31915	0	4.58	86	4.85	89	6	30	66 - 112
2,4-Diamino-6-nitrotoluene	5.31915	0	4.6	86	4.3	79	7	30	50 - 121
2,4-Dinitrotoluene	5.31915	0	4.78	90	4.77	88	0	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.31915	0	4.71	89	4.49	83	5	30	53 - 127
2,6-Dinitrotoluene	5.31915	0	4.73	89	4.9	90	4	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.31915	0	4.78	90	5.02	92	5	30	67 - 115
3,5-Dinitroaniline	5.31915	0	4.75	89	4.99	92	5	30	70 - 121
4-Amino-2,6-dinitrotoluene	5.31915	0	4.81	91	4.89	90	2	30	65 - 120
DNX	.53191	0	.559	105	.537	99	4	30	53 - 124
HMX	5.31915	0	4.85	91	5	92	3	30	44 - 128
MNX	.53191	0	.609	115	.569	105	7	30	60 - 121
Nitrobenzene	5.31915	0	3.76	71	4.48	82	17	30	62 - 116
PETN	5.31915	0	5.05	95	4.87	90	4	30	51 - 131
RDX	5.31915	0	5.15	97	5.43	100	5	30	57 - 125
TATB	1.32979	0	2.37	178 *	2.23	164 *	6	30	38 - 149
TNX	.53191	0	.56	105	.56	103	0	30	46 - 120
Tetryl	5.31915	0	4.78	90	4.47	82	7	30	50 - 126
m-Dinitrobenzene	5.31915	0	5.22	98	4.98	92	5	30	74 - 117
m-Nitrotoluene	5.31915	0	4.62	87	4.21	77	9	30	59 - 120

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

Quality Control Data

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1700504

Lab Code: GEL

GEL Job No (SDG) 2017-2751

Matrix: WATER

GEL Sample ID: 1203874660

Sample Amount 1000 mL

Date Received: 13-SEP-17

Moisture: .

Extraction Batch ID: 1700504

Extraction Type Sol Exchange

Date Extracted: 14-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0913043.wiff

Date Analyzed: 14-SEP-17 18:35

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

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1700504

Lab Code: GEL

GEL Job No (SDG) 2017-2751

Matrix: WATER

GEL Sample ID: 1203874660

Sample Amount 1000 mL

Date Received: 13-SEP-17

Moisture: .

Extraction Batch ID: 1700504

Extraction Type Sol Exchange

Date Extracted: 14-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

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

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1700504

Lab Code: GEL

GEL Job No (SDG) 2017-2751

Matrix: WATER

GEL Sample ID: 1203874661

Sample Amount 1000 mL

Date Received: 13-SEP-17

Moisture: .

Extraction Batch ID: 1700504

Extraction Type Sol Exchange

Date Extracted: 14-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0913044.wiff

Date Analyzed: 14-SEP-17 19:10

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
13980-04-6	TNX	.447		0.080	0.250
<i>13980-04-6</i>	<i>TNX</i>				
80251-29-2	DNX	.485		0.080	0.250
<i>80251-29-2</i>	<i>DNX</i>				
5755-27-1	MNX	.501		0.080	0.250
<i>5755-27-1</i>	<i>MNX</i>				
3058-38-6	TATB	1.56		0.300	1.00
<i>3058-38-6</i>	<i>TATB</i>				
78-30-8	tris(o-cresyl) phosphate	2.97		0.300	1.00
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
98-95-3	Nitrobenzene	3.98		0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
88-72-2	o-Nitrotoluene	4.1		0.082	0.250
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.11		0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	4.18		0.080	0.250
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	4.21		0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
99-08-1	m-Nitrotoluene	4.25		0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
2691-41-0	HMX	4.26		0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.27		0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1700504

Lab Code: GEL

GEL Job No (SDG) 2017-2751

Matrix: WATER

GEL Sample ID: 1203874661

Sample Amount 1000 mL

Date Received: 13-SEP-17

Moisture: .

Extraction Batch ID: 1700504

Extraction Type Sol Exchange

Date Extracted: 14-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
6629-29-4	2,4-Diamino-6-nitrotoluene	4.27		0.500	2.50
6629-29-4	2,4-Diamino-6-nitrotoluene				
99-35-4	1,3,5-Trinitrobenzene	4.29		0.080	0.250
99-35-4	1,3,5-Trinitrobenzene				
479-45-8	Tetryl	4.36		0.080	0.500
479-45-8	Tetryl				
118-96-7	2,4,6-Trinitrotoluene	4.38		0.080	0.250
118-96-7	2,4,6-Trinitrotoluene				
618-87-1	3,5-Dinitroaniline	4.41		0.300	1.00
618-87-1	3,5-Dinitroaniline				
78-11-5	PETN	4.42		0.100	0.500
78-11-5	PETN				
99-65-0	m-Dinitrobenzene	4.43		0.080	0.250
99-65-0	m-Dinitrobenzene				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.51		0.500	2.50
59229-75-3	2,6-Diamino-4-nitrotoluene				
99-99-0	p-Nitrotoluene	4.53		0.150	0.500
99-99-0	p-Nitrotoluene				
121-82-4	RDX	4.62		0.080	0.250
121-82-4	RDX				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-142901(432587002MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-2751

Matrix: WATER

GEL Sample ID: 1203874662

Sample Amount 940 mL

Date Received: 13-SEP-17

Moisture: .

Extraction Batch ID: 1700504

Extraction Type Sol Exchange

Date Extracted: 14-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0913047.wiff

Date Analyzed: 14-SEP-17 20:57

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
80251-29-2	DNX	.559		0.0851	0.266
80251-29-2	DNX				
13980-04-6	TNX	.56		0.0851	0.266
13980-04-6	TNX				
5755-27-1	MNX	.609		0.0851	0.266
5755-27-1	MNX				
3058-38-6	TATB	2.37		0.319	1.06
3058-38-6	TATB				
78-30-8	tris(o-cresyl) phosphate	2.8		0.319	1.06
78-30-8	tris(o-cresyl) phosphate				
98-95-3	Nitrobenzene	3.76		0.0851	0.266
98-95-3	Nitrobenzene				
88-72-2	o-Nitrotoluene	4.51		0.0872	0.266
88-72-2	o-Nitrotoluene				
118-96-7	2,4,6-Trinitrotoluene	4.58		0.0851	0.266
118-96-7	2,4,6-Trinitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	4.6		0.532	2.66
6629-29-4	2,4-Diamino-6-nitrotoluene				
99-08-1	m-Nitrotoluene	4.62		0.0851	0.266
99-08-1	m-Nitrotoluene				
99-99-0	p-Nitrotoluene	4.63		0.160	0.532
99-99-0	p-Nitrotoluene				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.71		0.532	2.66
59229-75-3	2,6-Diamino-4-nitrotoluene				
606-20-2	2,6-Dinitrotoluene	4.73		0.0851	0.266
606-20-2	2,6-Dinitrotoluene				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-142901(432587002MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-2751

Matrix: WATER

GEL Sample ID: 1203874662

Sample Amount 940 mL

Date Received: 13-SEP-17

Moisture: .

Extraction Batch ID: 1700504

Extraction Type Sol Exchange

Date Extracted: 14-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
618-87-1	3,5-Dinitroaniline	4.75		0.319	1.06
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
121-14-2	2,4-Dinitrotoluene	4.78		0.0851	0.266
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.78		0.0851	0.266
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	4.78		0.0851	0.532
<i>479-45-8</i>	<i>Tetryl</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.81		0.0851	0.266
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	4.85		0.0851	0.266
<i>2691-41-0</i>	<i>HMX</i>				
78-11-5	PETN	5.05		0.106	0.532
<i>78-11-5</i>	<i>PETN</i>				
121-82-4	RDX	5.15		0.0851	0.266
<i>121-82-4</i>	<i>RDX</i>				
99-35-4	1,3,5-Trinitrobenzene	5.17		0.0851	0.266
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	5.22		0.0851	0.266
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-142901(432587002MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-2751

Matrix: WATER

GEL Sample ID: 1203874663

Sample Amount 920 mL

Date Received: 13-SEP-17

Moisture: .

Extraction Batch ID: 1700504

Extraction Type Sol Exchange

Date Extracted: 14-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0913048.wiff

Date Analyzed: 14-SEP-17 21:32

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
80251-29-2	DNX	.537		0.087	0.272
80251-29-2	DNX				
13980-04-6	TNX	.56		0.087	0.272
13980-04-6	TNX				
5755-27-1	MNX	.569		0.087	0.272
5755-27-1	MNX				
3058-38-6	TATB	2.23		0.326	1.09
3058-38-6	TATB				
78-30-8	tris(o-cresyl) phosphate	3.12		0.326	1.09
78-30-8	tris(o-cresyl) phosphate				
99-08-1	m-Nitrotoluene	4.21		0.087	0.272
99-08-1	m-Nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	4.3		0.543	2.72
6629-29-4	2,4-Diamino-6-nitrotoluene				
479-45-8	Tetryl	4.47		0.087	0.543
479-45-8	Tetryl				
98-95-3	Nitrobenzene	4.48		0.087	0.272
98-95-3	Nitrobenzene				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.49		0.543	2.72
59229-75-3	2,6-Diamino-4-nitrotoluene				
121-14-2	2,4-Dinitrotoluene	4.77		0.087	0.272
121-14-2	2,4-Dinitrotoluene				
99-35-4	1,3,5-Trinitrobenzene	4.82		0.087	0.272
99-35-4	1,3,5-Trinitrobenzene				
118-96-7	2,4,6-Trinitrotoluene	4.85		0.087	0.272
118-96-7	2,4,6-Trinitrotoluene				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-142901(432587002MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-2751

Matrix: WATER

GEL Sample ID: 1203874663

Sample Amount 920 mL

Date Received: 13-SEP-17

Moisture: .

Extraction Batch ID: 1700504

Extraction Type Sol Exchange

Date Extracted: 14-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-11-5	PETN	4.87		0.109	0.543
<i>78-11-5</i>	<i>PETN</i>				
99-99-0	p-Nitrotoluene	4.88		0.163	0.543
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.89		0.087	0.272
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	4.9		0.087	0.272
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
99-65-0	m-Dinitrobenzene	4.98		0.087	0.272
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
618-87-1	3,5-Dinitroaniline	4.99		0.326	1.09
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
2691-41-0	HMX	5		0.087	0.272
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	5.02		0.087	0.272
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
88-72-2	o-Nitrotoluene	5.03		0.0891	0.272
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
121-82-4	RDX	5.43		0.087	0.272
<i>121-82-4</i>	<i>RDX</i>				

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-2751Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 13-SEP-17 11:08GEL Data File: EXP0913001.wiffInstrument ID: LCMSMS5Column: Ultracarb Phenomenex 5u ODS (20)

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

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-2751Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 13-SEP-17 11:44GEL Data File: EXP0913002.wiffInstrument ID: LCMSMS5Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2751

Lab Code: GEL

Lab Sample ID: XIBLK02

Analysis Date: 13-SEP-17 16:27

GEL Data File: EXP0913010.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): 2017-2751

Lab Code: GEL

Lab Sample ID: XIBLK03

Analysis Date: 13-SEP-17 18:49

GEL Data File: EXP0913014.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
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
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2751

Lab Code: GEL

Lab Sample ID: XIBLK04

Analysis Date: 14-SEP-17 00:44

GEL Data File: EXP0913024.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): 2017-2751

Lab Code: GEL

Lab Sample ID: XIBLK05

Analysis Date: 14-SEP-17 01:55

GEL Data File: EXP0913026.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
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
MNX	0	0
TNX	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2751

Lab Code: GEL

Lab Sample ID: XIBLK06

Analysis Date: 14-SEP-17 09:43

GEL Data File: EXP0913028.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): 2017-2751

Lab Code: GEL

Lab Sample ID: XIBLK07

Analysis Date: 14-SEP-17 10:18

GEL Data File: EXP0913029.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
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
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2751

Lab Code: GEL

Lab Sample ID: XIBLK08

Analysis Date: 14-SEP-17 11:29

GEL Data File: EXP0913031.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): 2017-2751

Lab Code: GEL

Lab Sample ID: XIBLK09

Analysis Date: 14-SEP-17 13:16

GEL Data File: EXP0913034.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2751

Lab Code: GEL

Lab Sample ID: XIBLK10

Analysis Date: 14-SEP-17 16:13

GEL Data File: EXP0913039.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): 2017-2751

Lab Code: GEL

Lab Sample ID: XIBLK11

Analysis Date: 14-SEP-17 17:24

GEL Data File: EXP0913041.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): 2017-2751

Lab Code: GEL

Lab Sample ID: XIBLK12

Analysis Date: 14-SEP-17 23:19

GEL Data File: EXP0913051.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2751

Lab Code: GEL

Lab Sample ID: XIBLK13

Analysis Date: 15-SEP-17 00:30

GEL Data File: EXP0913053.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

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2751
Work Order #: 432594

Sample ID	Client ID
432594001	CAWA-17-142887
432594002	CAWA-17-142922
432594004	CAWA-17-143050
432594005	CAWA-17-143054
1203873771	Method Blank (MB) ICP
1203873772	Laboratory Control Sample (LCS)
1203873775	432570001(CAWA-17-142856L) Serial Dilution (SD)
1203873773	432570001(CAWA-17-142856D) Sample Duplicate (DUP)
1203873774	432570001(CAWA-17-142856S) Matrix Spike (MS)
1203873788	Method Blank (MB) ICP-MS
1203873789	Laboratory Control Sample (LCS)
1203873792	432570001(CAWA-17-142856L) Serial Dilution (SD)
1203873790	432570001(CAWA-17-142856D) Sample Duplicate (DUP)
1203873791	432570001(CAWA-17-142856S) Matrix Spike (MS)
1203879599	Method Blank (MB) CVAA
1203879600	Laboratory Control Sample (LCS)
1203879605	432587001(CAWA-17-142866L) Serial Dilution (SD)
1203879601	432587001(CAWA-17-142866D) Sample Duplicate (DUP)
1203879603	432587001(CAWA-17-142866S) Matrix Spike (MS)

Sample Analysis

Samples 432594001,002,004 and 005 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1700104, 1700115, 1702521 and 1705736
Prep Batch :	1700103, 1700114 and 1702509
Standard Operating Procedures:	GL-MA-E-013 REV# 29, GL-MA-E-006 REV# 13, GL-MA-E-014 REV# 31, GL-MA-E-010 REV# 35 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 300X 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.

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 PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of potassium and sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 432594001 (CAWA-17-142887) and 432594004 (CAWA-17-143050)-ICP.

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: 432570001 (CAWA-17-142856)-ICP and ICP-MS and 432587001 (CAWA-17-142866)-CVAA.

Matrix Spike (MS/MSD) Recovery Statement

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

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. The relative percent differences (RPD) between the sample and its duplicate (DUP) were within acceptable limits for all applicable analytes.

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Additional Comments

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

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

Please refer to the Total Ca and Total Mg data to validate results appearing on the Hardness Summary sheet. Both results are in the Inorganic/metals section of the package. There is no Batch QC for calculated results, and

thus no QC Summary for the Hardness by Calculation Batch. The MDLs and PQLs are calculated using the higher of the two calculated values of Ca or Mg.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2017-2751 GEL Work Order: 432594

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature:



Name: Nik-Cole Elmore

Date: 09 OCT 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2751**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 432594001**BASIS:** As Received**DATE COLLECTED** 11-SEP-17**CLIENT ID:** CAWA-17-142887**LEVEL:** Low**DATE RECEIVED** 13-SEP-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	09/22/17 11:35	092217W1-11	1702521

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2751

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 432594001

BASIS: As Received

DATE COLLECTED 11-SEP-17

CLIENT ID: CAWA-17-142887

LEVEL: Low

DATE RECEIVED 13-SEP-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	10/05/17 15:58	171005-10	1700115
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	10/05/17 13:13	171005-2	1700115
7440-39-3	Barium	12.1	ug/L		1	5	5	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/05/17 13:13	171005-2	1700115
7440-70-2	Calcium	9870	ug/L		50	200	200	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/05/17 13:13	171005-2	1700115
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/05/17 13:13	171005-2	1700115
7439-95-4	Magnesium	2920	ug/L		110	300	300	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7439-98-7	Molybdenum	0.533	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/06/17 08:49	171005-9	1700115
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/05/17 13:13	171005-2	1700115
7440-09-7	Potassium	727	ug/L		50	150	150	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/05/17 13:13	171005-2	1700115
7631-86-9	Silica	56000	ug/L		53	213	213	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/05/17 13:13	171005-2	1700115
7440-23-5	Sodium	8000	ug/L		100	300	300	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7440-24-6	Strontium	47.9	ug/L		1	5	5	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/05/17 13:13	171005-2	1700115
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7440-61-1	Uranium	0.315	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/06/17 08:49	171005-9	1700115
7440-62-2	Vanadium	1.52	ug/L	J	1	5	5	1	P	JWJ	09/21/17 17:22	092117-1	1700104
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	JWJ	09/21/17 17:22	092117-1	1700104

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2751**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 432594001**BASIS:** As Received**DATE COLLECTED** 11-SEP-17**CLIENT ID:** CAWA-17-142887**LEVEL:** Low**DATE RECEIVED** 13-SEP-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	36.7	mg/L		0.453	1.24	1.24	1		TXT1	10/02/17 14:46		1705736

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1700104	1700103	SW846 3005A	50	mL	50	mL	09/13/17	JXM8
1700115	1700114	SW846 3005A	50	mL	50	mL	09/13/17	JXM8
1702521	1702509	EPA 245.1/245.2 Prep	20	mL	20	mL	09/21/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2751**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 432594002**BASIS:** As Received**DATE COLLECTED** 11-SEP-17**CLIENT ID:** CAWA-17-142922**LEVEL:** Low**DATE RECEIVED** 13-SEP-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	09/22/17 11:37	092217W1-11	1702521

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1702521	1702509	EPA 245.1/245.2 Prep	20	mL	20	mL	09/21/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2751**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 432594004**BASIS:** As Received**DATE COLLECTED** 11-SEP-17**CLIENT ID:** CAWA-17-143050**LEVEL:** Low**DATE RECEIVED** 13-SEP-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	09/22/17 11:42	092217W1-11	1702521

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2751

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 432594004

BASIS: As Received

DATE COLLECTED 11-SEP-17

CLIENT ID: CAWA-17-143050

LEVEL: Low

DATE RECEIVED 13-SEP-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	10/05/17 16:00	171005-10	1700115
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	10/05/17 13:16	171005-2	1700115
7440-39-3	Barium	12.3	ug/L		1	5	5	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/05/17 13:16	171005-2	1700115
7440-70-2	Calcium	9980	ug/L		50	200	200	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/05/17 13:16	171005-2	1700115
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/05/17 13:16	171005-2	1700115
7439-95-4	Magnesium	2990	ug/L		110	300	300	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7439-98-7	Molybdenum	0.551	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/06/17 08:51	171005-9	1700115
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/05/17 13:16	171005-2	1700115
7440-09-7	Potassium	732	ug/L		50	150	150	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/05/17 13:16	171005-2	1700115
7631-86-9	Silica	56400	ug/L		53	213	213	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/05/17 13:16	171005-2	1700115
7440-23-5	Sodium	8100	ug/L		100	300	300	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7440-24-6	Strontium	48.4	ug/L		1	5	5	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/05/17 13:16	171005-2	1700115
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7440-61-1	Uranium	0.316	ug/L		0.067	0.2	0.2	1	MS	BAJ	10/06/17 08:51	171005-9	1700115
7440-62-2	Vanadium	1.32	ug/L	J	1	5	5	1	P	JWJ	09/21/17 17:25	092117-1	1700104
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	JWJ	09/21/17 17:25	092117-1	1700104

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2751**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 432594004**BASIS:** As Received**DATE COLLECTED** 11-SEP-17**CLIENT ID:** CAWA-17-143050**LEVEL:** Low**DATE RECEIVED** 13-SEP-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	37.2	mg/L		0.453	1.24	1.24	1		TXT1	10/02/17 14:46		1705736

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1700104	1700103	SW846 3005A	50	mL	50	mL	09/13/17	JXM8
1700115	1700114	SW846 3005A	50	mL	50	mL	09/13/17	JXM8
1702521	1702509	EPA 245.1/245.2 Prep	20	mL	20	mL	09/21/17	AXS5

***Analytical Methods:**

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

METALS
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INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2751**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 432594005**BASIS:** As Received**DATE COLLECTED** 11-SEP-17**CLIENT ID:** CAWA-17-143054**LEVEL:** Low**DATE RECEIVED** 13-SEP-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.067	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	09/22/17 11:43	092217W1-11	1702521

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1702521	1702509	EPA 245.1/245.2 Prep	20	mL	20	mL	09/21/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
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PREPARATION BLANK SUMMARY

SDG NO. 2017-2751

Contract: ESHL00114

Matrix: W

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Acceptance Window</u>	<u>Conc Qual</u>	<u>M*</u>	<u>MDL</u>	<u>RDL</u>
1203873771	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Iron	30	ug/L	+/-100	U	P	30	100
	Manganese	2	ug/L	+/-10	U	P	2	10
	Silica	53	ug/L	+/-213	U	P	53	213
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Strontium	1	ug/L	+/-5	U	P	1	5
	Sodium	143	ug/L	+/-300	J	P	100	300
	Potassium	91.5	ug/L	+/-150	J	P	50	150
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Copper	3	ug/L	+/-10	U	P	3	10
1203873788	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
1203879599	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2

*Analytical Methods:

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

METALS

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Matrix Spike Summary

SDG NO. 2017-2751 Client ID: CAWA-17-142856S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 432570001 Spike ID: 1203873774

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Aluminum	ug/L	75-125	4990		68	U	5000	99.3		P
Barium	ug/L	75-125	562		78.3		500	96.8		P
Beryllium	ug/L	75-125	486		1	U	500	97.1		P
Boron	ug/L	75-125	493		15	U	500	96.2		P
Calcium	ug/L	75-125	22200		17800		5000	88.9		P
Cobalt	ug/L	75-125	497		1	U	500	99.4		P
Copper	ug/L	75-125	490		3	U	500	98.1		P
Iron	ug/L	75-125	5030		37.9	J	5000	99.8		P
Magnesium	ug/L	75-125	9950		4960		5000	99.7		P
Manganese	ug/L	75-125	491		11		500	96		P
Potassium	ug/L	75-125	9050		4410		5000	92.9		P
Silica	ug/L		54200		44700		10700	89	N/A	P
Sodium	ug/L	75-125	18300		13700		5000	91.9		P
Strontium	ug/L	75-125	588		116		500	94.3		P
Tin	ug/L	75-125	481		2.5	U	500	95.9		P
Vanadium	ug/L	75-125	487		2.69	J	500	96.8		P
Zinc	ug/L	75-125	492		3.3	U	500	98.2		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Matrix Spike Summary

SDG NO. 2017-2751 Client ID: CAWA-17-142856S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 432570001 Spike ID: 1203873791

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Uranium	ug/L	75-125	49.2		0.067	U	50	98.4		MS
Antimony	ug/L	75-125	54.4		1	U	50	108		MS
Arsenic	ug/L	75-125	51.4		2	U	50	100		MS
Cadmium	ug/L	75-125	52.6		0.3	U	50	105		MS
Chromium	ug/L	75-125	52.8		3	U	50	105		MS
Lead	ug/L	75-125	50.3		0.5	U	50	101		MS
Molybdenum	ug/L	75-125	55.4		0.852		50	109		MS
Nickel	ug/L	75-125	50.4		0.6	U	50	100		MS
Selenium	ug/L	75-125	50		2	U	50	99.6		MS
Silver	ug/L	75-125	51.5		0.3	U	50	103		MS
Thallium	ug/L	75-125	47.5		0.6	U	50	95		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Matrix Spike Summary

SDG NO. 2017-2751 **Client ID:** CAWA-17-142866S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 432587001 **Spike ID:** 1203879603

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

*Analytical Methods:

AV EPA 245.1/245.2

Metals
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Duplicate Sample Summary

SDG No.: 2017-2751

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-142856D

Matrix: WATER

Level: Low

Sample ID: 432570001

Duplicate ID: 1203873773

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	+/-20%	78.3		77.5		.95		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	17800		18000		1.24		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L	+/-100	37.9 J		34 J		11		P
Magnesium	ug/L	+/-20%	4960		5040		1.51		P
Manganese	ug/L	+/-10	11		11		.854		P
Potassium	ug/L	+/-20%	4410		4420		.211		P
Silica	ug/L	+/-20%	44700		45500		1.83		P
Sodium	ug/L	+/-20%	13700		13900		1.48		P
Strontium	ug/L	+/-20%	116		118		1.21		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	2.69 J		2.55 J		5.19		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-2751

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-142856D

Matrix: WATER

Level: Low

Sample ID: 432570001

Duplicate ID: 1203873790

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	0.852		0.888		4.14		MS
Nickel	ug/L		0.6 U		0.6 U				MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.3 U		0.3 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L		0.067 U		0.067 U				MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
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Duplicate Sample Summary

SDG No.: 2017-2751**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAWA-17-142866D**Matrix:** WATER**Level:** Low**Sample ID:** 432587001**Duplicate ID:** 1203879601**Percent Solids for Dup:** N/A

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

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-2751

Contract: ESHL00114

Aqueous LCS Source:OS2I

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203873772								
	Aluminum	ug/L	5000	5040		101	80-120	P
	Barium	ug/L	500	482		96.5	80-120	P
	Beryllium	ug/L	500	479		95.8	80-120	P
	Boron	ug/L	500	473		94.6	80-120	P
	Calcium	ug/L	5000	5110		102	80-120	P
	Cobalt	ug/L	500	497		99.5	80-120	P
	Copper	ug/L	500	486		97.1	80-120	P
	Iron	ug/L	5000	5050		101	80-120	P
	Magnesium	ug/L	5000	5150		103	80-120	P
	Manganese	ug/L	500	485		96.9	80-120	P
	Potassium	ug/L	5000	4910		98.2	80-120	P
	Silica	ug/L	10700	9830		91.8	80-120	P
	Sodium	ug/L	5000	5050		101	80-120	P
	Strontium	ug/L	500	482		96.3	80-120	P
	Tin	ug/L	500	476		95.2	80-120	P
	Vanadium	ug/L	500	483		96.5	80-120	P
	Zinc	ug/L	500	492		98.3	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-2751

Contract: ESHL00114

Aqueous LCS Source:O2Si

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203873789								
	Antimony	ug/L	50	56.5		113	80-120	MS
	Arsenic	ug/L	50	51		102	80-120	MS
	Cadmium	ug/L	50	54.2		108	80-120	MS
	Chromium	ug/L	50	53.4		107	80-120	MS
	Lead	ug/L	50	51.7		103	80-120	MS
	Molybdenum	ug/L	50	53.5		107	80-120	MS
	Nickel	ug/L	50	51.1		102	80-120	MS
	Selenium	ug/L	50	50.7		101	80-120	MS
	Silver	ug/L	50	52.7		105	80-120	MS
	Thallium	ug/L	50	48.6		97.2	80-120	MS
	Uranium	ug/L	50	48.1		96.3	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-2751

Contract: ESHL00114

Aqueous LCS Source: GEL

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203879600	Mercury	ug/L	2	2.05		103	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-2751

Client ID: CAWA-17-142856L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 432570001

Serial Dilution ID: 1203873775

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	78.3		80.9		3.406		10	P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	17800		18200		2.112		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	37.9	J	150	U	8.97			P
Magnesium	4960		5100		2.688			P
Manganese	11		11.5	J	4.449			P
Potassium	4410		4800		8.776		10	P
Silica	44700		45300		1.453		10	P
Sodium	13700		14700		7.538		10	P
Strontium	116		118		1.307		10	P
Tin	2.5	U	12.5	U				P
Vanadium	2.69	J	5	U	38.692			P
Zinc	3.3	U	16.5	U				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-2751

Client ID: CAWA-17-142856L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 432570001

Serial Dilution ID: 1203873792

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	2	U	10	U				MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	.852		1	U	13.732			MS
Nickel	.6	U	3	U				MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.067	U	.335	U				MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-2751 **Client ID:** CAWA-17-142866L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 432587001 **Serial Dilution ID:** 1203879605

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

*Analytical Methods:

AV EPA 245.1/245.2

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2751
Work Order #: 432594**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1701620

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
432594002	CAWA-17-142922
432594005	CAWA-17-143054
1203877657	Method Blank (MB)
1203877658	Laboratory Control Sample (LCS)
1203877659	432570002(CAWA-17-142891) Sample Duplicate (DUP)
1203877662	432570002(CAWA-17-142891) Post Spike (PS)
1203877663	433017001(NonSDG) Post Spike (PS)

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

SOP Reference

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

Samples 432570002 (CAWA-17-142891) and 433017001 (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:	Cyanide and Total		
Analytical Batch:	1700209	Method:	WSP-CN(T)
Prep Batch :	1700208	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
432594002	CAWA-17-142922
432594005	CAWA-17-143054
1203873999	Method Blank (MB)
1203874000	Laboratory Control Sample (LCS)
1203874001	432570002(CAWA-17-142891) Sample Duplicate (DUP)
1203874002	432570002(CAWA-17-142891) Matrix Spike (MS)
1203874805	432570002(CAWA-17-142891) 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-GC-E-095 REV# 20.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

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 432570002 (CAWA-17-142891) 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.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the spike and spike duplicate met the acceptance limits.

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

Sample1203874000 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1700336 and 1703207 **Method:** WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
432594001	CAWA-17-142887
432594004	CAWA-17-143050
1203874284	Method Blank (MB)
1203881300	Method Blank (MB)
1203874285	Laboratory Control Sample (LCS)
1203881301	Laboratory Control Sample (LCS)
1203874286	432325001(CAWA-17-142886) Sample Duplicate (DUP)
1203881302	432594004(CAWA-17-143050) Sample Duplicate (DUP)
1203874287	432325001(CAWA-17-142886) Post Spike (PS)
1203881303	432594004(CAWA-17-143050) Post Spike (PS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 25.

Preparation/Analytical Method Verification

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

Calibration Information

The Ion Chromatography analysis was performed on a Dionex ICS-3000 Ion Chromatograph.

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 MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Designation

Samples 432325001 (CAWA-17-142886) and 432594004 (CAWA-17-143050) 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 Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Manual Integrations**

Samples 1203874286 (CAWA-17-142886DUP), 1203874287 (CAWA-17-142886PS), 432594001 (CAWA-17-142887), 1203881302 (CAWA-17-143050DUP), 1203881303 (CAWA-17-143050PS) and 432594004 (CAWA-17-143050) 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: 1700465 **Method:** NH3
Prep Batch : 1700464 **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
432594001	CAWA-17-142887
432594004	CAWA-17-143050
1203874555	Method Blank (MB)
1203874556	Laboratory Control Sample (LCS)
1203874557	432570001(CAWA-17-142856) Sample Duplicate (DUP)
1203874558	432570001(CAWA-17-142856) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 432570001 (CAWA-17-142856) 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

Samples 1203874555 (MB), 1203874556 (LCS), 1203874557 (CAWA-17-142856DUP), 1203874558 (CAWA-17-142856MS), 432594001 (CAWA-17-142887) and 432594004 (CAWA-17-143050) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1700469	Method:	TKN
Prep Batch :	1700468	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
432594002	CAWA-17-142922
432594005	CAWA-17-143054
1203874559	Method Blank (MB)
1203874560	Laboratory Control Sample (LCS)
1203874561	432570002(CAWA-17-142891) Sample Duplicate (DUP)
1203874563	432570002(CAWA-17-142891) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 432570002 (CAWA-17-142891) 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

Sample 432594002 (CAWA-17-142922) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1700478

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
432594001	CAWA-17-142887
432594004	CAWA-17-143050
1203874585	Method Blank (MB)
1203874586	Laboratory Control Sample (LCS)
1203874590	432570001(CAWA-17-142856) Sample Duplicate (DUP)
1203874595	432570001(CAWA-17-142856) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 432570001 (CAWA-17-142856) 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:	1700471	Method:	PO4
Prep Batch :	1700470	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
432594001	CAWA-17-142887
432594004	CAWA-17-143050
1203874565	Method Blank (MB)
1203874566	Laboratory Control Sample (LCS)
1203874567	432570001(CAWA-17-142856) Sample Duplicate (DUP)
1203874570	432570001(CAWA-17-142856) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 432570001 (CAWA-17-142856) 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: 1700497

Method: TDS

Sample Analysis

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

Sample ID	Client ID
432594001	CAWA-17-142887
432594004	CAWA-17-143050
1203874646	Method Blank (MB)
1203874647	Laboratory Control Sample (LCS)
1203874648	432594001(CAWA-17-142887) 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 432594001 (CAWA-17-142887) 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: 1705527

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
432594001	CAWA-17-142887
432594004	CAWA-17-143050
1203886675	Laboratory Control Sample (LCS)
1203886676	432594001(CAWA-17-142887) 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# 14.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Calibration Verification Information

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

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 432594001 (CAWA-17-142887) 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: 1700639 and 1701903 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
432594001	CAWA-17-142887
432594004	CAWA-17-143050
1203875000	Laboratory Control Sample (LCS)
1203878363	Laboratory Control Sample (LCS)
1203875001	432594004(CAWA-17-143050) Sample Duplicate (DUP)
1203878364	432570001(CAWA-17-142856) Sample Duplicate (DUP)
1203878365	433059007(CAWA-17-142879) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Designation

Samples 432594004 (CAWA-17-143050), 432570001 (CAWA-17-142856) and 433059007 (CAWA-17-142879) were selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

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

Sample	Analyte	Value
1203875001 (CAWA-17-143050DUP)	pH	Received 13-SEP-17, out of holding 11-SEP-17
1203878364 (CAWA-17-142856DUP)	pH	Received 13-SEP-17, out of holding 07-SEP-17
1203878365 (CAWA-17-142879DUP)	pH	Received 19-SEP-17, out of holding 15-SEP-17
432594001 (CAWA-17-142887)	pH	Received 13-SEP-17, out of holding 11-SEP-17
432594004 (CAWA-17-143050)	pH	Received 13-SEP-17, out of holding 11-SEP-17

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Alkalinity

Analytical Batch: 1700638 and 1701895 **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
432594001	CAWA-17-142887
432594004	CAWA-17-143050
1203874996	Laboratory Control Sample (LCS)
1203878342	Laboratory Control Sample (LCS)
1203874998	432594004(CAWA-17-143050) Sample Duplicate (DUP)
1203878343	432570001(CAWA-17-142856) Sample Duplicate (DUP)
1203874999	432594004(CAWA-17-143050) Matrix Spike (MS)
1203878345	432570001(CAWA-17-142856) 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 recoveries met the acceptance limits.

Quality Control (QC) Designation

Samples 432594004 (CAWA-17-143050) and 432570001 (CAWA-17-142856) 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 Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

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Qualifier Definition Report for

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

Client SDG: 2017-2751 GEL Work Order: 432594


The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Aubrey Kingsbury

Date: 04 OCT 2017

Title: Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: October 4, 2017

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

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

Client SDG: 2017-2751

Client Sample ID: CAWA-17-142887
Sample ID: 432594001
Matrix: W
Collect Date: 11-SEP-17 14:44
Receive Date: 13-SEP-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MXL2	09/15/17	0416	1700336	1
Chloride		1.13	0.067	0.200	mg/L		1					
Fluoride	J	0.0409	0.033	0.100	mg/L		1					
Sulfate		2.22	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	U	ND	0.017	0.050	mg/L	1.00	1	KLP1	09/18/17	0903	1700465	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.540	0.017	0.050	mg/L		1	AXH3	09/15/17	0923	1700478	3
PO4 "As Received"												
Phosphorus, Total as P		0.121	0.020	0.050	mg/L	1.00	1	KLP1	09/15/17	1043	1700471	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		106	3.40	14.3	mg/L			KLP1	09/18/17	1309	1700497	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		51.1	1.45	4.00	mg/L			RXB5	09/19/17	1438	1701895	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		209	1.00	1.00	umhos/cm		1	VH1	10/03/17	1236	1705527	7
PH "As Received"												
pH at Temp 14.2C	H	7.72	0.010	0.100	SU		1	RXB5	09/19/17	1436	1701903	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	09/18/17	0809	1700464
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	09/14/17	1200	1700470

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Certificate of Analysis

Report Date: October 4, 2017

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

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

Client SDG: 2017-2751

Client Sample ID: CAWA-17-142887
Sample ID: 432594001

Project: ESHL00114
Client ID: ARSL004

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

Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: October 4, 2017

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2017-2751

Project: LANL- WQH Water Samples

Client Sample ID: CAWA-17-142922

Project: ESHL00114

Sample ID: 432594002

Client ID: ARSL004

Matrix: W

Collect Date: 11-SEP-17 14:44

Receive Date: 13-SEP-17

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.488	0.330	1.00	mg/L		1	TSM	09/21/17	1948	1701620	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	09/15/17	0819	1700209	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	09/14/17	1406	1700469	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	09/15/17	0738	1700208
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	09/14/17	1200	1700468

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

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Certificate of Analysis

Report Date: October 4, 2017

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

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

Client SDG: 2017-2751

Client Sample ID: CAWA-17-143050
Sample ID: 432594004
Matrix: W
Collect Date: 11-SEP-17 14:44
Receive Date: 13-SEP-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MXL2	09/23/17	0309	1703207	1
Chloride		1.08	0.067	0.200	mg/L		1					
Fluoride	J	0.0344	0.033	0.100	mg/L		1					
Sulfate		2.25	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	U	ND	0.017	0.050	mg/L	1.00	1	KLP1	09/18/17	0904	1700465	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.500	0.017	0.050	mg/L		1	AXH3	09/15/17	0924	1700478	3
PO4 "As Received"												
Phosphorus, Total as P		0.119	0.020	0.050	mg/L	1.00	1	KLP1	09/15/17	1044	1700471	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		104	3.40	14.3	mg/L			KLP1	09/18/17	1309	1700497	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		50.1	1.45	4.00	mg/L			RXB5	09/15/17	1457	1700638	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		114	1.00	1.00	umhos/cm		1	VH1	10/03/17	1241	1705527	7
PH "As Received"												
pH at Temp 10.9C	H	7.67	0.010	0.100	SU		1	RXB5	09/15/17	1456	1700639	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	09/18/17	0809	1700464
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	AXH3	09/14/17	1200	1700470

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Certificate of Analysis

Report Date: October 4, 2017

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

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

Client SDG: 2017-2751

Client Sample ID: CAWA-17-143050
Sample ID: 432594004

Project: ESHL00114
Client ID: ARSL004

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

Notes:

Column headers are defined as follows:

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

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Certificate of Analysis

Report Date: October 4, 2017

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

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

Client SDG: 2017-2751

Client Sample ID: CAWA-17-143054
Sample ID: 432594005
Matrix: W
Collect Date: 11-SEP-17 14:44
Receive Date: 13-SEP-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.445	0.330	1.00	mg/L		1	TSM	09/21/17	2035	1701620	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	09/15/17	0820	1700209	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	09/14/17	1326	1700469	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	09/15/17	0738	1700208
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	09/14/17	1200	1700468

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

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

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: October 4, 2017

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

Contact: Ms. Nita Patel

Workorder: 432594

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
----------	-----	--------	------	----	-------	------	------	-------	-------	------	------

Carbon Analysis

Batch	1701620										
QC1203877659	432570002	DUP									
Total Organic Carbon Average		2.81		2.83	mg/L	0.673	^	(+/-1.00)	TSM	09/21/17	17:27
QC1203877658	LCS										
Total Organic Carbon Average	10.0			10.0	mg/L			(80%-120%)		09/21/17	16:29
QC1203877657	MB										
Total Organic Carbon Average			U	ND	mg/L					09/21/17	16:17
QC1203877662	432570002	PS									
Total Organic Carbon Average	10.0	2.81		13.4	mg/L			(75%-125%)		09/21/17	18:14
QC1203877663	433017001	PS									
Total Organic Carbon Average	10.0	11.4		21.7	mg/L			(75%-125%)		09/22/17	06:45

Flow Injection Analysis

Batch	1700209										
QC1203874001	432570002	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	09/15/17	08:14
QC1203874000	LCS										
Cyanide, Total	50.0				53.6	ug/L		(90%-110%)		09/15/17	08:17
QC1203873999	MB										
Cyanide, Total			U	ND	ug/L					09/15/17	08:07
QC1203874002	432570002	MS									
Cyanide, Total	100	U	ND		102	ug/L		(90%-110%)		09/15/17	08:15
QC1203874805	432570002	MSD									
Cyanide, Total	100	U	ND		101	ug/L	0.985	(0%-20%)		09/15/17	08:16

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QC Summary

Workorder: 432594

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1700336										
QC1203874286	432325001	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MXL2	09/14/17	22:29
Chloride			1.66		1.64	mg/L	1.06	(0%-20%)			
Fluoride			0.112		0.109	mg/L	2.9 ^	(+/-0.100)			
Sulfate			4.43		4.42	mg/L	0.296	(0%-20%)			
QC1203874285	LCS										
Bromide	1.25				1.27	mg/L	102	(80%-120%)		09/14/17	21:31
Chloride	5.00				4.76	mg/L	95.1	(80%-120%)			
Fluoride	2.50				2.47	mg/L	98.9	(80%-120%)			
Sulfate	10.0				9.73	mg/L	97.3	(80%-120%)			
QC1203874284	MB										
Bromide			U		ND	mg/L				09/14/17	21:02
Chloride			U		ND	mg/L					
Fluoride			U		ND	mg/L					
Sulfate			U		ND	mg/L					
QC1203874287	432325001	PS									
Bromide	1.25	U	ND		1.24	mg/L	96.2	(75%-125%)		09/14/17	22:58
Chloride	5.00		1.66		6.43	mg/L	95.5	(75%-125%)			

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QC Summary

Workorder: 432594

Page 3 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1700336										
Fluoride	2.50	0.112		2.48	mg/L		94.9	(75%-125%)	MXL2	09/14/17	22:58
Sulfate	10.0	4.43		14.3	mg/L		98.8	(75%-125%)			
Batch	1703207										
QC1203881302	432594004	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MXL2	09/23/17	03:39
Chloride			1.08		1.07	mg/L	0.531	(0%-20%)			
Fluoride		J	0.0344	U	ND	mg/L	200	^			
Sulfate			2.25		2.22	mg/L	1.25	(0%-20%)			
QC1203881301	LCS										
Bromide	1.25				1.26	mg/L	101	(80%-120%)		09/23/17	02:40
Chloride	5.00				4.73	mg/L	94.5	(80%-120%)			
Fluoride	2.50				2.38	mg/L	95.1	(80%-120%)			
Sulfate	10.0				9.80	mg/L	98	(80%-120%)			
QC1203881300	MB										
Bromide			U		ND	mg/L				09/23/17	02:11
Chloride			U		ND	mg/L					
Fluoride			U		ND	mg/L					
Sulfate			U		ND	mg/L					

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QC Summary

Workorder: 432594

Page 4 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1703207										
QC1203881303	432594004	PS									
Bromide	1.25	U	ND	1.26	mg/L		97.1	(75%-125%)	MXL2	09/23/17	04:08
Chloride	5.00		1.08	5.86	mg/L		95.7	(75%-125%)			
Fluoride	2.50	J	0.0344	2.39	mg/L		94.2	(75%-125%)			
Sulfate	10.0		2.25	12.1	mg/L		98.7	(75%-125%)			
Nutrient Analysis											
Batch	1700465										
QC1203874557	432570001	DUP									
Nitrogen, Ammonia		J	0.0221	U	ND	mg/L	200	^	KLP1	09/18/17	09:01
QC1203874556	LCS										
Nitrogen, Ammonia	1.00			1.09	mg/L		109	(90%-110%)		09/18/17	08:59
QC1203874555	MB										
Nitrogen, Ammonia			U	ND	mg/L					09/18/17	08:58
QC1203874558	432570001	MS									
Nitrogen, Ammonia	1.00	J	0.0221	1.04	mg/L		102	(90%-110%)		09/18/17	09:02
Batch	1700469										
QC1203874561	432570002	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	09/14/17	13:15
QC1203874560	LCS										
Nitrogen, Total Kjeldahl	1.00			0.949	mg/L		94.9	(90%-110%)		09/14/17	13:14
QC1203874559	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					09/14/17	13:13

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QC Summary

Workorder: 432594

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1700469										
QC1203874563	432570002	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	0.973	mg/L		94.4	(90%-110%)	KLP1	09/14/17	13:16
Batch	1700471										
QC1203874567	432570001	DUP									
Phosphorus, Total as P			0.174	0.177	mg/L	1.71	^	(+/-0.050)	KLP1	09/15/17	10:33
QC1203874566	LCS										
Phosphorus, Total as P	1.00			0.990	mg/L		99	(80%-124%)		09/15/17	10:31
QC1203874565	MB										
Phosphorus, Total as P			U	ND	mg/L					09/15/17	10:30
QC1203874570	432570001	MS									
Phosphorus, Total as P	1.00		0.174	1.40	mg/L		123	(63%-139%)		09/15/17	10:38
Batch	1700478										
QC1203874590	432570001	DUP									
Nitrogen, Nitrate/Nitrite		J	0.0308	J	0.0311	mg/L	0.969	^	(+/-0.050)	AXH3	09/15/17 09:15
QC1203874586	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.04	mg/L		104	(90%-110%)		09/15/17	08:51
QC1203874585	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					09/15/17	08:49
QC1203874595	432570001	PS									
Nitrogen, Nitrate/Nitrite	1.00	J	0.0308	1.06	mg/L		103	(90%-110%)		09/15/17	09:16
Solids Analysis											
Batch	1700497										
QC1203874648	432594001	DUP									
Total Dissolved Solids			106	106	mg/L	1.36		(0%-5%)	KLP1	09/18/17	13:09

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QC Summary

Workorder: 432594

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Solids Analysis											
Batch	1700497										
QC1203874647	LCS										
Total Dissolved Solids	300			289	mg/L		96.2	(95%-105%)	KLP1	09/18/17	13:09
QC1203874646	MB										
Total Dissolved Solids			U	ND	mg/L					09/18/17	13:09
Titration and Ion Analysis											
Batch	1700638										
QC1203874998	432594004	DUP									
Alkalinity, Total as CaCO3		50.1		49.9	mg/L	0.399		(0%-20%)	RXB5	09/15/17	15:00
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				
QC1203874996	LCS										
Alkalinity, Total as CaCO3	100			106	mg/L		106	(90%-110%)		09/15/17	14:46
QC1203874999	432594004	MS									
Alkalinity, Total as CaCO3	100	50.1		155	mg/L		105	(80%-120%)		09/15/17	15:01
Batch	1700639										
QC1203875001	432594004	DUP									
pH		H	7.67	H	7.68	SU	0.13	(0%-5%)	RXB5	09/15/17	14:58
QC1203875000	LCS										
pH	7.00			6.99	SU		99.9	(99%-101%)		09/15/17	14:46
Batch	1701895										
QC1203878343	432570001	DUP									
Alkalinity, Total as CaCO3		76.2		77.6	mg/L	1.82		(0%-20%)	RXB5	09/19/17	14:29
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				
QC1203878342	LCS										
Alkalinity, Total as CaCO3	100			108	mg/L		108	(90%-110%)		09/19/17	14:16

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1701895										
QC1203878345	432570001	MS									
Alkalinity, Total as CaCO3	100	76.2		178	mg/L		101	(80%-120%)	RXB5	09/19/17	14:30
Batch	1701903										
QC1203878364	432570001	DUP									
pH	H	8.30	H	8.31	SU	0.12		(0%-5%)	RXB5	09/19/17	14:27
QC1203878365	433059007	DUP									
pH	H	7.14	H	7.19	SU	0.698		(0%-5%)		09/19/17	15:09
QC1203878363	LCS										
pH	7.00			6.98	SU		99.7	(99%-101%)		09/19/17	13:55
Batch	1705527										
QC1203886676	432594001	DUP									
Conductivity		209		210	umhos/cm	0.477		(0%-10%)	VH1	10/03/17	12:40
QC1203886675	LCS										
Conductivity	1410			1410	umhos/cm		99.6	(95%-105%)		10/03/17	12:30

Notes:

- < Result is less than value reported
- > Result is greater than value reported
- B The target analyte was detected in the associated blank.
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- H Analytical holding time was exceeded
- J Value is estimated
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	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.										
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.