

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:

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11390

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

SAMPLE ID: CAWA-17-142859

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):	1122		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	PP	
LOCATION ID:	CDV-16-02656		FIELD PREP:	F	
LOCATION TYPE:	OK		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	MA
	WSP- GENINORG+PerChlorat e	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): D. Jaramillo

RELINQUISHED BY (Printed Name) <i>Daniel Jaramillo</i> (Signature) <i>[Signature]</i>	Date/Time 09/11/2017 1300	RECEIVED BY <i>M. Engueta</i> (Printed Name) <i>MAT ENGUETA</i> (Signature)	Date/Time 9-1-17 1300
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-17-142894

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):	1122		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	PP	
LOCATION ID:	CDV-16-02656		FIELD PREP:	UF	
LOCATION TYPE:	OK		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	MSGP-Hg	1000 500 ML POLY 211/261 71B	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 completed: Results negative

LOCATION COMMENTS: NA

FIELD PARAMETERS:

Sample Time	1122	HH:MM	Dissolved Oxygen	1.84	Flow (in gpm)	0.06
Oxidation-Reduction Potential	180.2		pH	6.49	Specific Conductance	185.6
Temperature	14.5		Turbidity	5.8		

COLLECTED BY (PRINT): D. Jarama/110

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 09/11/2017 1300	RECEIVED BY (Printed Name) (Signature)	Date/Time 9-1-17 1300
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-17-143016

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):	1122		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	CDV-16-02656		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	1 2 9/11/2017	HCL	Y	NA

SAMPLE COMMENTS: custody seal broken on FTB; Approved by SMO PERSONAL to use

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): D. Jaramillo & T. Bonham

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 09/11/2017 1300	RECEIVED BY (Printed Name) (Signature)	Date/Time 9-1-17 1300
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-17-143045

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):	1122		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	CDV-16-02656		FIELD PREP:	UF	
LOCATION TYPE:	OK		FIELD QC TYPE:	FB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / <u>NO</u> / NA

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): T. Bonham

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 09/11/2017 1300	RECEIVED BY (Printed Name) (Signature)	Date/Time 9-1-17 1300
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 08/25/2017

COC: 2017-2680

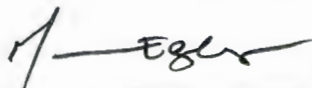
TEST - Field Screen		YES	NO	NA
The sample has field screening measurements of alpha activity and beta activity.				
Activity (dpm/100cm ²)	Sampled Location			
Alpha detectable and < 20,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49			
Alpha > 125 and < 20,000	other locations			
Beta > 1,500 and < 100,000	any location			
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.				
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.				

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.				
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.				

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) MATT ENGLERT	8-5-17
(Signature) 	7:26

DATA VALIDATION REPORT

Chain Of Custody No. 2017-2680

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
432189	EPA:120.1	1				
432189	EPA:150.1	1				
432189	EPA:160.1	1				
432189	EPA:170.0	2		1	1	
432189	EPA:245.2	2				
432189	EPA:300.0	1				
432189	EPA:310.1	1				
432189	EPA:335.4	1				
432189	EPA:350.1	1				
432189	EPA:351.2	1				
432189	EPA:353.2	1				
432189	EPA:365.4	1				
432189	SM:A2340B	1				
432189	SW-846:6010C	1				
432189	SW-846:6020	1				
432189	SW-846:6850	1				
432189	SW-846:8260B	1		1	1	
432189	SW-846:8330B	1				
432189	SW-846:9060	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
432189	EPA:120.1	1701648	1701648	1										1				2			
432189	EPA:150.1	1699723	1699723	1										1				2			
432189	EPA:160.1	1698958	1698958	1					1					1				1			
432189	EPA:170.0	NA	NA	2		1	1														
432189	EPA:245.2	1701447	1701439	2					1	1				1				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
432189	EPA:300.0	1699909	1699909	1					1					1				1			
432189	EPA:310.1	1699718	1699718	1						1				1				1			
432189	EPA:335.4	1698825	1698824	1					1	1				1				1			
432189	EPA:350.1	1698865	1698864	1					1	1				1				1			
432189	EPA:351.2	1698312	1698311	1					1	1				1				1			
432189	EPA:353.2	1698870	1698870	1					1					1				1			
432189	EPA:365.4	1698273	1698272	1					1	1				1				1			
432189	SM:A2340B	1705336	1705336	1																	
432189	SW-846:6010C	1698754	1698752	1					1	1				1				1			
432189	SW-846:6020	1698740	1698739	1					1	1				1				1			
432189	SW-846:6020	1705902	1705901	1					1	1				1				1			
432189	SW-846:6850	1699246	1699245	1					1	1	1			1							
432189	SW-846:8260B	1700295	1700295	1		1	1		2					4							
432189	SW-846:8330B	1699047	1699046	1					1	1	1			1							
432189	SW-846:9060	1699093	1699093	1					1					1			2				

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	CAPA-17-142931	1203877745	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAWA-17-142859	1203877746	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAWA-17-142859	432189001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203877744	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-142857	1203872595	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-142859	1203872596	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-142859	432189001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203872594	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-17-142859	1203870780	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-17-142859	432189001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203870779	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203870778	MB	1	0	0	0
EPA:170.0	VOC	CAWA-17-142859	432189001	REG	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:170.0	VOC	CAWA-17-142894	432189002	REG	1	0	0	0
EPA:170.0	VOC	CAWA-17-143016	432189003	FTB	1	0	0	0
EPA:170.0	VOC	CAWA-17-143045	432189004	FB	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-142854	1203877128	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-142854	1203877130	MS	0	0	1	0
EPA:245.2	INORGANIC	CAWA-17-142859	432189001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-142894	432189002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203877127	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203877126	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-17-142859	1203873012	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-17-142859	432189001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203873011	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203873010	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-142859	1203872591	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-142859	1203872593	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-142859	432189001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203872589	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-142892	1203870421	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-142892	1203870422	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-142894	432189002	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203870420	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203870419	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-142857	1203870530	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-142857	1203870531	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-142859	432189001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203870529	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203870528	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-142894	432189002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203869130	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203869129	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	WST35-17-144895	1203869131	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	WST35-17-144895	1203869132	MS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-17-142857	1203870543	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-17-142859	432189001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203870541	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203870540	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-142854	1203869044	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-142854	1203869046	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-142859	432189001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203869042	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:365.4	GENERAL CHEMISTRY	MB	1203869041	MB	1	0	0	0
SM:A2340B	INORGANIC	CAWA-17-142859	432189001	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAWA-17-142857	1203870223	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAWA-17-142857	1203870224	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAWA-17-142859	432189001	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203870222	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203870221	MB	17	0	0	0
SW-846:6020	INORGANIC	CAWA-17-142857	1203870190	DUP	9	0	0	0
SW-846:6020	INORGANIC	CAWA-17-142857	1203870191	MS	0	0	9	0
SW-846:6020	INORGANIC	CAWA-17-142857	1203887591	DUP	2	0	0	0
SW-846:6020	INORGANIC	CAWA-17-142857	1203887592	MS	0	0	2	0
SW-846:6020	INORGANIC	CAWA-17-142859	432189001	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203870189	LCS	0	0	9	0
SW-846:6020	INORGANIC	LCS	1203887590	LCS	0	0	2	0
SW-846:6020	INORGANIC	MB	1203870188	MB	9	0	0	0
SW-846:6020	INORGANIC	MB	1203887589	MB	2	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-142857	1203871484	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-142857	1203871485	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-142859	432189001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203871483	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203871482	MB	1	0	0	0
SW-846:8260B	VOC	CAWA-17-142894	432189002	REG	80	3	0	0
SW-846:8260B	VOC	CAWA-17-143016	432189003	FTB	80	3	0	0
SW-846:8260B	VOC	CAWA-17-143045	432189004	FB	80	3	0	0
SW-846:8260B	VOC	LCS	1203874200	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203874201	LCS	0	3	10	0
SW-846:8260B	VOC	LCS	1203874202	LCS	0	3	70	0
SW-846:8260B	VOC	LCS	1203874203	LCS	0	3	10	0
SW-846:8260B	VOC	MB	1203874198	MB	80	3	0	0
SW-846:8260B	VOC	MB	1203874199	MB	80	3	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-142892	1203870913	MS	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-142892	1203870914	MSD	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-142894	432189002	REG	23	1	0	0
SW-846:8330B	LCMS/MS HIGH	LCS	1203870912	LCS	0	1	23	0
SW-846:8330B	LCMS/MS HIGH	MB	1203870911	MB	23	1	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-17-142934	1203871105	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-17-142894	432189002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203871103	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203871102	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	WT_IPC-17-135360	1203871104	DUP	1	0	0	0

DATA VALIDATION REPORT

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203870221	METHOD BLANK	SW-846:6010C	W	Sodium	-199	J	ug/L	300
MB	1203871102	METHOD BLANK	SW-846:9060	W	Total Organic Carbon	0.673	J	mg/L	1.00
CAWA-17-143016	432189003	TRIP BLANK	EPA:170.0	W	Temperature	4		Deg C	
CAWA-17-143045	432189004	FIELD BLANK	EPA:170.0	W	Temperature	4		Deg C	

Field Sample ID	Blank Lab	Blank Type	Analytical Method	Parameter Name	Blank Lab Result	Blank Lab Units	Lab Result	Lab Qualifier	Lab Detection Limit	Detect Flag	Detect to Nondetect Factor	Detect to Estimated Factor	Use Factors
CAWA-17-142859	1203870221	METHOD BLANK	SW-846:6010C	Sodium	-199	ug/L	13300		300	Y			
CAWA-17-142894	1203871102	METHOD BLANK	SW-846:9060	Total Organic Carbon	0.673	mg/L	2.45		1.00	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

DATA VALIDATION REPORT

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

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CAWA-17-142857	1203870531		EPA:350.1	Ammonia as Nitrogen	1698864	09-07-2017	W	89.2		110	90	10		
WST35-17-144895	1203869132		EPA:351.2	Total Kjeldahl Nitrogen	1698311	09-07-2017	W	72		110	90	10		

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?

Field Sample ID	Lab Sample ID	LD Lab Sample ID	Analytical Method	Parameter Name	Sample Matrix	Lab Result	LD Lab Result	Lab Units	Detect Flag	LD Detect Flag	RPD	RPD Limit
CAWA-17-142859	432189001	1203870780	EPA:160.1	Total Dissolved	W	150	141	mg/L	Y	Y	5.88	5

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

DATA VALIDATION REPORT

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Paramter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
CDV-16-02656	2017-2680	CAWA-17-142894	REG	INIT	GENERAL CHEMISTRY	SW-846:9060	Total Organic Carbon		U	I4	N	2.45	mg/L	2.45	mg/L			W	09/01/2017		1699093	VAL	Y

Reason Code

Description

I4

the sample result is =<5x the concentration of related analyte in the method blank.

J_LAB

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

NQ

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

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-17-142859	CDV-16-02656	REG	EPA:120.1	0	1
CAWA-17-142859	CDV-16-02656	REG	EPA:150.1	0	1
CAWA-17-142859	CDV-16-02656	REG	EPA:160.1	0	1
CAWA-17-142859	CDV-16-02656	REG	EPA:170.0	0	1
CAWA-17-142859	CDV-16-02656	REG	EPA:245.2	0	1
CAWA-17-142859	CDV-16-02656	REG	EPA:300.0	0	4
CAWA-17-142859	CDV-16-02656	REG	EPA:310.1	0	2
CAWA-17-142859	CDV-16-02656	REG	EPA:350.1	0	1
CAWA-17-142859	CDV-16-02656	REG	EPA:353.2	0	1
CAWA-17-142859	CDV-16-02656	REG	EPA:365.4	0	1
CAWA-17-142859	CDV-16-02656	REG	SM:A2340B	0	1
CAWA-17-142859	CDV-16-02656	REG	SW-846:6010C	0	17
CAWA-17-142859	CDV-16-02656	REG	SW-846:6020	0	11
CAWA-17-142859	CDV-16-02656	REG	SW-846:6850	0	1
CAWA-17-142894	CDV-16-02656	REG	EPA:170.0	0	1
CAWA-17-142894	CDV-16-02656	REG	EPA:245.2	0	1
CAWA-17-142894	CDV-16-02656	REG	EPA:335.4	0	1
CAWA-17-142894	CDV-16-02656	REG	EPA:351.2	0	1
CAWA-17-142894	CDV-16-02656	REG	SW-846:8260B	0	80
CAWA-17-142894	CDV-16-02656	REG	SW-846:8330B	0	23

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-17-142894	CDV-16-02656	REG	SW-846:9060	0	1
CAWA-17-143016	CDV-16-02656	FTB	EPA:170.0	0	1
CAWA-17-143016	CDV-16-02656	FTB	SW-846:8260B	0	80
CAWA-17-143045	CDV-16-02656	FB	EPA:170.0	0	1
CAWA-17-143045	CDV-16-02656	FB	SW-846:8260B	0	80

September 19, 2017

gel.com

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

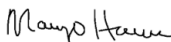
Re: LANL- WQH Water Samples
Work Order: 432189
SDG: 2017-2680

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on September 06, 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,


Margo Herron for
Valerie Davis
Project Manager

Chain of Custody: 2017-2680
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 432189
SDG: 2017-2680

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 432189
SDG # : 2017-2680**

September 19, 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 06, 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 temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
432189001	CAWA-17-142859
432189002	CAWA-17-142894
432189003	CAWA-17-143016
432189004	CAWA-17-143045

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.

Margo Herron
Margo Herron for
Valerie Davis
Project Manager

List of current GEL Certifications as of 19 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

[illegible]

COC: 2017-2680

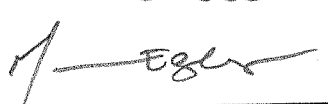
TEST – Field Screen		YES	NO	NA
The sample has field screening measurements of alpha activity and beta activity.				
Activity (dpm/100cm ²)	Sampled Location			
Alpha detectable and < 20,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49			
Alpha > 125 and < 20,000	other locations			
Beta > 1,500 and < 100,000	any location			
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.				
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.				

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.				
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.				

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) MAT ENGLERT	8-5-17
(Signature) 	7:26

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

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 05SEP17
ACTWGT: 52.0 LB MAN
CAD: 0014176/CAFE2916

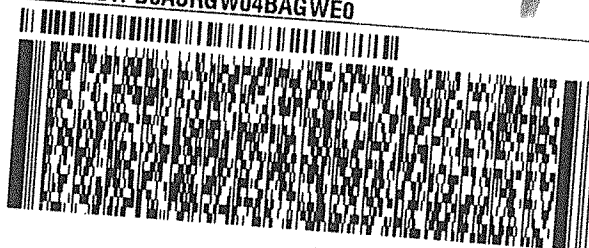
BILL SENDER

TO **VALERIE DAVIS**
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PDOASRGW04BAGWE0



FedEx
Express



J151315081301uy

1 of 2

TRK# 5908 1782 6836
0201

MASTER

X7 RBWA

WED - 06 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

SHIP DATE: 05SEP17
ACTWGT: 31.0 LB MAN
CAD: 0014176/CAFE2916

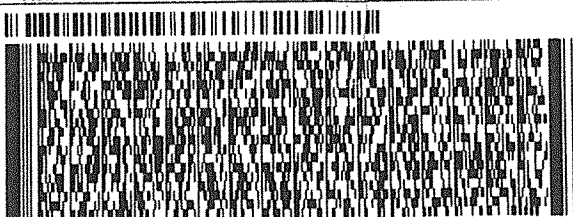
BILL SENDER

TO **VALERIE DAVIS**
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PDOASRGW04BAGWE0



FedEx
Express



J151315081301uy

2 of 2

MPS# 5908 1782 6847
0263

Mstr# 5908 1782 6836

X7 RBWA

WED - 06 SEP 10:30A
PRIORITY OVERNIGHT

29407
SC-US CHS

P 0215 111

538CL/FF19/1206

538CL/FF19/3299

SAMPLE RECEIPT & REVIEW FORM

Client: <u>ESHLC</u>		SDG/AR/COC/Work Order: <u>432189</u>	
Received By: <u>ZKW</u>		Date Received: <u>9/6/17</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 6847</u> <u>5908 1782 6836</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input 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 checked="" type="checkbox"/> No <input 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> <u>CPM</u> mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. <input checked="" type="checkbox"/> PCB's <input type="checkbox"/> Flammable <input type="checkbox"/> Foreign Soil <input type="checkbox"/> RCRA <input type="checkbox"/> Asbestos <input type="checkbox"/> Beryllium <input type="checkbox"/> Other:	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<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>4°C</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>IR4-17</u> Secondary Temperature Device Serial # (if Applicable):
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#:
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ 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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
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 KHatt

Date 9/7/17

Page 1 of 1

Data Review Qualifier Flag Definition Sheet

Data Review Qualifier Definitions

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

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

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

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

Volatile Analysis

Case Narrative

**GC/MS Volatile
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2680
Work Order #: 432189**

Method/Analysis Information

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

Analytical Method: SW-846:8260B

Analytical Batch
Number: 1700295

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
432189002	CAWA-17-142894
432189003	CAWA-17-143016
432189004	CAWA-17-143045
1203874198	Method Blank (MB)
1203874199	Method Blank (MB)
1203874200	Laboratory Control Sample (LCS)
1203874201	Laboratory Control Sample (LCS)
1203874202	Laboratory Control Sample (LCS)
1203874203	Laboratory Control Sample (LCS)
1203874204	432512002(CAPA-17-142953) Post Spike (PS)
1203874205	432512002(CAPA-17-142953) Post Spike (PS)
1203874206	432512002(CAPA-17-142953) Post Spike Duplicate (PSD)
1203874207	432512002(CAPA-17-142953) Post Spike Duplicate (PSD)

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

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

SOP Reference

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

Calibration Information

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

recoveries reported for Dibromofluoromethane. This is due to increased regulations for this analyte and an industry shortage.

Initial Calibration

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

Continuing Calibration Verification Requirements

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

Quality Control (QC) Information

Blank (MB) Statement

Target analytes were detected in the blanks 1203874198 (MB) and 1203874199 (MB) below the reporting limit.

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 432512002 (CAPA-17-142953) 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
VOA6.I	Agilent 6890N/5975 GC/MS w/ OI 4560/Archon Autosampler	HP6890N/HP5975	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: 2017-2680 GEL Work Order: 432189

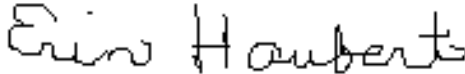
The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Erin Haubert

Date: 29 SEP 2017

Title: Data Validator

Sample Data Summary

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2680

Lab Sample ID: 432189002

Date Collected: 09/01/2017 11:22

Date Received: 09/06/2017 09:00

Matrix: W

Client ID: CAWA-17-142894

Batch ID: 1700295

Run Date: 09/13/2017 19:17

Prep Date: 09/13/2017 19:17

Data File: 091317V6\6Y316.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	J	2.35	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: 2017-2680

Lab Sample ID: 432189002

Date Collected: 09/01/2017 11:22

Date Received: 09/06/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1700295

Inst: VOA6.I

Dilution: 1

Run Date: 09/13/2017 19:17

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 09/13/2017 19:17

Data File: 091317V6\6Y316.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: 2017-2680

Lab Sample ID: 432189002

Date Collected: 09/01/2017 11:22

Date Received: 09/06/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAWA-17-142894

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1700295

Inst: VOA6.I

Dilution: 1

Run Date: 09/13/2017 19:17

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 09/13/2017 19:17

Column: DB-624

Data File: 091317V6\6Y316.D

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	54.2	50.0	ug/L 108	(71%-134%)
Bromofluorobenzene	49.5	50.0	ug/L 99	(70%-131%)
Toluene-d8	47.4	50.0	ug/L 95	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.592	8.42	ug/L	0	J

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2680

Lab Sample ID: 432189003

Date Collected: 09/01/2017 11:22

Date Received: 09/06/2017 09:00

Matrix: W

Client ID: CAWA-17-143016

Batch ID: 1700295

Run Date: 09/14/2017 13:11

Prep Date: 09/14/2017 13:11

Data File: 091417V6\6Y409.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Project: ESHL00114

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: 2017-2680

Lab Sample ID: 432189003

Date Collected: 09/01/2017 11:22

Date Received: 09/06/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAWA-17-143016

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1700295

Inst: VOA6.I

Dilution: 1

Run Date: 09/14/2017 13:11

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 09/14/2017 13:11

Data File: 091417V6\6Y409.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: 2017-2680
Lab Sample ID: 432189003

Client ID: CAWA-17-143016
Batch ID: 1700295
Run Date: 09/14/2017 13:11
Prep Date: 09/14/2017 13:11
Data File: 091417V6\6Y409.D

Date Collected: 09/01/2017 11:22
Date Received: 09/06/2017 09:00
Client: ARSL004
Method: SW-846:8260B
Inst: VOA6.I
Analyst: JP1

Column: DB-624

Matrix: W

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

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	61.0	50.0	ug/L 122	(71%-134%)
Bromofluorobenzene	54.3	50.0	ug/L 109	(70%-131%)
Toluene-d8	53.4	50.0	ug/L 107	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.584	5.75	ug/L	0	J

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2680

Lab Sample ID: 432189004

Date Collected: 09/01/2017 11:22

Date Received: 09/06/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAWA-17-143045

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1700295

Inst: VOA6.I

Dilution: 1

Run Date: 09/14/2017 13:39

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 09/14/2017 13:39

Data File: 091417V6\6Y410.D

Column: DB-624

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2680

Lab Sample ID: 432189004

Date Collected: 09/01/2017 11:22

Date Received: 09/06/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAWA-17-143045

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1700295

Inst: VOA6.I

Dilution: 1

Run Date: 09/14/2017 13:39

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 09/14/2017 13:39

Data File: 091417V6\6Y410.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: 2017-2680

Lab Sample ID: 432189004

Date Collected: 09/01/2017 11:22

Date Received: 09/06/2017 09:00

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAWA-17-143045

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1700295

Inst: VOA6.I

Dilution: 1

Run Date: 09/14/2017 13:39

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 09/14/2017 13:39

Column: DB-624

Data File: 091417V6\6Y410.D

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	53.6	50.0	ug/L 107	(71%-134%)
Bromofluorobenzene	49.2	50.0	ug/L 98	(70%-131%)
Toluene-d8	48.6	50.0	ug/L 97	(74%-124%)

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.592	5.66	ug/L	0	J

Quality Control Summary

Volatile
Surrogate Recovery Report

Page 1 of 1

SDG Number: 2017-2680**Matrix Type: LIQUID**

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203874200	LCS for batch 1700295	107	97	99
1203874201	LCS for batch 1700295	104	96	99
1203874198	MB for batch 1700295	102	95	98
432189002	CAWA-17-142894	108	95	99
1203874204	CAPA-17-142953PS	112	100	100
1203874206	CAPA-17-142953PSD	108	97	97
1203874205	CAPA-17-142953PS	109	98	102
1203874207	CAPA-17-142953PSD	107	95	99
1203874202	LCS for batch 1700295	104	98	99
1203874203	LCS for batch 1700295	108	95	98
1203874199	MB for batch 1700295	109	97	99
432189003	CAWA-17-143016	122	107	109
432189004	CAWA-17-143045	107	97	98

Surrogate**Acceptance Limits**

DCED4 = 1,2-Dichloroethane-d4

(71%-134%)

TOL = Toluene-d8

(74%-124%)

BFB = Bromofluorobenzene

(70%-131%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 4

SDG Number: 2017-2680

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1700295

Matrix: WATER

Lab Sample ID 1203874200

Instrument: VOA6.I

Analysis Date: 09/13/2017 13:12

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
179601-23-1	LCS m,p-Xylenes	100	0.0	85.1	85	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1120	90	61-125
67-64-1	LCS Acetone	250	0.0	315	126	48-157
74-88-4	LCS Iodomethane	250	0.0	196	78	72-128
75-15-0	LCS Carbon disulfide	250	0.0	183	73	69-138
108-05-4	LCS Vinyl acetate	250	0.0	274	109	67-125
78-93-3	LCS 2-Butanone	250	0.0	274	110	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	225	90	66-124
591-78-6	LCS 2-Hexanone	250	0.0	296	118	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	58.1	116	40-160
74-87-3	LCS Chloromethane	50.0	0.0	64.9	130	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	60.0	120	65-137
74-83-9	LCS Bromomethane	50.0	0.0	52.6	105	63-137
75-00-3	LCS Chloroethane	50.0	0.0	55.1	110	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	57.1	114	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	57.7	115	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	40.6	81	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	42.7	85	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	43.5	87	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	44.1	88	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	43.5	87	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	44.1	88	75-123

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2017-2680

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1700295

Matrix: WATER

Lab Sample ID 1203874200

Instrument: VOA6.I

Analysis Date: 09/13/2017 13:12

Dilution: 1

Analyst: JPI

Purge Vol: 5 mL

Batch ID: 1700295

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	45.2	90	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	42.7	85	76-125
67-66-3	LCS Chloroform	50.0	0.0	44.2	88	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	43.0	86	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	42.4	85	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	44.5	89	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	45.3	91	74-122
71-43-2	LCS Benzene	50.0	0.0	42.3	85	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	43.9	88	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	43.3	87	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	43.8	88	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	44.3	89	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	44.4	89	78-131
108-88-3	LCS Toluene	50.0	0.0	41.4	83	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	44.0	88	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	42.5	85	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	42.0	84	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	43.4	87	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	45.3	91	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	43.9	88	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	42.0	84	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	42.4	85	73-125

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2017-2680

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1700295

Matrix: WATER

Lab Sample ID 1203874200

Instrument: VOA6.I

Analysis Date: 09/13/2017 13:12

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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	41.8	84	74-126
100-42-5	LCS Styrene	50.0	0.0	42.3	85	72-130
75-25-2	LCS Bromoform	50.0	0.0	48.5	97	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	41.4	83	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	43.4	87	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	45.6	91	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	41.9	84	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	41.2	82	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	42.4	85	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	41.7	83	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	41.7	83	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	42.2	84	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	42.1	84	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	42.1	84	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	41.1	82	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	42.3	85	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	42.3	85	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	42.0	84	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	46.5	93	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	43.5	87	72-136
91-20-3	LCS Naphthalene	50.0	0.0	43.9	88	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	43.2	86	70-130

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2017-2680

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1700295

Matrix: WATER

Lab Sample ID 1203874200

Instrument: VOA6.I

Analysis Date: 09/13/2017 13:12

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	43.2	86	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	43.8	88	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	42.4	85	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	5130	103	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2017-2680

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1700295

Matrix: WATER

Lab Sample ID 1203874201

Instrument: VOA6.I

Analysis Date: 09/13/2017 14:08

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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	190	76	60-140
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	245	98	61-148
107-05-1	LCS Allyl chloride	250	0.0	225	90	59-125
107-13-1	LCS Acrylonitrile	250	0.0	213	85	65-122
107-12-0	LCS Propionitrile	250	0.0	205	82	64-124
126-98-7	LCS Methacrylonitrile	250	0.0	217	87	64-126
80-62-6	LCS Methyl methacrylate	250	0.0	214	86	69-127
97-63-2	LCS Ethyl methacrylate	250	0.0	203	81	66-130
78-83-1	LCS Isobutyl alcohol	2500	0.0	2150	86	65-135
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	42.1	84	66-147

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 4

SDG Number: 2017-2680

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1700295

Matrix: WATER

Lab Sample ID 1203874202

Instrument: VOA6.I

Analysis Date: 09/14/2017 10:24

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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	93.7	94	71-127
75-05-8	LCS Acetonitrile	1250	0.0	1110	89	61-125
67-64-1	LCS Acetone	250	0.0	324	130	48-157
74-88-4	LCS Iodomethane	250	0.0	238	95	72-128
75-15-0	LCS Carbon disulfide	250	0.0	232	93	69-138
108-05-4	LCS Vinyl acetate	250	0.0	254	102	67-125
78-93-3	LCS 2-Butanone	250	0.0	280	112	55-138
108-10-1	LCS 4-Methyl-2-pentanone	250	0.0	224	90	66-124
591-78-6	LCS 2-Hexanone	250	0.0	298	119	56-140
75-71-8	LCS Dichlorodifluoromethane	50.0	0.0	58.0	116	40-160
74-87-3	LCS Chloromethane	50.0	0.0	64.7	129	58-135
75-01-4	LCS Vinyl chloride	50.0	0.0	60.6	121	65-137
74-83-9	LCS Bromomethane	50.0	0.0	51.9	104	63-137
75-00-3	LCS Chloroethane	50.0	0.0	53.9	108	69-129
75-69-4	LCS Trichlorofluoromethane	50.0	0.0	56.9	114	69-138
60-29-7	LCS Ethyl ether	50.0	0.0	54.4	109	72-125
75-35-4	LCS 1,1-Dichloroethylene	50.0	0.0	49.6	99	66-126
75-09-2	LCS Methylene chloride	50.0	0.0	48.3	97	68-119
1634-04-4	LCS tert-Butyl methyl ether	50.0	0.0	47.9	96	76-128
156-60-5	LCS trans-1,2-Dichloroethylene	50.0	0.0	51.1	102	71-124
75-34-3	LCS 1,1-Dichloroethane	50.0	0.0	49.5	99	73-123
156-59-2	LCS cis-1,2-Dichloroethylene	50.0	0.0	50.3	101	75-123

Volatile
Quality Control Summary
Spike Recovery Report

Page 2 of 4

SDG Number: 2017-2680

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1700295

Matrix: WATER

Lab Sample ID 1203874202

Instrument: VOA6.I

Analysis Date: 09/14/2017 10:24

Dilution: 1

Analyst: JPI

Purge Vol: 5 mL

Batch ID: 1700295

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	51.6	103	72-138
74-97-5	LCS Bromochloromethane	50.0	0.0	47.5	95	76-125
67-66-3	LCS Chloroform	50.0	0.0	49.6	99	76-123
71-55-6	LCS 1,1,1-Trichloroethane	50.0	0.0	48.9	98	74-136
563-58-6	LCS 1,1-Dichloropropene	50.0	0.0	48.6	97	72-129
56-23-5	LCS Carbon tetrachloride	50.0	0.0	50.8	102	72-140
107-06-2	LCS 1,2-Dichloroethane	50.0	0.0	50.0	100	74-122
71-43-2	LCS Benzene	50.0	0.0	48.1	96	72-121
79-01-6	LCS Trichloroethylene	50.0	0.0	49.2	98	74-125
78-87-5	LCS 1,2-Dichloropropane	50.0	0.0	48.7	97	73-121
74-95-3	LCS Dibromomethane	50.0	0.0	47.1	94	78-123
75-27-4	LCS Bromodichloromethane	50.0	0.0	49.2	98	77-131
10061-01-5	LCS cis-1,3-Dichloropropylene	50.0	0.0	48.7	97	78-131
108-88-3	LCS Toluene	50.0	0.0	46.7	93	71-121
10061-02-6	LCS trans-1,3-Dichloropropylene	50.0	0.0	48.0	96	78-131
79-00-5	LCS 1,1,2-Trichloroethane	50.0	0.0	45.0	90	74-118
142-28-9	LCS 1,3-Dichloropropane	50.0	0.0	45.0	90	74-118
127-18-4	LCS Tetrachloroethylene	50.0	0.0	48.8	98	69-129
124-48-1	LCS Dibromochloromethane	50.0	0.0	48.8	98	76-137
106-93-4	LCS 1,2-Dibromoethane	50.0	0.0	46.6	93	78-122
108-90-7	LCS Chlorobenzene	50.0	0.0	46.7	93	74-120
100-41-4	LCS Ethylbenzene	50.0	0.0	46.8	94	73-125

Volatile
Quality Control Summary
Spike Recovery Report

Page 3 of 4

SDG Number: 2017-2680

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1700295

Matrix: WATER

Lab Sample ID 1203874202

Instrument: VOA6.I

Analysis Date: 09/14/2017 10:24

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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	46.1	92	74-126
100-42-5	LCS Styrene	50.0	0.0	46.1	92	72-130
75-25-2	LCS Bromoform	50.0	0.0	48.9	98	72-136
98-82-8	LCS Isopropylbenzene	50.0	0.0	45.4	91	70-130
79-34-5	LCS 1,1,2,2-Tetrachloroethane	50.0	0.0	42.7	85	70-126
96-18-4	LCS 1,2,3-Trichloropropane	50.0	0.0	44.6	89	74-122
108-86-1	LCS Bromobenzene	50.0	0.0	45.8	92	74-120
103-65-1	LCS n-Propylbenzene	50.0	0.0	45.2	90	67-128
108-67-8	LCS 1,3,5-Trimethylbenzene	50.0	0.0	46.5	93	70-129
95-49-8	LCS 2-Chlorotoluene	50.0	0.0	45.4	91	71-124
106-43-4	LCS 4-Chlorotoluene	50.0	0.0	45.6	91	69-125
98-06-6	LCS tert-Butylbenzene	50.0	0.0	46.4	93	72-130
95-63-6	LCS 1,2,4-Trimethylbenzene	50.0	0.0	45.9	92	70-126
135-98-8	LCS sec-Butylbenzene	50.0	0.0	45.7	91	70-131
99-87-6	LCS 4-Isopropyltoluene	50.0	0.0	44.9	90	71-131
541-73-1	LCS 1,3-Dichlorobenzene	50.0	0.0	46.2	92	72-121
106-46-7	LCS 1,4-Dichlorobenzene	50.0	0.0	45.8	92	71-120
104-51-8	LCS n-Butylbenzene	50.0	0.0	45.5	91	68-134
96-12-8	LCS 1,2-Dibromo-3-chloropropane	50.0	0.0	42.4	85	68-141
87-68-3	LCS Hexachlorobutadiene	50.0	0.0	47.0	94	72-136
91-20-3	LCS Naphthalene	50.0	0.0	43.0	86	72-132
87-61-6	LCS 1,2,3-Trichlorobenzene	50.0	0.0	44.4	89	70-130

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2680

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1700295

Matrix: WATER

Lab Sample ID 1203874202

Instrument: VOA6.I

Analysis Date: 09/14/2017 10:24

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits
120-82-1	LCS 1,2,4-Trichlorobenzene	50.0	0.0	45.2	90	71-129
630-20-6	LCS 1,1,1,2-Tetrachloroethane	50.0	0.0	47.8	96	79-127
95-50-1	LCS 1,2-Dichlorobenzene	50.0	0.0	45.2	90	74-120
71-36-3	LCS n-Butyl alcohol	5000	0.0	4640	93	63-138

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 1

SDG Number: 2017-2680

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 1700295

Matrix: WATER

Lab Sample ID 1203874203

Instrument: VOA6.I

Analysis Date: 09/14/2017 11:48

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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	207	83	60-140
76-13-1	LCS Trichlorotrifluoroethane	250	0.0	236	94	61-148
107-05-1	LCS Allyl chloride	250	0.0	225	90	59-125
107-13-1	LCS Acrylonitrile	250	0.0	241	97	65-122
107-12-0	LCS Propionitrile	250	0.0	235	94	64-124
126-98-7	LCS Methacrylonitrile	250	0.0	244	98	64-126
80-62-6	LCS Methyl methacrylate	250	0.0	236	95	69-127
97-63-2	LCS Ethyl methacrylate	250	0.0	220	88	66-130
78-83-1	LCS Isobutyl alcohol	2500	0.0	2560	103	65-135
126-99-8	LCS 2-Chloro-1,3-butadiene	50.0	0.0	42.2	84	66-147

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2680

Sample Type: Post Spike

Client ID: CAPA-17-142953PS

Matrix: W

Lab Sample ID 1203874204

Instrument: VOA6.I

Analysis Date: 09/13/2017 21:37

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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	80.5	80	59-132
75-05-8	PS Acetonitrile	1250	0.00 U	1120	89	56-131
67-64-1	PS Acetone	250	0.00 U	138	55	25-155
74-88-4	PS Iodomethane	250	0.00 U	186	74	66-133
75-15-0	PS Carbon disulfide	250	0.00 U	170	68	61-141
108-05-4	PS Vinyl acetate	250	0.00 U	264	105	48-133
78-93-3	PS 2-Butanone	250	0.00 U	149	60	25-143
108-10-1	PS 4-Methyl-2-pentanone	250	0.00 U	205	82	61-127
591-78-6	PS 2-Hexanone	250	0.00 U	193	77	33-138
75-71-8	PS Dichlorodifluoromethane	50.0	0.00 U	64.0	128	33-164
74-87-3	PS Chloromethane	50.0	0.00 U	60.7	121	53-139
75-01-4	PS Vinyl chloride	50.0	0.00 U	57.0	114	58-140
74-83-9	PS Bromomethane	50.0	0.00 U	60.1	120	59-146
75-00-3	PS Chloroethane	50.0	0.00 U	55.3	111	65-129
75-69-4	PS Trichlorofluoromethane	50.0	0.00 U	57.6	115	65-141
60-29-7	PS Ethyl ether	50.0	0.00 U	58.0	116	69-127
75-35-4	PS 1,1-Dichloroethylene	50.0	0.00 U	38.6	77	59-130
75-09-2	PS Methylene chloride	50.0	0.00 U	41.1	82	62-123
1634-04-4	PS tert-Butyl methyl ether	50.0	0.00 U	42.5	85	69-132
156-60-5	PS trans-1,2-Dichloroethylene	50.0	0.00 U	42.2	84	65-127
75-34-3	PS 1,1-Dichloroethane	50.0	0.00 U	42.5	85	67-127
156-59-2	PS cis-1,2-Dichloroethylene	50.0	0.00 U	43.2	86	69-127

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2680

Sample Type: Post Spike

Client ID: CAPA-17-142953PS

Matrix: W

Lab Sample ID 1203874204

Instrument: VOA6.I

Analysis Date: 09/13/2017 21:37

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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	41.8	84	66-137
74-97-5	PS Bromochloromethane	50.0	0.00 U	41.7	83	71-130
67-66-3	PS Chloroform	50.0	0.00 U	43.7	87	71-129
71-55-6	PS 1,1,1-Trichloroethane	50.0	0.00 U	41.0	82	69-139
563-58-6	PS 1,1-Dichloropropene	50.0	0.00 U	40.2	80	67-130
56-23-5	PS Carbon tetrachloride	50.0	0.00 U	41.9	84	66-143
107-06-2	PS 1,2-Dichloroethane	50.0	0.00 U	46.1	92	69-130
71-43-2	PS Benzene	50.0	0.00 U	40.9	82	66-125
79-01-6	PS Trichloroethylene	50.0	0.00 U	41.6	83	65-131
78-87-5	PS 1,2-Dichloropropane	50.0	0.00 U	43.1	86	67-127
74-95-3	PS Dibromomethane	50.0	0.00 U	42.6	85	72-129
75-27-4	PS Bromodichloromethane	50.0	0.00 U	43.4	87	70-138
10061-01-5	PS cis-1,3-Dichloropropylene	50.0	0.00 U	42.2	84	70-134
108-88-3	PS Toluene	50.0	0.00 U	39.8	80	60-126
10061-02-6	PS trans-1,3-Dichloropropylene	50.0	0.00 U	42.4	85	69-135
79-00-5	PS 1,1,2-Trichloroethane	50.0	0.00 U	42.1	84	66-125
142-28-9	PS 1,3-Dichloropropane	50.0	0.00 U	42.4	85	67-124
127-18-4	PS Tetrachloroethylene	50.0	0.00 U	41.5	83	60-130
124-48-1	PS Dibromochloromethane	50.0	0.00 U	44.0	88	68-143
106-93-4	PS 1,2-Dibromoethane	50.0	0.00 U	43.0	86	71-127
108-90-7	PS Chlorobenzene	50.0	0.00 U	40.8	82	64-124
100-41-4	PS Ethylbenzene	50.0	0.00 U	40.7	81	61-130

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2680

Sample Type: Post Spike

Client ID: CAPA-17-142953PS

Matrix: W

Lab Sample ID 1203874204

Instrument: VOA6.I

Analysis Date: 09/13/2017 21:37

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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	40.3	81	62-131
100-42-5	PS Styrene	50.0	0.00 U	40.7	81	59-135
75-25-2	PS Bromoform	50.0	0.00 U	45.1	90	64-138
98-82-8	PS Isopropylbenzene	50.0	0.00 U	39.0	78	55-133
79-34-5	PS 1,1,2,2-Tetrachloroethane	50.0	0.00 U	41.2	82	62-129
96-18-4	PS 1,2,3-Trichloropropane	50.0	0.00 U	43.1	86	70-124
108-86-1	PS Bromobenzene	50.0	0.00 U	40.7	81	62-124
103-65-1	PS n-Propylbenzene	50.0	0.00 U	38.6	77	50-133
108-67-8	PS 1,3,5-Trimethylbenzene	50.0	0.00 U	39.7	79	53-135
95-49-8	PS 2-Chlorotoluene	50.0	0.00 U	39.2	78	56-128
106-43-4	PS 4-Chlorotoluene	50.0	0.00 U	38.9	78	53-130
98-06-6	PS tert-Butylbenzene	50.0	0.00 U	39.4	79	55-135
95-63-6	PS 1,2,4-Trimethylbenzene	50.0	0.00 U	39.1	78	53-132
135-98-8	PS sec-Butylbenzene	50.0	0.00 U	39.2	78	50-138
99-87-6	PS 4-Isopropyltoluene	50.0	0.00 U	38.6	77	49-138
541-73-1	PS 1,3-Dichlorobenzene	50.0	0.00 U	39.2	78	56-126
106-46-7	PS 1,4-Dichlorobenzene	50.0	0.00 U	39.0	78	55-125
104-51-8	PS n-Butylbenzene	50.0	0.00 U	37.1	74	43-142
96-12-8	PS 1,2-Dibromo-3-chloropropane	50.0	0.00 U	41.1	82	62-141
87-68-3	PS Hexachlorobutadiene	50.0	0.00 U	37.9	76	40-147
91-20-3	PS Naphthalene	50.0	0.00 U	40.1	80	62-134
87-61-6	PS 1,2,3-Trichlorobenzene	50.0	0.00 U	38.5	77	52-135

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2680

Sample Type: Post Spike

Client ID: CAPA-17-142953PS

Matrix: W

Lab Sample ID 1203874204

Instrument: VOA6.I

Analysis Date: 09/13/2017 21:37

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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	37.1	74	50-133
630-20-6	PS 1,1,1,2-Tetrachloroethane	50.0	0.00 U	43.0	86	71-133
95-50-1	PS 1,2-Dichlorobenzene	50.0	0.00 U	39.8	80	60-125
71-36-3	PS n-Butyl alcohol	5000	0.00 U	4830	97	60-140

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2680

Sample Type: Post Spike Duplicate

Client ID: CAPA-17-142953PSD

Matrix: W

Lab Sample ID 1203874206

Instrument: VOA6.I

Analysis Date: 09/13/2017 22:05

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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	80.1	80	59-132	1	0-20
75-05-8	PSD Acetonitrile	1250	0.00 U	1130	91	56-131	1	0-20
67-64-1	PSD Acetone	250	0.00 U	137	55	25-155	0	0-20
74-88-4	PSD Iodomethane	250	0.00 U	189	75	66-133	1	0-20
75-15-0	PSD Carbon disulfide	250	0.00 U	170	68	61-141	0	0-20
108-05-4	PSD Vinyl acetate	250	0.00 U	253	101	48-133	4	0-20
78-93-3	PSD 2-Butanone	250	0.00 U	149	60	25-143	0	0-20
108-10-1	PSD 4-Methyl-2-pentanone	250	0.00 U	208	83	61-127	2	0-20
591-78-6	PSD 2-Hexanone	250	0.00 U	195	78	33-138	1	0-20
75-71-8	PSD Dichlorodifluoromethane	50.0	0.00 U	60.9	122	33-164	5	0-20
74-87-3	PSD Chloromethane	50.0	0.00 U	58.8	118	53-139	3	0-20
75-01-4	PSD Vinyl chloride	50.0	0.00 U	55.2	110	58-140	3	0-20
74-83-9	PSD Bromomethane	50.0	0.00 U	57.8	116	59-146	4	0-20
75-00-3	PSD Chloroethane	50.0	0.00 U	53.2	106	65-129	4	0-20
75-69-4	PSD Trichlorofluoromethane	50.0	0.00 U	54.7	109	65-141	5	0-20
60-29-7	PSD Ethyl ether	50.0	0.00 U	55.9	112	69-127	4	0-20
75-35-4	PSD 1,1-Dichloroethylene	50.0	0.00 U	38.5	77	59-130	0	0-20
75-09-2	PSD Methylene chloride	50.0	0.00 U	41.6	83	62-123	1	0-20
1634-04-4	PSD tert-Butyl methyl ether	50.0	0.00 U	43.5	87	69-132	2	0-20
156-60-5	PSD trans-1,2-Dichloroethylene	50.0	0.00 U	42.0	84	65-127	1	0-20
75-34-3	PSD 1,1-Dichloroethane	50.0	0.00 U	42.5	85	67-127	0	0-20
156-59-2	PSD cis-1,2-Dichloroethylene	50.0	0.00 U	43.1	86	69-127	0	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2680

Sample Type: Post Spike Duplicate

Client ID: CAPA-17-142953PSD

Matrix: W

Lab Sample ID 1203874206

Instrument: VOA6.I

Analysis Date: 09/13/2017 22:05

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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 42.0	84	66-137	1	0-20
74-97-5	PSD Bromochloromethane	50.0	0.00	U 42.4	85	71-130	2	0-20
67-66-3	PSD Chloroform	50.0	0.00	U 43.7	87	71-129	0	0-20
71-55-6	PSD 1,1,1-Trichloroethane	50.0	0.00	U 41.2	82	69-139	1	0-20
563-58-6	PSD 1,1-Dichloropropene	50.0	0.00	U 39.6	79	67-130	1	0-20
56-23-5	PSD Carbon tetrachloride	50.0	0.00	U 42.0	84	66-143	0	0-20
107-06-2	PSD 1,2-Dichloroethane	50.0	0.00	U 46.6	93	69-130	1	0-20
71-43-2	PSD Benzene	50.0	0.00	U 40.9	82	66-125	0	0-20
79-01-6	PSD Trichloroethylene	50.0	0.00	U 40.9	82	65-131	2	0-20
78-87-5	PSD 1,2-Dichloropropane	50.0	0.00	U 43.3	87	67-127	1	0-20
74-95-3	PSD Dibromomethane	50.0	0.00	U 43.4	87	72-129	2	0-20
75-27-4	PSD Bromodichloromethane	50.0	0.00	U 44.1	88	70-138	2	0-20
10061-01-5	PSD cis-1,3-Dichloropropylene	50.0	0.00	U 42.5	85	70-134	1	0-20
108-88-3	PSD Toluene	50.0	0.00	U 39.7	79	60-126	0	0-20
10061-02-6	PSD trans-1,3-Dichloropropylene	50.0	0.00	U 43.0	86	69-135	2	0-20
79-00-5	PSD 1,1,2-Trichloroethane	50.0	0.00	U 42.7	85	66-125	1	0-20
142-28-9	PSD 1,3-Dichloropropane	50.0	0.00	U 42.6	85	67-124	0	0-20
127-18-4	PSD Tetrachloroethylene	50.0	0.00	U 40.6	81	60-130	2	0-20
124-48-1	PSD Dibromochloromethane	50.0	0.00	U 44.7	89	68-143	2	0-20
106-93-4	PSD 1,2-Dibromoethane	50.0	0.00	U 43.2	86	71-127	1	0-20
108-90-7	PSD Chlorobenzene	50.0	0.00	U 40.6	81	64-124	0	0-20
100-41-4	PSD Ethylbenzene	50.0	0.00	U 40.0	80	61-130	2	0-20

Volatile
Quality Control Summary
Spike Recovery Report

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SDG Number: 2017-2680

Sample Type: Post Spike Duplicate

Client ID: CAPA-17-142953PSD

Matrix: W

Lab Sample ID 1203874206

Instrument: VOA6.I

Analysis Date: 09/13/2017 22:05

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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	40.4	81	62-131	0	0-20
100-42-5	PSD Styrene	50.0	0.00 U	40.5	81	59-135	0	0-20
75-25-2	PSD Bromoform	50.0	0.00 U	45.8	92	64-138	1	0-20
98-82-8	PSD Isopropylbenzene	50.0	0.00 U	38.3	77	55-133	2	0-20
79-34-5	PSD 1,1,2,2-Tetrachloroethane	50.0	0.00 U	41.7	83	62-129	1	0-20
96-18-4	PSD 1,2,3-Trichloropropane	50.0	0.00 U	42.6	85	70-124	1	0-20
108-86-1	PSD Bromobenzene	50.0	0.00 U	40.4	81	62-124	1	0-20
103-65-1	PSD n-Propylbenzene	50.0	0.00 U	37.6	75	50-133	3	0-20
108-67-8	PSD 1,3,5-Trimethylbenzene	50.0	0.00 U	39.2	78	53-135	1	0-20
95-49-8	PSD 2-Chlorotoluene	50.0	0.00 U	38.5	77	56-128	2	0-20
106-43-4	PSD 4-Chlorotoluene	50.0	0.00 U	38.3	77	53-130	2	0-20
98-06-6	PSD tert-Butylbenzene	50.0	0.00 U	38.9	78	55-135	1	0-20
95-63-6	PSD 1,2,4-Trimethylbenzene	50.0	0.00 U	38.8	78	53-132	1	0-20
135-98-8	PSD sec-Butylbenzene	50.0	0.00 U	38.7	77	50-138	1	0-20
99-87-6	PSD 4-Isopropyltoluene	50.0	0.00 U	38.1	76	49-138	1	0-20
541-73-1	PSD 1,3-Dichlorobenzene	50.0	0.00 U	39.2	78	56-126	0	0-20
106-46-7	PSD 1,4-Dichlorobenzene	50.0	0.00 U	39.1	78	55-125	0	0-20
104-51-8	PSD n-Butylbenzene	50.0	0.00 U	36.8	74	43-142	1	0-20
96-12-8	PSD 1,2-Dibromo-3-chloropropane	50.0	0.00 U	41.9	84	62-141	2	0-20
87-68-3	PSD Hexachlorobutadiene	50.0	0.00 U	39.4	79	40-147	4	0-20
91-20-3	PSD Naphthalene	50.0	0.00 U	41.6	83	62-134	4	0-20
87-61-6	PSD 1,2,3-Trichlorobenzene	50.0	0.00 U	40.0	80	52-135	4	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 8 of 8

SDG Number: 2017-2680

Sample Type: Post Spike Duplicate

Client ID: CAPA-17-142953PSD

Matrix: W

Lab Sample ID 1203874206

Instrument: VOA6.I

Analysis Date: 09/13/2017 22:05

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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	38.2	76	50-133	3	0-20
630-20-6	PSD 1,1,1,2-Tetrachloroethane	50.0	0.00 U	43.6	87	71-133	1	0-20
95-50-1	PSD 1,2-Dichlorobenzene	50.0	0.00 U	40.2	80	60-125	1	0-20
71-36-3	PSD n-Butyl alcohol	5000	0.00 U	4940	99	60-140	2	0-20

Volatile
Quality Control Summary
Spike Recovery Report

Page 1 of 2

SDG Number: 2017-2680

Sample Type: Post Spike

Client ID: CAPA-17-142953PS

Matrix: W

Lab Sample ID 1203874205

Instrument: VOA6.I

Analysis Date: 09/13/2017 23:29

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

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	191	76	49-141
76-13-1	PS Trichlorotrifluoroethane	250	0.00 U	242	97	57-149
107-05-1	PS Allyl chloride	250	0.00 U	232	93	54-128
107-13-1	PS Acrylonitrile	250	0.00 U	236	95	59-129
107-12-0	PS Propionitrile	250	0.00 U	229	91	58-131
126-98-7	PS Methacrylonitrile	250	0.00 U	243	97	59-134
80-62-6	PS Methyl methacrylate	250	0.00 U	232	93	62-135
97-63-2	PS Ethyl methacrylate	250	0.00 U	222	89	60-136
78-83-1	PS Isobutyl alcohol	2500	0.00 U	2440	98	60-143
126-99-8	PS 2-Chloro-1,3-butadiene	50.0	0.00 U	42.4	85	63-146

Volatile

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Quality Control Summary
Spike Recovery Report

SDG Number: 2017-2680

Sample Type: Post Spike Duplicate

Client ID: CAPA-17-142953PSD

Matrix: W

Lab Sample ID 1203874207

Instrument: VOA6.I

Analysis Date: 09/13/2017 23:57

Dilution: 1

Analyst: JP1

Purge Vol: 5 mL

Batch ID: 1700295

CAS No	Parmname	Amount Added ug/L	Sample Conc. ug/L	Spike Conc. ug/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
107-02-8	PSD Acrolein	250	0.00 U	190	76	49-141	1	0-20
76-13-1	PSD Trichlorotrifluoroethane	250	0.00 U	230	92	57-149	5	0-20
107-05-1	PSD Allyl chloride	250	0.00 U	218	87	54-128	6	0-20
107-13-1	PSD Acrylonitrile	250	0.00 U	228	91	59-129	3	0-20
107-12-0	PSD Propionitrile	250	0.00 U	223	89	58-131	2	0-20
126-98-7	PSD Methacrylonitrile	250	0.00 U	235	94	59-134	3	0-20
80-62-6	PSD Methyl methacrylate	250	0.00 U	226	90	62-135	3	0-20
97-63-2	PSD Ethyl methacrylate	250	0.00 U	213	85	60-136	4	0-20
78-83-1	PSD Isobutyl alcohol	2500	0.00 U	2410	96	60-143	1	0-20
126-99-8	PSD 2-Chloro-1,3-butadiene	50.0	0.00 U	39.7	79	63-146	7	0-20

Method Blank Summary

Page 1 of 1

SDG Number:	2017-2680	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1700295	Instrument ID:	VOA6.I	Data File:	091317V6\6Y306BA.D
Lab Sample ID:	1203874198	Prep Date:	09/13/2017 14:35	Analyzed:	09/13/17 14:35
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 1700295	1203874200	091317V6\6Y303LA.D	09/13/17	1312
02 LCS for batch 1700295	1203874201	091317V6\6Y305LA.D	09/13/17	1408
03 CAWA-17-142894	432189002	091317V6\6Y316.D	09/13/17	1917
04 CAPA-17-142953PS	1203874204	091317V6\6Y321.D	09/13/17	2137
05 CAPA-17-142953PSD	1203874206	091317V6\6Y322.D	09/13/17	2205
06 CAPA-17-142953PS	1203874205	091317V6\6Y325.D	09/13/17	2329
07 CAPA-17-142953PSD	1203874207	091317V6\6Y326.D	09/13/17	2357

Method Blank Summary

Page 1 of 1

SDG Number:	2017-2680	Client:	ARSL004	Matrix:	WATER
Client ID:	MB for batch 1700295	Instrument ID:	VOA6.I	Data File:	091417V6\6Y408BA95.D
Lab Sample ID:	1203874199	Prep Date:	09/14/2017 12:44	Analyzed:	09/14/17 12:44
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
09 LCS for batch 1700295	1203874202	091417V6\6Y403LA95.D	09/14/17	1024
10 LCS for batch 1700295	1203874203	091417V6\6Y406LA95.D	09/14/17	1148
11 CAWA-17-143016	432189003	091417V6\6Y409.D	09/14/17	1311
12 CAWA-17-143045	432189004	091417V6\6Y410.D	09/14/17	1339

Quality Control Data

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2680

Lab Sample ID: 1203874198

Client Sample: QC for batch 1700295

Client ID: MB for batch 1700295

Batch ID: 1700295

Run Date: 09/13/2017 14:35

Prep Date: 09/13/2017 14:35

Data File: 091317V6\6Y306BA.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	J	0.420	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	J	0.370	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: 2017-2680

Lab Sample ID: 1203874198

Client Sample: QC for batch 1700295

Client ID: MB for batch 1700295

Batch ID: 1700295

Run Date: 09/13/2017 14:35

Prep Date: 09/13/2017 14:35

Data File: 091317V6\6Y306BA.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	J	0.490	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number: 2017-2680	Matrix: WATER	
Lab Sample ID: 1203874198		
Client Sample: QC for batch 1700295	Client: ARSL004	Project: QC
Client ID: MB for batch 1700295	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1700295	Inst: VOA6.I	Dilution: 1
Run Date: 09/13/2017 14:35	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 09/13/2017 14:35		
Data File: 091317V6\6Y306BA.D	Column: DB-624	

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.1	50.0	ug/L	102 (71%-134%)
Bromofluorobenzene	48.9	50.0	ug/L	98 (70%-131%)
Toluene-d8	47.6	50.0	ug/L	95 (74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2680

Lab Sample ID: 1203874199

Client Sample: QC for batch 1700295

Client ID: MB for batch 1700295

Batch ID: 1700295

Run Date: 09/14/2017 12:44

Prep Date: 09/14/2017 12:44

Data File: 091417V6\6Y408BA95.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	J	0.330	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: 2017-2680		Matrix:	WATER
Lab Sample ID: 1203874199			
Client Sample: QC for batch 1700295	Client: ARSL004	Project:	QC
Client ID: MB for batch 1700295	Method: SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID: 1700295	Inst: VOA6.I	Dilution:	1
Run Date: 09/14/2017 12:44	Analyst: JP1	Purge Vol:	5 mL
Prep Date: 09/14/2017 12:44			
Data File: 091417V6\6Y408BA95.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	J	0.400	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene	U	0.300	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	1.00
108-88-3	Toluene	U	0.300	ug/L	0.300	1.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

Page 3 of 3

SDG Number: 2017-2680	Matrix: WATER	
Lab Sample ID: 1203874199		
Client Sample: QC for batch 1700295	Client: ARSL004	Project: QC
Client ID: MB for batch 1700295	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1700295	Inst: VOA6.I	Dilution: 1
Run Date: 09/14/2017 12:44	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 09/14/2017 12:44		
Data File: 091417V6\6Y408BA95.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	54.7	50.0	ug/L 109	(71%-134%)
Bromofluorobenzene	49.3	50.0	ug/L 99	(70%-131%)
Toluene-d8	48.6	50.0	ug/L 97	(74%-124%)

Tentatively Identified Compound Summary

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

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2680

Lab Sample ID: 1203874200

Client Sample: QC for batch 1700295

Client ID: LCS for batch 1700295

Batch ID: 1700295

Run Date: 09/13/2017 13:12

Prep Date: 09/13/2017 13:12

Data File: 091317V6\6Y303LA.D

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		43.8	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		43.0	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		43.4	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		42.5	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		43.5	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		40.6	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		42.4	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	43.2	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		45.6	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	B	43.2	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		42.1	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		46.5	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		43.9	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		42.4	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		45.3	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		43.3	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		42.4	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		42.3	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		42.0	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		42.3	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		45.2	ug/L	0.300	1.00
78-93-3	2-Butanone		274	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene		41.7	ug/L	0.300	1.00
591-78-6	2-Hexanone		296	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		41.7	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		41.1	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		225	ug/L	1.50	5.00
67-64-1	Acetone		315	ug/L	1.50	10.0
75-05-8	Acetonitrile		1120	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		42.3	ug/L	0.300	1.00
108-86-1	Bromobenzene		41.9	ug/L	0.300	1.00
74-97-5	Bromochloromethane		42.7	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		44.3	ug/L	0.300	1.00
75-25-2	Bromoform		48.5	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2680

Lab Sample ID: 1203874200

Client Sample: QC for batch 1700295

Client ID: LCS for batch 1700295

Batch ID: 1700295

Run Date: 09/13/2017 13:12

Prep Date: 09/13/2017 13:12

Data File: 091317V6\6Y303LA.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		52.6	ug/L	0.300	1.00
75-15-0	Carbon disulfide		183	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		44.5	ug/L	0.300	1.00
108-90-7	Chlorobenzene		42.0	ug/L	0.300	1.00
75-00-3	Chloroethane		55.1	ug/L	0.300	1.00
67-66-3	Chloroform		44.2	ug/L	0.300	1.00
74-87-3	Chloromethane		64.9	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		45.3	ug/L	0.300	1.00
74-95-3	Dibromomethane		43.8	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		58.1	ug/L	0.300	1.00
60-29-7	Ethyl ether		57.7	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		42.4	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	43.5	ug/L	0.300	1.00
74-88-4	Iodomethane		196	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		41.4	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		42.7	ug/L	1.00	10.0
91-20-3	Naphthalene		43.9	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		42.3	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		43.4	ug/L	0.300	1.00
108-88-3	Toluene		41.4	ug/L	0.300	1.00
79-01-6	Trichloroethylene		43.9	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		57.1	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		274	ug/L	1.50	5.00
75-01-4	Vinyl chloride		60.0	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		44.1	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		44.4	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		85.1	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		5130	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		42.0	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		41.2	ug/L	0.300	1.00
95-47-6	o-Xylene		41.8	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		42.1	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number:	2017-2680	Matrix:	WATER
Lab Sample ID:	1203874200		
Client Sample:	QC for batch 1700295	Client:	ARSL004
Client ID:	LCS for batch 1700295	Method:	SW-846:8260B
Batch ID:	1700295	Inst:	VOA6.I
Run Date:	09/13/2017 13:12	Analyst:	JP1
Prep Date:	09/13/2017 13:12		
Data File:	091317V6\6Y303LA.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		43.5	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		42.2	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		44.1	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		44.0	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	49.7	50.0	99	(70%-131%)
Toluene-d8	48.3	50.0	97	(74%-124%)

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2680

Lab Sample ID: 1203874201

Client Sample: QC for batch 1700295

Client ID: LCS for batch 1700295

Batch ID: 1700295

Run Date: 09/13/2017 14:08

Prep Date: 09/13/2017 14:08

Data File: 091317V6\6Y305LA.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	0.300	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene	U	0.300	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	U	0.300	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane	U	0.300	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene	U	0.300	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane	U	0.300	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane	U	0.300	ug/L	0.300	1.00
78-93-3	2-Butanone	U	1.50	ug/L	1.50	5.00
126-99-8	2-Chloro-1,3-butadiene		42.1	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		190	ug/L	1.50	5.00
107-13-1	Acrylonitrile		213	ug/L	1.50	5.00
107-05-1	Allyl chloride		225	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: 2017-2680

Lab Sample ID: 1203874201

Client Sample: QC for batch 1700295

Client ID: LCS for batch 1700295

Batch ID: 1700295

Run Date: 09/13/2017 14:08

Prep Date: 09/13/2017 14:08

Data File: 091317V6\6Y305LA.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		203	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		2150	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		217	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		214	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		205	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		245	ug/L	2.00	5.00
108-05-4	Vinyl acetate	U	1.50	ug/L	1.50	5.00
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes	U	0.300	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol	U	15.0	ug/L	15.0	50.0
104-51-8	n-Butylbenzene	U	0.300	ug/L	0.300	1.00
103-65-1	n-Propylbenzene	U	0.300	ug/L	0.300	1.00
95-47-6	o-Xylene	U	0.300	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene	U	0.300	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number:	2017-2680	Matrix:	WATER
Lab Sample ID:	1203874201		
Client Sample:	QC for batch 1700295	Client:	ARSL004
Client ID:	LCS for batch 1700295	Method:	SW-846:8260B
Batch ID:	1700295	Inst:	VOA6.I
Run Date:	09/13/2017 14:08	Analyst:	JP1
Prep Date:	09/13/2017 14:08	Purge Vol:	5 mL
Data File:	091317V6\6Y305LA.D	Column:	DB-624

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

Surrogate/Tracer recovery	Result	Nominal		Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	51.9	50.0	ug/L	104	(71%-134%)
Bromofluorobenzene	49.7	50.0	ug/L	99	(70%-131%)
Toluene-d8	48.1	50.0	ug/L	96	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2680

Lab Sample ID: 1203874202

Client Sample: QC for batch 1700295

Client ID: LCS for batch 1700295

Batch ID: 1700295

Run Date: 09/14/2017 10:24

Prep Date: 09/14/2017 10:24

Data File: 091417V6\6Y403LA95.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		47.8	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		48.9	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		42.7	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		45.0	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		49.5	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		49.6	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		48.6	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	44.4	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		44.6	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene		45.2	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		45.9	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		42.4	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		46.6	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		45.2	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		50.0	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		48.7	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		46.5	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		46.2	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		45.0	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		45.8	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		51.6	ug/L	0.300	1.00
78-93-3	2-Butanone		280	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		45.4	ug/L	0.300	1.00
591-78-6	2-Hexanone		298	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		45.6	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		44.9	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		224	ug/L	1.50	5.00
67-64-1	Acetone		324	ug/L	1.50	10.0
75-05-8	Acetonitrile		1110	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		48.1	ug/L	0.300	1.00
108-86-1	Bromobenzene		45.8	ug/L	0.300	1.00
74-97-5	Bromochloromethane		47.5	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		49.2	ug/L	0.300	1.00
75-25-2	Bromoform		48.9	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number: 2017-2680

Lab Sample ID: 1203874202

Client Sample: QC for batch 1700295

Client ID: LCS for batch 1700295

Batch ID: 1700295

Run Date: 09/14/2017 10:24

Prep Date: 09/14/2017 10:24

Data File: 091417V6\6Y403LA95.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		51.9	ug/L	0.300	1.00
75-15-0	Carbon disulfide		232	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		50.8	ug/L	0.300	1.00
108-90-7	Chlorobenzene		46.7	ug/L	0.300	1.00
75-00-3	Chloroethane		53.9	ug/L	0.300	1.00
67-66-3	Chloroform		49.6	ug/L	0.300	1.00
74-87-3	Chloromethane		64.7	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		48.8	ug/L	0.300	1.00
74-95-3	Dibromomethane		47.1	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		58.0	ug/L	0.300	1.00
60-29-7	Ethyl ether		54.4	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		46.8	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	47.0	ug/L	0.300	1.00
74-88-4	Iodomethane		238	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		45.4	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		48.3	ug/L	1.00	10.0
91-20-3	Naphthalene		43.0	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		46.1	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		48.8	ug/L	0.300	1.00
108-88-3	Toluene		46.7	ug/L	0.300	1.00
79-01-6	Trichloroethylene		49.2	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		56.9	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		254	ug/L	1.50	5.00
75-01-4	Vinyl chloride		60.6	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		50.3	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		48.7	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		93.7	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4640	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		45.5	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		45.2	ug/L	0.300	1.00
95-47-6	o-Xylene		46.1	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		45.7	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

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SDG Number:	2017-2680	Matrix:	WATER
Lab Sample ID:	1203874202		
Client Sample:	QC for batch 1700295	Client:	ARSL004
Client ID:	LCS for batch 1700295	Method:	SW-846:8260B
Batch ID:	1700295	Inst:	VOA6.I
Run Date:	09/14/2017 10:24	Analyst:	JP1
Prep Date:	09/14/2017 10:24	Purge Vol:	5 mL
Data File:	091417V6\6Y403LA95.D	Column:	DB-624

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		47.9	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		46.4	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		51.1	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		48.0	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	52.2	50.0	104	(71%-134%)
Bromofluorobenzene	49.4	50.0	99	(70%-131%)
Toluene-d8	49.1	50.0	98	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2680		Matrix:	WATER
Lab Sample ID: 1203874203			
Client Sample: QC for batch 1700295	Client: ARSL004	Project:	QC
Client ID: LCS for batch 1700295	Method: SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID: 1700295	Inst: VOA6.I	Dilution:	1
Run Date: 09/14/2017 11:48	Analyst: JP1	Purge Vol:	5 mL
Prep Date: 09/14/2017 11:48			
Data File: 091417V6\6Y406LA95.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		42.2	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		207	ug/L	1.50	5.00
107-13-1	Acrylonitrile		241	ug/L	1.50	5.00
107-05-1	Allyl chloride		225	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

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SDG Number: 2017-2680

Lab Sample ID: 1203874203

Client Sample: QC for batch 1700295

Client ID: LCS for batch 1700295

Batch ID: 1700295

Run Date: 09/14/2017 11:48

Prep Date: 09/14/2017 11:48

Data File: 091417V6\6Y406LA95.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Matrix: WATER

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		220	ug/L	1.50	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	U	0.300	ug/L	0.300	1.00
74-88-4	Iodomethane	U	1.50	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol		2560	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		244	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		236	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		235	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		236	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:	2017-2680	Matrix:	WATER
Lab Sample ID:	1203874203		
Client Sample:	QC for batch 1700295	Client:	ARSL004
Client ID:	LCS for batch 1700295	Method:	SW-846:8260B
Batch ID:	1700295	Inst:	VOA6.I
Run Date:	09/14/2017 11:48	Analyst:	JP1
Prep Date:	09/14/2017 11:48	Purge Vol:	5 mL
Data File:	091417V6\6Y406LA95.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	54.2	50.0	ug/L	108 (71%-134%)
Bromofluorobenzene	49.0	50.0	ug/L	98 (70%-131%)
Toluene-d8	47.3	50.0	ug/L	95 (74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	2017-2680	Date Collected:	09/06/2017 10:56	Matrix:	W
Lab Sample ID:	1203874204	Date Received:	09/08/2017 09:20		
Client Sample:	QC for batch 1700295	Client:	ARSL004	Project:	QC
Client ID:	CAPA-17-142953PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1700295	Inst:	VOA6.I	Dilution:	1
Run Date:	09/13/2017 21:37	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	09/13/2017 21:37				
Data File:	091317V6\6Y321.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		43.0	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		41.0	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		41.2	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		42.1	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		42.5	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		38.6	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		40.2	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	38.5	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		43.1	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	B	37.1	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		39.1	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		41.1	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		43.0	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		39.8	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		46.1	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		43.1	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		39.7	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		39.2	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		42.4	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		39.0	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		41.8	ug/L	0.300	1.00
78-93-3	2-Butanone		149	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		39.2	ug/L	0.300	1.00
591-78-6	2-Hexanone		193	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		38.9	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		38.6	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		205	ug/L	1.50	5.00
67-64-1	Acetone		138	ug/L	1.50	10.0
75-05-8	Acetonitrile		1120	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		40.9	ug/L	0.300	1.00
108-86-1	Bromobenzene		40.7	ug/L	0.300	1.00
74-97-5	Bromochloromethane		41.7	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		43.4	ug/L	0.300	1.00
75-25-2	Bromoform		45.1	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2680	Date Collected:	09/06/2017 10:56	Matrix:	W
Lab Sample ID:	1203874204	Date Received:	09/08/2017 09:20		
Client Sample:	QC for batch 1700295	Client:	ARSL004	Project:	QC
Client ID:	CAPA-17-142953PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1700295	Inst:	VOA6.I	Dilution:	1
Run Date:	09/13/2017 21:37	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	09/13/2017 21:37				
Data File:	091317V6\6Y321.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		60.1	ug/L	0.300	1.00
75-15-0	Carbon disulfide		170	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		41.9	ug/L	0.300	1.00
108-90-7	Chlorobenzene		40.8	ug/L	0.300	1.00
75-00-3	Chloroethane		55.3	ug/L	0.300	1.00
67-66-3	Chloroform		43.7	ug/L	0.300	1.00
74-87-3	Chloromethane		60.7	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		44.0	ug/L	0.300	1.00
74-95-3	Dibromomethane		42.6	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		64.0	ug/L	0.300	1.00
60-29-7	Ethyl ether		58.0	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		40.7	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	37.9	ug/L	0.300	1.00
74-88-4	Iodomethane		186	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		39.0	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		41.1	ug/L	1.00	10.0
91-20-3	Naphthalene		40.1	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		40.7	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		41.5	ug/L	0.300	1.00
108-88-3	Toluene		39.8	ug/L	0.300	1.00
79-01-6	Trichloroethylene		41.6	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		57.6	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		264	ug/L	1.50	5.00
75-01-4	Vinyl chloride		57.0	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		43.2	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		42.2	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		80.5	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4830	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		37.1	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		38.6	ug/L	0.300	1.00
95-47-6	o-Xylene		40.3	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		39.2	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2680	Date Collected:	09/06/2017 10:56	Matrix:	W
Lab Sample ID:	1203874204	Date Received:	09/08/2017 09:20		
Client Sample:	QC for batch 1700295	Client:	ARSL004	Project:	QC
Client ID:	CAPA-17-142953PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1700295	Inst:	VOA6.I	Dilution:	1
Run Date:	09/13/2017 21:37	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	09/13/2017 21:37				
Data File:	091317V6\6Y321.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		42.5	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		39.4	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		42.2	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		42.4	ug/L	0.300	1.00

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	55.8	50.0	ug/L 112	(71%-134%)
Bromofluorobenzene	50.2	50.0	ug/L 100	(70%-131%)
Toluene-d8	49.8	50.0	ug/L 100	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2680	Date Collected: 09/06/2017 10:56	Matrix: W
Lab Sample ID: 1203874205	Date Received: 09/08/2017 09:20	
Client Sample: QC for batch 1700295	Client: ARSL004	Project: QC
Client ID: CAPA-17-142953PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1700295	Inst: VOA6.I	Dilution: 1
Run Date: 09/13/2017 23:29	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 09/13/2017 23:29		
Data File: 091317V6\6Y325.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		42.4	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		191	ug/L	1.50	5.00
107-13-1	Acrylonitrile		236	ug/L	1.50	5.00
107-05-1	Allyl chloride		232	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: 2017-2680	Date Collected: 09/06/2017 10:56	Matrix: W
Lab Sample ID: 1203874205	Date Received: 09/08/2017 09:20	
Client Sample: QC for batch 1700295	Client: ARSL004	Project: QC
Client ID: CAPA-17-142953PS	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1700295	Inst: VOA6.I	Dilution: 1
Run Date: 09/13/2017 23:29	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 09/13/2017 23:29		
Data File: 091317V6\6Y325.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		222	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		2440	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		243	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		232	ug/L	1.50	5.00
75-09-2	Methylene chloride	U	1.00	ug/L	1.00	10.0
91-20-3	Naphthalene	U	0.300	ug/L	0.300	1.00
107-12-0	Propionitrile		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		242	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:	2017-2680	Date Collected:	09/06/2017 10:56	Matrix:	W
Lab Sample ID:	1203874205	Date Received:	09/08/2017 09:20		
Client Sample:	QC for batch 1700295	Client:	ARSL004	Project:	QC
Client ID:	CAPA-17-142953PS	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1700295	Inst:	VOA6.I	Dilution:	1
Run Date:	09/13/2017 23:29	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	09/13/2017 23:29				
Data File:	091317V6\6Y325.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	54.5	50.0	ug/L	109	(71%-134%)
Bromofluorobenzene	51.2	50.0	ug/L	102	(70%-131%)
Toluene-d8	49.0	50.0	ug/L	98	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2680	Date Collected: 09/06/2017 10:56	Matrix: W
Lab Sample ID: 1203874206	Date Received: 09/08/2017 09:20	
Client Sample: QC for batch 1700295	Client: ARSL004	Project: QC
Client ID: CAPA-17-142953PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1700295	Inst: VOA6.I	Dilution: 1
Run Date: 09/13/2017 22:05	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 09/13/2017 22:05		
Data File: 091317V6\6Y322.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
630-20-6	1,1,1,2-Tetrachloroethane		43.6	ug/L	0.300	1.00
71-55-6	1,1,1-Trichloroethane		41.2	ug/L	0.300	1.00
79-34-5	1,1,2,2-Tetrachloroethane		41.7	ug/L	0.300	1.00
79-00-5	1,1,2-Trichloroethane		42.7	ug/L	0.300	1.00
75-34-3	1,1-Dichloroethane		42.5	ug/L	0.300	1.00
75-35-4	1,1-Dichloroethylene		38.5	ug/L	0.300	1.00
563-58-6	1,1-Dichloropropene		39.6	ug/L	0.300	1.00
87-61-6	1,2,3-Trichlorobenzene	B	40.0	ug/L	0.300	1.00
96-18-4	1,2,3-Trichloropropane		42.6	ug/L	0.300	1.00
120-82-1	1,2,4-Trichlorobenzene	B	38.2	ug/L	0.300	1.00
95-63-6	1,2,4-Trimethylbenzene		38.8	ug/L	0.300	1.00
96-12-8	1,2-Dibromo-3-chloropropane		41.9	ug/L	0.500	1.00
106-93-4	1,2-Dibromoethane		43.2	ug/L	0.300	1.00
95-50-1	1,2-Dichlorobenzene		40.2	ug/L	0.300	1.00
107-06-2	1,2-Dichloroethane		46.6	ug/L	0.300	1.00
78-87-5	1,2-Dichloropropane		43.3	ug/L	0.300	1.00
108-67-8	1,3,5-Trimethylbenzene		39.2	ug/L	0.300	1.00
541-73-1	1,3-Dichlorobenzene		39.2	ug/L	0.300	1.00
142-28-9	1,3-Dichloropropane		42.6	ug/L	0.300	1.00
106-46-7	1,4-Dichlorobenzene		39.1	ug/L	0.300	1.00
594-20-7	2,2-Dichloropropane		42.0	ug/L	0.300	1.00
78-93-3	2-Butanone		149	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		38.5	ug/L	0.300	1.00
591-78-6	2-Hexanone		195	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene		38.3	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene		38.1	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone		208	ug/L	1.50	5.00
67-64-1	Acetone		137	ug/L	1.50	10.0
75-05-8	Acetonitrile		1130	ug/L	8.00	25.0
107-02-8	Acrolein	U	1.50	ug/L	1.50	5.00
107-13-1	Acrylonitrile	U	1.50	ug/L	1.50	5.00
107-05-1	Allyl chloride	U	1.50	ug/L	1.50	5.00
71-43-2	Benzene		40.9	ug/L	0.300	1.00
108-86-1	Bromobenzene		40.4	ug/L	0.300	1.00
74-97-5	Bromochloromethane		42.4	ug/L	0.300	1.00
75-27-4	Bromodichloromethane		44.1	ug/L	0.300	1.00
75-25-2	Bromoform		45.8	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2680	Date Collected:	09/06/2017 10:56	Matrix:	W
Lab Sample ID:	1203874206	Date Received:	09/08/2017 09:20		
Client Sample:	QC for batch 1700295	Client:	ARSL004	Project:	QC
Client ID:	CAPA-17-142953PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1700295	Inst:	VOA6.I	Dilution:	1
Run Date:	09/13/2017 22:05	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	09/13/2017 22:05				
Data File:	091317V6\6Y322.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane		57.8	ug/L	0.300	1.00
75-15-0	Carbon disulfide		170	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride		42.0	ug/L	0.300	1.00
108-90-7	Chlorobenzene		40.6	ug/L	0.300	1.00
75-00-3	Chloroethane		53.2	ug/L	0.300	1.00
67-66-3	Chloroform		43.7	ug/L	0.300	1.00
74-87-3	Chloromethane		58.8	ug/L	0.300	1.00
124-48-1	Dibromochloromethane		44.7	ug/L	0.300	1.00
74-95-3	Dibromomethane		43.4	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane		60.9	ug/L	0.300	1.00
60-29-7	Ethyl ether		55.9	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate	U	1.50	ug/L	1.50	5.00
100-41-4	Ethylbenzene		40.0	ug/L	0.300	1.00
87-68-3	Hexachlorobutadiene	B	39.4	ug/L	0.300	1.00
74-88-4	Iodomethane		189	ug/L	1.50	5.00
78-83-1	Isobutyl alcohol	U	15.0	ug/L	15.0	50.0
98-82-8	Isopropylbenzene		38.3	ug/L	0.300	1.00
126-98-7	Methacrylonitrile	U	1.50	ug/L	1.50	5.00
80-62-6	Methyl methacrylate	U	1.50	ug/L	1.50	5.00
75-09-2	Methylene chloride		41.6	ug/L	1.00	10.0
91-20-3	Naphthalene		41.6	ug/L	0.300	1.00
107-12-0	Propionitrile	U	1.50	ug/L	1.50	5.00
100-42-5	Styrene		40.5	ug/L	0.300	1.00
127-18-4	Tetrachloroethylene		40.6	ug/L	0.300	1.00
108-88-3	Toluene		39.7	ug/L	0.300	1.00
79-01-6	Trichloroethylene		40.9	ug/L	0.300	1.00
75-69-4	Trichlorofluoromethane		54.7	ug/L	0.300	1.00
76-13-1	Trichlorotrifluoroethane	U	2.00	ug/L	2.00	5.00
108-05-4	Vinyl acetate		253	ug/L	1.50	5.00
75-01-4	Vinyl chloride		55.2	ug/L	0.300	1.00
156-59-2	cis-1,2-Dichloroethylene		43.1	ug/L	0.300	1.00
10061-01-5	cis-1,3-Dichloropropylene		42.5	ug/L	0.300	1.00
179601-23-1	m,p-Xylenes		80.1	ug/L	0.300	2.00
71-36-3	n-Butyl alcohol		4940	ug/L	15.0	50.0
104-51-8	n-Butylbenzene		36.8	ug/L	0.300	1.00
103-65-1	n-Propylbenzene		37.6	ug/L	0.300	1.00
95-47-6	o-Xylene		40.4	ug/L	0.300	1.00
135-98-8	sec-Butylbenzene		38.7	ug/L	0.300	1.00

**Volatile
Certificate of Analysis
Sample Summary**

SDG Number:	2017-2680	Date Collected:	09/06/2017 10:56	Matrix:	W
Lab Sample ID:	1203874206	Date Received:	09/08/2017 09:20		
Client Sample:	QC for batch 1700295	Client:	ARSL004	Project:	QC
Client ID:	CAPA-17-142953PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1700295	Inst:	VOA6.I	Dilution:	1
Run Date:	09/13/2017 22:05	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	09/13/2017 22:05				
Data File:	091317V6\6Y322.D	Column:	DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		43.5	ug/L	0.300	1.00
98-06-6	tert-Butylbenzene		38.9	ug/L	0.300	1.00
156-60-5	trans-1,2-Dichloroethylene		42.0	ug/L	0.300	1.00
10061-02-6	trans-1,3-Dichloropropylene		43.0	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	48.3	50.0	97	(70%-131%)
Toluene-d8	48.3	50.0	97	(74%-124%)

Volatile
Certificate of Analysis
Sample Summary

SDG Number: 2017-2680	Date Collected: 09/06/2017 10:56	Matrix: W
Lab Sample ID: 1203874207	Date Received: 09/08/2017 09:20	
Client Sample: QC for batch 1700295	Client: ARSL004	Project: QC
Client ID: CAPA-17-142953PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1700295	Inst: VOA6.I	Dilution: 1
Run Date: 09/13/2017 23:57	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 09/13/2017 23:57		
Data File: 091317V6\6Y326.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		39.7	ug/L	0.300	1.00
95-49-8	2-Chlorotoluene	U	0.300	ug/L	0.300	1.00
591-78-6	2-Hexanone	U	1.50	ug/L	1.50	5.00
106-43-4	4-Chlorotoluene	U	0.300	ug/L	0.300	1.00
99-87-6	4-Isopropyltoluene	U	0.300	ug/L	0.300	1.00
108-10-1	4-Methyl-2-pentanone	U	1.50	ug/L	1.50	5.00
67-64-1	Acetone	U	1.50	ug/L	1.50	10.0
75-05-8	Acetonitrile	U	8.00	ug/L	8.00	25.0
107-02-8	Acrolein		190	ug/L	1.50	5.00
107-13-1	Acrylonitrile		228	ug/L	1.50	5.00
107-05-1	Allyl chloride		218	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: 2017-2680	Date Collected: 09/06/2017 10:56	Matrix: W
Lab Sample ID: 1203874207	Date Received: 09/08/2017 09:20	
Client Sample: QC for batch 1700295	Client: ARSL004	Project: QC
Client ID: CAPA-17-142953PSD	Method: SW-846:8260B	SOP Ref: GL-OA-E-038
Batch ID: 1700295	Inst: VOA6.I	Dilution: 1
Run Date: 09/13/2017 23:57	Analyst: JP1	Purge Vol: 5 mL
Prep Date: 09/13/2017 23:57		
Data File: 091317V6\6Y326.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		213	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		2410	ug/L	15.0	50.0
98-82-8	Isopropylbenzene	U	0.300	ug/L	0.300	1.00
126-98-7	Methacrylonitrile		235	ug/L	1.50	5.00
80-62-6	Methyl methacrylate		226	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		223	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		230	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:	2017-2680	Date Collected:	09/06/2017 10:56	Matrix:	W
Lab Sample ID:	1203874207	Date Received:	09/08/2017 09:20		
Client Sample:	QC for batch 1700295	Client:	ARSL004	Project:	QC
Client ID:	CAPA-17-142953PSD	Method:	SW-846:8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1700295	Inst:	VOA6.I	Dilution:	1
Run Date:	09/13/2017 23:57	Analyst:	JP1	Purge Vol:	5 mL
Prep Date:	09/13/2017 23:57				
Data File:	091317V6\6Y326.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	53.5	50.0	107	(71%-134%)
Bromofluorobenzene	49.4	50.0	99	(70%-131%)
Toluene-d8	47.5	50.0	95	(74%-124%)

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2680
Work Order #: 432189**

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:	1699246
Prep Batch Number:	1699245

Sample Analysis

Sample ID	Client ID
432189001	432189001 (CAWA-17-142859)
1203871486	Interference Check Sample (ICS)
1203871482	Method Blank (MB)
1203871483	Laboratory Control Sample (LCS)
1203871484	432185001(CAWA-17-142857) Matrix Spike (MS)
1203871485	432185001(CAWA-17-142857) 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.

Interference Check Sample (ICS)

The ICS spike recoveries met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Client sample 432185001 (CAWA-17-142857) 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: 2017-2680 GEL Work Order: 432189

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 13 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: 1699245Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-142859Date Received: 06-SEP-17GEL Job No (SDG): 2017-2680GEL Sample ID: 432189001Date Filtered: 07-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	0.0904	ug/L	J	1	08-SEP-17 18:37	per0908019a
	Perchlorate Isotope Ratio			3.01			1	08-SEP-17 18:37	per0908019a
14797-73-0	Perchlorate-101	.05	.2	0.090	ug/L	J	1	08-SEP-17 18:37	per0908019a
	Perchlorate-O(18)			0.445	ug/L		1	08-SEP-17 18:37	per0908019a

^ 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): 2017-2680

Extract Batch Code: 1699245

Date Filtered: 07-SEP-17

Matrix: WATER

Sample ID: 1203871483

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.204	ug/L	102		85 - 115
Perchlorate Isotope Ratio		2.81				-
Perchlorate-101	0.200	.218	ug/L	109		85 - 115
Perchlorate-O(18)		.462	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): 2017-2680

Extract Batch Code: 1699245

Date Extracted: 07-SEP-17

GEL MS/PS ID: 1203871484

Client ID: CAWA-17-142857

GEL MSD/PSD ID: 1203871485

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	0.485	ug/L	0.656	85	.682	98	4	30	75 - 125
Perchlorate Isotope Ratio	0	3.05		2.92		2.96		1		-
Perchlorate-101	0.200	0.476	ug/L	0.674	99	.691	108	3	30	75 - 125
Perchlorate-O(18)	0	0.465	ug/L	0.471		.454		4		-

^ 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: 1699245Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 07-SEP-17GEL Job No (SDG): 2017-2680GEL Sample ID: 1203871482Date Filtered: 07-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	08-SEP-17 17:26	per0908013a
	Perchlorate Isotope Ratio						1	08-SEP-17 17:26	per0908013a
14797-73-0	Perchlorate-101	.05	.2	0.050	ug/L	U	1	08-SEP-17 17:26	per0908013a
	Perchlorate-O(18)			0.471	ug/L		1	08-SEP-17 17:26	per0908013a

^ 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: 1699245Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 07-SEP-17GEL Job No (SDG): 2017-2680GEL Sample ID: 1203871483Date Filtered: 07-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	0.204	ug/L		1	08-SEP-17 17:38	per0908014a
	Perchlorate Isotope Ratio			2.81			1	08-SEP-17 17:38	per0908014a
14797-73-0	Perchlorate-101	.05	.2	0.218	ug/L		1	08-SEP-17 17:38	per0908014a
	Perchlorate-O(18)			0.462	ug/L		1	08-SEP-17 17:38	per0908014a

^ 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: 1699245Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-2680GEL Sample ID: 1203871486Date Filtered: 07-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	0.231	ug/L		1	08-SEP-17 17:50	per0908015a
	Perchlorate Isotope Ratio			2.74			1	08-SEP-17 17:50	per0908015a
14797-73-0	Perchlorate-101	.05	.2	0.253	ug/L		1	08-SEP-17 17:50	per0908015a
	Perchlorate-O(18)			0.469	ug/L		1	08-SEP-17 17:50	per0908015a

^ 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: 1699245Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-142857MSDate Received: 06-SEP-17GEL Job No (SDG): 2017-2680GEL Sample ID: 1203871484Date Filtered: 07-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	0.656	ug/L		1	08-SEP-17 18:14	per0908017a
	Perchlorate Isotope Ratio			2.92			1	08-SEP-17 18:14	per0908017a
14797-73-0	Perchlorate-101	.05	.2	0.674	ug/L		1	08-SEP-17 18:14	per0908017a
	Perchlorate-O(18)			0.471	ug/L		1	08-SEP-17 18:14	per0908017a

^ 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: 1699245Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-142857MSDDate Received: 06-SEP-17GEL Job No (SDG): 2017-2680GEL Sample ID: 1203871485Date Filtered: 07-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	0.682	ug/L		1	08-SEP-17 18:26	per0908018a
	Perchlorate Isotope Ratio			2.96			1	08-SEP-17 18:26	per0908018a
14797-73-0	Perchlorate-101	.05	.2	0.691	ug/L		1	08-SEP-17 18:26	per0908018a
	Perchlorate-O(18)			0.454	ug/L		1	08-SEP-17 18:26	per0908018a

^ 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 #: 2017-2680
Work Order #: 432189**

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: 1699047

Prep Batch Number: 1699046

Sample Analysis

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

Sample ID	Client ID
432189002	CAWA-17-142894
1203870911	Method Blank (MB)
1203870912	Laboratory Control Sample (LCS)
1203870913	432185002(CAWA-17-142892) Matrix Spike (MS)
1203870914	432185002(CAWA-17-142892) 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 432185002 (CAWA-17-142892) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

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

MS/MSD Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

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

Sample Re-extraction/Re-analysis

Samples in the analytical batch were re-analyzed for biased low CCV recoveries in the original analysis. The re-analysis data are reported.

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: 2017-2680 GEL Work Order: 432189

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: 21 SEP 2017

Title: Group Leader

Sample Data Summary

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-142894

Lab Code: GEL

GEL Job No (SDG) 2017-2680

Matrix: WATER

GEL Sample ID: 432189002

Sample Amount 920 mL

Date Received: 06-SEP-17

Moisture: .

Extraction Batch ID: 1699046

Extraction Type Sol Exchange

Date Extracted: 07-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0907077.wiff

Date Analyzed: 09-SEP-17 06:41

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.087	U	0.087	0.272
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.087	U	0.087	0.272
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.087	U	0.087	0.272
<i>121-82-4</i>	<i>RDX</i>				
13980-04-6	TNX	.087	U	0.087	0.272
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.087	U	0.087	0.272
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.087	U	0.087	0.272
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.087	U	0.087	0.272
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.087	U	0.087	0.543
<i>479-45-8</i>	<i>Tetryl</i>				
5755-27-1	MNX	.087	U	0.087	0.272
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.087	U	0.087	0.272
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.087	U	0.087	0.272
<i>80251-29-2</i>	<i>DNX</i>				
98-95-3	Nitrobenzene	.087	U	0.087	0.272
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.087	U	0.087	0.272
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-142894

Lab Code: GEL

GEL Job No (SDG) 2017-2680

Matrix: WATER

GEL Sample ID: 432189002

Sample Amount 920 mL

Date Received: 06-SEP-17

Moisture: .

Extraction Batch ID: 1699046

Extraction Type Sol Exchange

Date Extracted: 07-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	.087	U	0.087	0.272
99-35-4	1,3,5-Trinitrobenzene				
99-65-0	m-Dinitrobenzene	.087	U	0.087	0.272
99-65-0	m-Dinitrobenzene				
88-72-2	o-Nitrotoluene	.0891	U	0.0891	0.272
88-72-2	o-Nitrotoluene				
78-11-5	PETN	.109	U	0.109	0.543
78-11-5	PETN				
99-99-0	p-Nitrotoluene	.163	U	0.163	0.543
99-99-0	p-Nitrotoluene				
3058-38-6	TATB	.326	U	0.326	1.09
3058-38-6	TATB				
618-87-1	3,5-Dinitroaniline	.326	U	0.326	1.09
618-87-1	3,5-Dinitroaniline				
78-30-8	tris(o-cresyl) phosphate	.326	U	0.326	1.09
78-30-8	tris(o-cresyl) phosphate				
59229-75-3	2,6-Diamino-4-nitrotoluene	.543	U	0.543	2.72
59229-75-3	2,6-Diamino-4-nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	.543	U	0.543	2.72
6629-29-4	2,4-Diamino-6-nitrotoluene				

Quality Control Summary

High Explosives Surrogate Recovery Summary**Lab Name:** GEL Laboratories LLC**GEL Job No (SDG):** 2017-2680**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
432189002	CAWA-17-142894	97	55 - 115	
1203870911	MB for batch 1699046	87	55 - 115	
1203870912	LCS for batch 1699046	86	55 - 115	
1203870913	CAWA-17-142892MS	86	55 - 115	
1203870914	CAWA-17-142892MSD	84	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) 2017-2680

Extract Batch Code: 1699046

Date Extracted: 07-SEP-17

GEL LCS ID: 1203870912

GEL LCSDUP ID: .

Analysis Date/Time: 09-SEP-17 06:05

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
RDX	5	4.14	83					64 - 117
TATB	1.25	1.23	98					47 - 135
TNX	.5	.436	87					51 - 110
Tetryl	5	4.37	87					55 - 122
m-Dinitrobenzene	5	4.58	92					74 - 117
m-Nitrotoluene	5	3.82	76					66 - 114
o-Nitrotoluene	5	3.5	70					64 - 115
p-Nitrotoluene	5	4.24	85					66 - 127
tris(o-cresyl) phosphate	5	3.02	60					43 - 104
1,3,5-Trinitrobenzene	5	4.06	81					70 - 110
2,4,6-Trinitrotoluene	5	4.18	84					69 - 113
2,4-Diamino-6-nitrotoluene	5	3.16	63					50 - 121
2,4-Dinitrotoluene	5	4.13	83					71 - 110
2,6-Diamino-4-nitrotoluene	5	4.22	84					53 - 127
2,6-Dinitrotoluene	5	4.14	83					72 - 105
2-Amino-4,6-dinitrotoluene	5	4.55	91					70 - 112
3,5-Dinitroaniline	5	4.63	93					70 - 121
4-Amino-2,6-dinitrotoluene	5	4.27	85					74 - 116
DNX	.5	.456	91					65 - 113
HMX	5	4.18	84					58 - 113
MNX	.5	.49	98					66 - 114
Nitrobenzene	5	3.65	73					64 - 115
PETN	5	5	100					57 - 126

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-17-142892

Lab Code: GEL

GEL Job No (SDG) 2017-2680

Extract Batch Code: 1699046

Date Extracted: 07-SEP-17

GEL Spike ID: 1203870913

GEL SpikeDup ID: 1203870914

Analysis Date/Time: 09-SEP-17 09:38

MSD Analysis Date/Time: 09-SEP-17 10:13

Reporting Units: ug/L

QC Type: MS/MSD

Compound	Spike Added	Sample Conc	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Rec Limits
2,4,6-Trinitrotoluene	5.31915	0	4.48	84	4.42	81	1	30	66 - 112
2,4-Diamino-6-nitrotoluene	5.31915	0	3.99	75	3.85	71	3	30	50 - 121
2,4-Dinitrotoluene	5.31915	0	4.49	84	4.63	85	3	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.31915	0	4.62	87	4.43	81	4	30	53 - 127
2,6-Dinitrotoluene	5.31915	0	4.23	80	4.39	81	4	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.31915	.0758	4.6	85	4.63	84	1	30	67 - 115
3,5-Dinitroaniline	5.31915	.152	5.24	96	5.41	97	3	30	70 - 121
4-Amino-2,6-dinitrotoluene	5.31915	.169	4.68	85	4.82	86	3	30	65 - 120
DNX	.53191	0	.525	99	.595	109	12	30	53 - 124
HMX	5.31915	.908	5.42	85	5.87	91	8	30	44 - 128
MNX	.53191	.104	.608	95	.613	94	1	30	60 - 121
Nitrobenzene	5.31915	0	3.28	62	3.83	70	15	30	62 - 116
PETN	5.31915	0	5.55	104	5.5	101	1	30	51 - 131
RDX	5.31915	12	16	62	16.2	65	1	30	57 - 125
TATB	1.32979	0	1.53	115	2.01	148	27	30	38 - 149
TNX	.53191	.147	.624	90	.596	83	5	30	46 - 120
Tetryl	5.31915	0	4.91	92	4.9	90	0	30	50 - 126
m-Dinitrobenzene	5.31915	0	4.8	90	4.91	90	2	30	74 - 117
m-Nitrotoluene	5.31915	0	3.93	74	3.99	73	2	30	59 - 120
o-Nitrotoluene	5.31915	0	3.43	64	3.87	71	12	30	56 - 119
p-Nitrotoluene	5.31915	0	3.98	75	4.31	79	8	30	61 - 129
tris(o-cresyl) phosphate	5.31915	0	3.43	64	3.55	65	4	30	38 - 105
1,3,5-Trinitrobenzene	5.31915	.155	4.68	85	4.52	80	4	30	67 - 111

#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 1699046

Lab Code: GEL

GEL Job No (SDG) 2017-2680

Matrix: WATER

GEL Sample ID: 1203870911

Sample Amount 1000 mL

Date Received: 06-SEP-17

Moisture: .

Extraction Batch ID: 1699046

Extraction Type Sol Exchange

Date Extracted: 07-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0907075.wiff

Date Analyzed: 09-SEP-17 05:30

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.08	U	0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.08	U	0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.08	U	0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
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 1699046

Lab Code: GEL

GEL Job No (SDG) 2017-2680

Matrix: WATER

GEL Sample ID: 1203870911

Sample Amount 1000 mL

Date Received: 06-SEP-17

Moisture: .

Extraction Batch ID: 1699046

Extraction Type Sol Exchange

Date Extracted: 07-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 1699046

Lab Code: GEL

GEL Job No (SDG) 2017-2680

Matrix: WATER

GEL Sample ID: 1203870912

Sample Amount 1000 mL

Date Received: 06-SEP-17

Moisture: .

Extraction Batch ID: 1699046

Extraction Type Sol Exchange

Date Extracted: 07-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0907076.wiff

Date Analyzed: 09-SEP-17 06:05

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
13980-04-6	TNX	.436		0.080	0.250
<i>13980-04-6</i>	<i>TNX</i>				
80251-29-2	DNX	.456		0.080	0.250
<i>80251-29-2</i>	<i>DNX</i>				
5755-27-1	MXN	.49		0.080	0.250
<i>5755-27-1</i>	<i>MXN</i>				
3058-38-6	TATB	1.23		0.300	1.00
<i>3058-38-6</i>	<i>TATB</i>				
78-30-8	tris(o-cresyl) phosphate	3.02		0.300	1.00
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	3.16		0.500	2.50
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
88-72-2	o-Nitrotoluene	3.5		0.082	0.250
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
98-95-3	Nitrobenzene	3.65		0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	3.82		0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	4.06		0.080	0.250
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
121-14-2	2,4-Dinitrotoluene	4.13		0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	4.14		0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
606-20-2	2,6-Dinitrotoluene	4.14		0.080	0.250
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1699046

Lab Code: GEL

GEL Job No (SDG) 2017-2680

Matrix: WATER

GEL Sample ID: 1203870912

Sample Amount 1000 mL

Date Received: 06-SEP-17

Moisture: .

Extraction Batch ID: 1699046

Extraction Type Sol Exchange

Date Extracted: 07-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	4.18		0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
2691-41-0	HMX	4.18		0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.22		0.500	2.50
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
99-99-0	p-Nitrotoluene	4.24		0.150	0.500
<i>99-99-0</i>	<i>p-Nitrotoluene</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>				
479-45-8	Tetryl	4.37		0.080	0.500
<i>479-45-8</i>	<i>Tetryl</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.55		0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
99-65-0	m-Dinitrobenzene	4.58		0.080	0.250
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
618-87-1	3,5-Dinitroaniline	4.63		0.300	1.00
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-11-5	PETN	5		0.100	0.500
<i>78-11-5</i>	<i>PETN</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-142892(432185002MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-2680

Matrix: WATER

GEL Sample ID: 1203870913

Sample Amount 940 mL

Date Received: 06-SEP-17

Moisture: .

Extraction Batch ID: 1699046

Extraction Type Sol Exchange

Date Extracted: 07-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0907082.wiff

Date Analyzed: 09-SEP-17 09:38

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
80251-29-2	DNX	.525		0.0851	0.266
80251-29-2	DNX				
5755-27-1	MNX	.608		0.0851	0.266
5755-27-1	MNX				
13980-04-6	TNX	.624		0.0851	0.266
13980-04-6	TNX				
3058-38-6	TATB	1.53		0.319	1.06
3058-38-6	TATB				
98-95-3	Nitrobenzene	3.28		0.0851	0.266
98-95-3	Nitrobenzene				
78-30-8	tris(o-cresyl) phosphate	3.43		0.319	1.06
78-30-8	tris(o-cresyl) phosphate				
88-72-2	o-Nitrotoluene	3.43		0.0872	0.266
88-72-2	o-Nitrotoluene				
99-08-1	m-Nitrotoluene	3.93		0.0851	0.266
99-08-1	m-Nitrotoluene				
99-99-0	p-Nitrotoluene	3.98		0.160	0.532
99-99-0	p-Nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	3.99		0.532	2.66
6629-29-4	2,4-Diamino-6-nitrotoluene				
606-20-2	2,6-Dinitrotoluene	4.23		0.0851	0.266
606-20-2	2,6-Dinitrotoluene				
118-96-7	2,4,6-Trinitrotoluene	4.48		0.0851	0.266
118-96-7	2,4,6-Trinitrotoluene				
121-14-2	2,4-Dinitrotoluene	4.49		0.0851	0.266
121-14-2	2,4-Dinitrotoluene				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-142892(432185002MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-2680

Matrix: WATER

GEL Sample ID: 1203870913

Sample Amount 940 mL

Date Received: 06-SEP-17

Moisture: .

Extraction Batch ID: 1699046

Extraction Type Sol Exchange

Date Extracted: 07-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
35572-78-2	2-Amino-4,6-dinitrotoluene	4.6		0.0851	0.266
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.62		0.532	2.66
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.68		0.0851	0.266
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	4.68		0.0851	0.266
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	4.8		0.0851	0.266
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
479-45-8	Tetryl	4.91		0.0851	0.532
<i>479-45-8</i>	<i>Tetryl</i>				
618-87-1	3,5-Dinitroaniline	5.24		0.319	1.06
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
2691-41-0	HMX	5.42		0.0851	0.266
<i>2691-41-0</i>	<i>HMX</i>				
78-11-5	PETN	5.55		0.106	0.532
<i>78-11-5</i>	<i>PETN</i>				
121-82-4	RDX	16		0.0851	0.266
<i>121-82-4</i>	<i>RDX</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-142892(432185002MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-2680

Matrix: WATER

GEL Sample ID: 1203870914

Sample Amount 920 mL

Date Received: 06-SEP-17

Moisture: .

Extraction Batch ID: 1699046

Extraction Type Sol Exchange

Date Extracted: 07-SEP-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0907083.wiff

Date Analyzed: 09-SEP-17 10:13

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
80251-29-2	DNX	.595		0.087	0.272
80251-29-2	DNX				
13980-04-6	TNX	.596		0.087	0.272
13980-04-6	TNX				
5755-27-1	MNX	.613		0.087	0.272
5755-27-1	MNX				
3058-38-6	TATB	2.01		0.326	1.09
3058-38-6	TATB				
78-30-8	tris(o-cresyl) phosphate	3.55		0.326	1.09
78-30-8	tris(o-cresyl) phosphate				
98-95-3	Nitrobenzene	3.83		0.087	0.272
98-95-3	Nitrobenzene				
6629-29-4	2,4-Diamino-6-nitrotoluene	3.85		0.543	2.72
6629-29-4	2,4-Diamino-6-nitrotoluene				
88-72-2	o-Nitrotoluene	3.87		0.0891	0.272
88-72-2	o-Nitrotoluene				
99-08-1	m-Nitrotoluene	3.99		0.087	0.272
99-08-1	m-Nitrotoluene				
99-99-0	p-Nitrotoluene	4.31		0.163	0.543
99-99-0	p-Nitrotoluene				
606-20-2	2,6-Dinitrotoluene	4.39		0.087	0.272
606-20-2	2,6-Dinitrotoluene				
118-96-7	2,4,6-Trinitrotoluene	4.42		0.087	0.272
118-96-7	2,4,6-Trinitrotoluene				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.43		0.543	2.72
59229-75-3	2,6-Diamino-4-nitrotoluene				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-142892(432185002MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-2680

Matrix: WATER

GEL Sample ID: 1203870914

Sample Amount 920 mL

Date Received: 06-SEP-17

Moisture: .

Extraction Batch ID: 1699046

Extraction Type Sol Exchange

Date Extracted: 07-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	4.52		0.087	0.272
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
121-14-2	2,4-Dinitrotoluene	4.63		0.087	0.272
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.63		0.087	0.272
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.82		0.087	0.272
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
479-45-8	Tetryl	4.9		0.087	0.543
<i>479-45-8</i>	<i>Tetryl</i>				
99-65-0	m-Dinitrobenzene	4.91		0.087	0.272
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
618-87-1	3,5-Dinitroaniline	5.41		0.326	1.09
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-11-5	PETN	5.5		0.109	0.543
<i>78-11-5</i>	<i>PETN</i>				
2691-41-0	HMX	5.87		0.087	0.272
<i>2691-41-0</i>	<i>HMX</i>				
121-82-4	RDX	16.2		0.087	0.272
<i>121-82-4</i>	<i>RDX</i>				

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-2680Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 07-SEP-17 09:45GEL Data File: EXP0907001.wiffInstrument ID: LCMSMS5Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	376.91
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): 2017-2680Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 07-SEP-17 10:20GEL Data File: EXP0907002.wiffInstrument ID: LCMSMS5Column: 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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK02

Analysis Date: 07-SEP-17 15:04

GEL Data File: EXP0907010.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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK03

Analysis Date: 07-SEP-17 17:26

GEL Data File: EXP0907014.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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK04

Analysis Date: 07-SEP-17 22:09

GEL Data File: EXP0907022.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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK05

Analysis Date: 07-SEP-17 23:20

GEL Data File: EXP0907024.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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK06

Analysis Date: 08-SEP-17 07:02

GEL Data File: EXP0907037.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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK07

Analysis Date: 08-SEP-17 12:56

GEL Data File: EXP0907047.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
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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK08

Analysis Date: 08-SEP-17 14:07

GEL Data File: EXP0907049.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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK09

Analysis Date: 08-SEP-17 15:54

GEL Data File: EXP0907052.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	5.61
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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK10

Analysis Date: 08-SEP-17 17:40

GEL Data File: EXP0907055.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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK11

Analysis Date: 08-SEP-17 18:16

GEL Data File: EXP0907056.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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK12

Analysis Date: 08-SEP-17 19:27

GEL Data File: EXP0907058.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK13

Analysis Date: 08-SEP-17 20:38

GEL Data File: EXP0907060.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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK14

Analysis Date: 08-SEP-17 22:59

GEL Data File: EXP0907064.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK15

Analysis Date: 09-SEP-17 03:08

GEL Data File: EXP0907071.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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK16

Analysis Date: 09-SEP-17 04:19

GEL Data File: EXP0907073.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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK17

Analysis Date: 09-SEP-17 10:49

GEL Data File: EXP0907084.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): 2017-2680

Lab Code: GEL

Lab Sample ID: XIBLK18

Analysis Date: 09-SEP-17 12:00

GEL Data File: EXP0907086.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

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2680
Work Order #: 432189

Sample ID	Client ID
432189001	CAWA-17-142859
432189002	CAWA-17-142894
1203870221	Method Blank (MB) ICP
1203870222	Laboratory Control Sample (LCS)
1203870225	432185001(CAWA-17-142857L) Serial Dilution (SD)
1203870223	432185001(CAWA-17-142857D) Sample Duplicate (DUP)
1203870224	432185001(CAWA-17-142857S) Matrix Spike (MS)
1203870188	Method Blank (MB) ICP-MS
1203887589	Method Blank (MB) ICP-MS
1203870189	Laboratory Control Sample (LCS)
1203887590	Laboratory Control Sample (LCS)
1203870192	432185001(CAWA-17-142857L) Serial Dilution (SD)
1203887593	432185001(CAWA-17-142857L) Serial Dilution (SD)
1203870190	432185001(CAWA-17-142857D) Sample Duplicate (DUP)
1203887591	432185001(CAWA-17-142857D) Sample Duplicate (DUP)
1203870191	432185001(CAWA-17-142857S) Matrix Spike (MS)
1203887592	432185001(CAWA-17-142857S) Matrix Spike (MS)
1203877126	Method Blank (MB) CVAA
1203877127	Laboratory Control Sample (LCS)
1203877132	432105001(CAWA-17-142854L) Serial Dilution (SD)
1203877128	432105001(CAWA-17-142854D) Sample Duplicate (DUP)
1203877130	432105001(CAWA-17-142854S) Matrix Spike (MS)

Sample Analysis

Samples 432189001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1698754, 1698740, 1705902, 1701447 and 1705336
Prep Batch :	1698752, 1698739, 1705901 and 1701439
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 P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

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

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

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

The 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. 432189001 (CAWA-17-142859)-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: 432185001 (CAWA-17-142857)-ICP, ICP-MS and ICP-MS and 432105001 (CAWA-17-142854)-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

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 25x the IDL/MDL for CVAA, 50X the IDL/MDL for ICP and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified.

Analyte	Sample	Value
Potassium	1203870225 (CAWA-17-142857SDILT)	10.4 *(0%-10%)
Sodium	1203870225 (CAWA-17-142857SDILT)	15.7 *(0%-10%)

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: 2017-2680 GEL Work Order: 432189

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- E %difference of sample and SD is >10%. Sample concentration must meet flagging 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: 03 OCT 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2680**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 432189001**BASIS:** As Received**DATE COLLECTED** 01-SEP-17**CLIENT ID:** CAWA-17-142859**LEVEL:** Low**DATE RECEIVED** 06-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	09/19/17 10:55	091917W1-7	1701447

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2680

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 432189001

BASIS: As Received

DATE COLLECTED 01-SEP-17

CLIENT ID: CAWA-17-142859

LEVEL: Low

DATE RECEIVED 06-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	255	ug/L		68	200	200	1	P	HSC	09/21/17 13:29	092117-1	1698754
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	09/29/17 22:34	170929-2	1698740
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	BAJ	10/03/17 15:17	171003-5	1705902
7440-39-3	Barium	1850	ug/L		1	5	5	1	P	HSC	09/21/17 13:29	092117-1	1698754
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	HSC	09/21/17 13:29	092117-1	1698754
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	09/21/17 13:29	092117-1	1698754
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/02/17 15:38	171002-3	1698740
7440-70-2	Calcium	15700	ug/L		50	200	200	1	P	HSC	09/21/17 13:29	092117-1	1698754
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	10/02/17 15:38	171002-3	1698740
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	09/21/17 13:29	092117-1	1698754
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	09/21/17 13:29	092117-1	1698754
7439-89-6	Iron	125	ug/L		30	100	100	1	P	HSC	09/21/17 13:29	092117-1	1698754
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	10/02/17 15:38	171002-3	1698740
7439-95-4	Magnesium	4390	ug/L		110	300	300	1	P	HSC	09/21/17 13:29	092117-1	1698754
7439-96-5	Manganese	18.6	ug/L		2	10	10	1	P	HSC	09/21/17 13:29	092117-1	1698754
7439-98-7	Molybdenum	0.958	ug/L		0.2	0.5	0.5	1	MS	BAJ	10/02/17 18:08	171002-4	1698740
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/03/17 15:46	171003-6	1705902
7440-09-7	Potassium	2920	ug/L		50	150	150	1	P	HSC	09/21/17 13:29	092117-1	1698754
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	10/02/17 15:38	171002-3	1698740
7631-86-9	Silica	38200	ug/L		53	213	213	1	P	HSC	09/21/17 13:29	092117-1	1698754
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	10/02/17 18:08	171002-4	1698740
7440-23-5	Sodium	13300	ug/L		100	300	300	1	P	HSC	09/21/17 13:29	092117-1	1698754
7440-24-6	Strontium	114	ug/L		1	5	5	1	P	HSC	09/21/17 13:29	092117-1	1698754
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	10/02/17 15:38	171002-3	1698740
7440-31-5	Tin	2.6	ug/L	J	2.5	10	10	1	P	HSC	09/21/17 13:29	092117-1	1698754
7440-61-1	Uranium	0.067	ug/L	U	0.067	0.2	0.2	1	MS	BAJ	10/02/17 15:38	171002-3	1698740
7440-62-2	Vanadium	1.54	ug/L	J	1	5	5	1	P	HSC	09/21/17 13:29	092117-1	1698754
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	09/21/17 13:29	092117-1	1698754

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2680**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 432189001**BASIS:** As Received**DATE COLLECTED** 01-SEP-17**CLIENT ID:** CAWA-17-142859**LEVEL:** Low**DATE RECEIVED** 06-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	57.4	mg/L		0.453	1.24	1.24	1		TXT1	09/29/17 13:57		1705336

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1698740	1698739	SW846 3005A	50	mL	50	mL	09/06/17	JXM8
1698754	1698752	SW846 3005A	50	mL	50	mL	09/06/17	JXM8
1701447	1701439	EPA 245.1/245.2 Prep	20	mL	20	mL	09/18/17	AXS5
1705902	1705901	SW846 3005A	25	mL	25	mL	10/03/17	SXW1

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2680**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 432189002**BASIS:** As Received**DATE COLLECTED** 01-SEP-17**CLIENT ID:** CAWA-17-142894**LEVEL:** Low**DATE RECEIVED** 06-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	09/19/17 10:57	091917W1-7	1701447

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1701447	1701439	EPA 245.1/245.2 Prep	20	mL	20	mL	09/18/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
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PREPARATION BLANK SUMMARY

SDG NO. 2017-2680

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>
1203870188	Antimony	1	ug/L	+/-3	U	MS	1	3
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203870221	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
	Aluminum	68	ug/L	+/-200	U	P	68	200
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Calcium	50	ug/L	+/-200	U	P	50	200
	Copper	3	ug/L	+/-10	U	P	3	10
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Sodium	-199	ug/L	+/-300	J	P	100	300
	Silica	53	ug/L	+/-213	U	P	53	213
	Potassium	50	ug/L	+/-150	U	P	50	150
	Manganese	2	ug/L	+/-10	U	P	2	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Barium	1	ug/L	+/-5	U	P	1	5
1203877126	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2
1203887589	Arsenic	2	ug/L	+/-5	U	MS	2	5
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2

*Analytical Methods:

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

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-2680 **Client ID:** CAWA-17-142857S

Contract: ESHL00114 **Level:** Low

Matrix: WATER **% Solids:**

Sample ID: 432185001 **Spike ID:** 1203870191

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Antimony	ug/L	75-125	48.4		1	U	50	96.4		MS
Cadmium	ug/L	75-125	57.4		0.3	U	50	115		MS
Chromium	ug/L	75-125	60.7		3	U	50	119		MS
Lead	ug/L	75-125	56.5		0.5	U	50	113		MS
Molybdenum	ug/L	75-125	60.8		0.903		50	120		MS
Selenium	ug/L	75-125	61.1		2	U	50	121		MS
Silver	ug/L	75-125	59		0.3	U	50	118		MS
Thallium	ug/L	75-125	55.9		0.6	U	50	112		MS
Uranium	ug/L	75-125	58.3		0.288		50	116		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-2680 Client ID: CAWA-17-142857S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 432185001 Spike ID: 1203870224

<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>
Sodium	ug/L	75-125	17200		13000		5000	83.9		P
Strontium	ug/L	75-125	571		101		500	93.9		P
Tin	ug/L	75-125	475		2.73	J	500	94.4		P
Vanadium	ug/L	75-125	481		2.4	J	500	95.6		P
Zinc	ug/L	75-125	452		3.3	U	500	90.1		P
Aluminum	ug/L	75-125	5040		194	J	5000	97		P
Barium	ug/L	75-125	713		236		500	95.5		P
Beryllium	ug/L	75-125	472		1	U	500	94.5		P
Boron	ug/L	75-125	508		15	U	500	99.2		P
Calcium	ug/L	75-125	20200		15100		5000	103		P
Cobalt	ug/L	75-125	476		1	U	500	95.1		P
Copper	ug/L	75-125	486		3	U	500	97.1		P
Iron	ug/L	75-125	4980		76.5	J	5000	98		P
Magnesium	ug/L	75-125	9530		4560		5000	99.4		P
Manganese	ug/L	75-125	470		2	U	500	94		P
Potassium	ug/L	75-125	7350		2630		5000	94.5		P
Silica	ug/L	75-125	48500		37700		10700	101		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Matrix Spike Summary

SDG NO. 2017-2680 **Client ID:** CAWA-17-142854S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 432105001 **Spike ID:** 1203877130

<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	2.12		0.067	U	2	106		AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-2680 **Client ID:** CAWA-17-142857S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 432185001 **Spike ID:** 1203887592

<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>
Arsenic	ug/L	75-125	51.6		2	U	50	101		MS
Nickel	ug/L	75-125	48.7		0.732	J	50	95.9		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
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Duplicate Sample Summary

SDG No.: 2017-2680

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-142857D

Matrix: WATER

Level: Low

Sample ID: 432185001

Duplicate ID: 1203870190

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
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	0.903		0.977		7.87		MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.3 U		0.3 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L	+/- .2	0.288		0.312		8		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-2680

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-142857D

Matrix: WATER

Level: Low

Sample ID: 432185001

Duplicate ID: 1203870223

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L	+/-200	194 J		184 J		5.56		P
Barium	ug/L	+/-20%	236		240		1.88		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	15100		15300		1.33		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L	+/-100	76.5 J		77.1 J		.825		P
Magnesium	ug/L	+/-20%	4560		4620		1.35		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	2630		2670		1.7		P
Silica	ug/L	+/-20%	37700		38400		1.87		P
Sodium	ug/L	+/-20%	13000		12400		4.51		P
Strontium	ug/L	+/-20%	101		99.6		1.46		P
Tin	ug/L		2.73 J		2.5 U		200		P
Vanadium	ug/L	+/-5	2.4 J		2.28 J		4.92		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
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Duplicate Sample Summary

SDG No.: 2017–2680**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAWA–17–142854D**Matrix:** WATER**Level:** Low**Sample ID:** 432105001**Duplicate ID:** 1203877128**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
–6–
Duplicate Sample Summary

SDG No.: 2017–2680**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAWA–17–142857D**Matrix:** WATER**Level:** Low**Sample ID:** 432185001**Duplicate ID:** 1203887591**Percent Solids for Dup:** N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Arsenic	ug/L		2 U		2 U				MS
Nickel	ug/L	+/-2	0.732 J		0.793 J		8		MS

***Analytical Methods:**

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-2680

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>
1203870189								
	Antimony	ug/L	50	49.3		98.6	80-120	MS
	Cadmium	ug/L	50	58.5		117	80-120	MS
	Chromium	ug/L	50	57.2		114	80-120	MS
	Lead	ug/L	50	57.9		116	80-120	MS
	Molybdenum	ug/L	50	58		116	80-120	MS
	Selenium	ug/L	50	59.4		119	80-120	MS
	Silver	ug/L	50	57.8		116	80-120	MS
	Thallium	ug/L	50	55.8		112	80-120	MS
	Uranium	ug/L	50	57.7		115	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-2680

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>
1203870222								
	Aluminum	ug/L	5000	4890		97.8	80-120	P
	Barium	ug/L	500	481		96.2	80-120	P
	Beryllium	ug/L	500	472		94.4	80-120	P
	Boron	ug/L	500	491		98.3	80-120	P
	Calcium	ug/L	5000	4950		98.9	80-120	P
	Cobalt	ug/L	500	494		98.7	80-120	P
	Copper	ug/L	500	486		97.1	80-120	P
	Iron	ug/L	5000	5150		103	80-120	P
	Magnesium	ug/L	5000	5150		103	80-120	P
	Manganese	ug/L	500	484		96.7	80-120	P
	Potassium	ug/L	5000	4650		93	80-120	P
	Silica	ug/L	10700	9920		92.6	80-120	P
	Sodium	ug/L	5000	4950		99.1	80-120	P
	Strontium	ug/L	500	501		100	80-120	P
	Tin	ug/L	500	473		94.7	80-120	P
	Vanadium	ug/L	500	481		96.2	80-120	P
	Zinc	ug/L	500	460		91.9	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-2680

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>
1203877127	Mercury	ug/L	2	2.17		108	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-2680

Contract: ESHL00114

Aqueous LCS Source: Inorganic Ventures

Solid LCS Source:

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1203887590								
	Arsenic	ug/L	50	50		100	80-120	MS
	Nickel	ug/L	50	52.8		106	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-2680

Client ID: CAWA-17-142857L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 432185001

Serial Dilution ID: 1203870192

<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
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	.903		1.08	J	19.048			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.288		.335	U	28.819			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-2680

Client ID: CAWA-17-142857L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 432185001

Serial Dilution ID: 1203870225

<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	194	J	340	U	25.255			P
Barium	236		235		.564		10	P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	15100		15000		.641		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	76.5	J	150	U	11.511			P
Magnesium	4560		4520		.802			P
Manganese	2	U	10	U				P
Potassium	2630		2350		10.447	E	10	P
Silica	37700		37200		1.281		10	P
Sodium	13000		10900		15.669	E	10	P
Strontium	101		96.6		4.436		10	P
Tin	2.73	J	12.5	U	85.684			P
Vanadium	2.4	J	5	U	62.43			P
Zinc	3.3	U	16.5	U				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 2017-2680 **Client ID:** CAWA-17-142854L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 432105001 **Serial Dilution ID:** 1203877132

<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

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-2680 **Client ID:** CAWA-17-142857L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 432185001 **Serial Dilution ID:** 1203887593

<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>
Arsenic	2	U	10	U				MS
Nickel	.732	J	3	U	11.885			MS

*Analytical Methods:

MS SW846 3005A/6020A

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2680
Work Order #: 432189**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1699093

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
432189002	CAWA-17-142894
1203871102	Method Blank (MB)
1203871103	Laboratory Control Sample (LCS)
1203871104	431769002(NonSDG) Sample Duplicate (DUP)
1203871105	432105005(CAPA-17-142934) Sample Duplicate (DUP)
1203871107	431769002(NonSDG) Post Spike (PS)
1203871108	432105005(CAPA-17-142934) 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 431769002 (NonSDG) and 432105005 (CAPA-17-142934) 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 following samples 1203871104 (Non SDG 431769002DUP) and 1203871107 (Non SDG 431769002PS) in this sample group were diluted due to matrix interference. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Sample Re-analysis

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

Miscellaneous Information**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:	1698825	Method:	WSP-CN(T)
Prep Batch :	1698824	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
432189002	CAWA-17-142894
1203870419	Method Blank (MB)
1203870420	Laboratory Control Sample (LCS)
1203870421	432185002(CAWA-17-142892) Sample Duplicate (DUP)
1203870422	432185002(CAWA-17-142892) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 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.

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 432185002 (CAWA-17-142892) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product: Ion Chromatography
Analytical Batch: 1699909 **Method:** WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
432189001	CAWA-17-142859
1203873010	Method Blank (MB)
1203873011	Laboratory Control Sample (LCS)
1203873012	432189001(CAWA-17-142859) Sample Duplicate (DUP)
1203873013	432189001(CAWA-17-142859) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 432189001 (CAWA-17-142859) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Manual Integrations

Samples 1203873012 (CAWA-17-142859DUP) and 432189001 (CAWA-17-142859) were manually integrated to correctly position the baseline as set in the calibration standards.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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scanned and inserted into the electronic package.

Method/Analysis Information

Product:	Ammonia Nitrogen		
Analytical Batch:	1698865	Method:	NH3
Prep Batch :	1698864	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
432189001	CAWA-17-142859
1203870528	Method Blank (MB)
1203870529	Laboratory Control Sample (LCS)
1203870530	432185001(CAWA-17-142857) Sample Duplicate (DUP)
1203870531	432185001(CAWA-17-142857) 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 432185001 (CAWA-17-142857) was selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Ammonia	1203870531 (CAWA-17-142857MS)	89.2* (90%-110%)

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

Samples 1203870530 (CAWA-17-142857DUP), 1203870531 (CAWA-17-142857MS) and 432189001 (CAWA-17-142859) 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:

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Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1698312	Method:	TKN
Prep Batch :	1698311	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
432189002	CAWA-17-142894
1203869129	Method Blank (MB)
1203869130	Laboratory Control Sample (LCS)
1203869131	431899001(WST35-17-144895) Sample Duplicate (DUP)
1203869132	431899001(WST35-17-144895) 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 431899001 (WST35-17-144895) was selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Total Kjeldahl	1203869132 (WST35-17-144895MS)	72* (90%-110%)

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1698870

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
432189001	CAWA-17-142859
1203870540	Method Blank (MB)
1203870541	Laboratory Control Sample (LCS)
1203870543	432185001(CAWA-17-142857) Sample Duplicate (DUP)
1203870545	432185001(CAWA-17-142857) 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 432185001 (CAWA-17-142857) 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:	1698273	Method:	PO4
Prep Batch :	1698272	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
432189001	CAWA-17-142859
1203869041	Method Blank (MB)
1203869042	Laboratory Control Sample (LCS)
1203869044	432105001(CAWA-17-142854) Sample Duplicate (DUP)
1203869046	432105001(CAWA-17-142854) 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 432105001 (CAWA-17-142854) 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

Sample1203869041 (MB) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1698958

Method: TDS

Sample Analysis

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

Sample ID	Client ID
432189001	CAWA-17-142859
1203870778	Method Blank (MB)
1203870779	Laboratory Control Sample (LCS)
1203870780	432189001(CAWA-17-142859) 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 432189001 (CAWA-17-142859) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample:

Analyte	Sample	Value
Total Dissolved Solids	1203870780 (CAWA-17-142859DUP)	5.88* (0%-5%)

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: 1701648

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
432189001	CAWA-17-142859
1203877744	Laboratory Control Sample (LCS)
1203877745	431853001(CAPA-17-142931) Sample Duplicate (DUP)
1203877746	432189001(CAWA-17-142859) 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

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

Samples 431853001 (CAPA-17-142931) and 432189001 (CAWA-17-142859) 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

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: 1699723 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
432189001	CAWA-17-142859
1203872594	Laboratory Control Sample (LCS)
1203872595	432185001(CAWA-17-142857) Sample Duplicate (DUP)
1203872596	432189001(CAWA-17-142859) 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 recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 432185001 (CAWA-17-142857) and 432189001 (CAWA-17-142859) 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
1203872595 (CAWA-17-142857DUP)	pH	Received 06-SEP-17, out of holding 01-SEP-17
1203872596 (CAWA-17-142859DUP)	pH	Received 06-SEP-17, out of holding 01-SEP-17
432189001 (CAWA-17-142859)	pH	Received 06-SEP-17, out of holding 01-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: 1699718 **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
432189001	CAWA-17-142859
1203872589	Laboratory Control Sample (LCS)
1203872591	432189001(CAWA-17-142859) Sample Duplicate (DUP)
1203872593	432189001(CAWA-17-142859) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 13.

Preparation/Analytical Method Verification

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

Calibration Information

The Titration and Ion analysis was performed on a Electronic bottle-top buret.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 432189001 (CAWA-17-142859) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

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Qualifier Definition Report for

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

Client SDG: 2017-2680 GEL Work Order: 432189

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Kristen Mizzell

Date: 26 SEP 2017

Title: Analyst I

Sample Data Summary

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Certificate of Analysis

Report Date: September 26, 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: 2017-2680

Client Sample ID: CAWA-17-142859
Sample ID: 432189001
Matrix: W
Collect Date: 01-SEP-17 11:22
Receive Date: 06-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	09/13/17	0842	1699909	1
Chloride		9.76	0.067	0.200	mg/L		1					
Fluoride		0.149	0.033	0.100	mg/L		1					
Sulfate		5.85	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0504	0.017	0.050	mg/L	1.00	1	KLP1	09/07/17	1421	1698865	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.0875	0.017	0.050	mg/L		1	AXH3	09/07/17	0826	1698870	3
PO4 "As Received"												
Phosphorus, Total as P		0.0972	0.020	0.050	mg/L	1.00	1	KLP1	09/07/17	1223	1698273	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		150	3.40	14.3	mg/L			KLP1	09/07/17	1511	1698958	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		71.9	1.45	4.00	mg/L			RXB5	09/09/17	1718	1699718	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		199	1.00	1.00	umhos/cm		1	VH1	09/20/17	1512	1701648	7
PH "As Received"												
pH at Temp 10.4C	H	7.07	0.010	0.100	SU		1	RXB5	09/09/17	1716	1699723	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	09/07/17	0833	1698864
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	09/07/17	1000	1698272

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Certificate of Analysis

Report Date: September 26, 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: 2017-2680

Client Sample ID: CAWA-17-142859
Sample ID: 432189001

Project: ESHL00114
Client ID: ARSL004

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

Notes:

Column headers are defined as follows:

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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 26, 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: 2017-2680

Client Sample ID: CAWA-17-142894
Sample ID: 432189002
Matrix: W
Collect Date: 01-SEP-17 11:22
Receive Date: 06-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		2.45	0.330	1.00	mg/L		1	TSM	09/13/17	1237	1699093	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	0706	1698825	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	09/07/17	1524	1698312	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	09/14/17	0927	1698824
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	AXH3	09/07/17	1000	1698311

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: September 26, 2017

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

Contact: Ms. Nita Patel

Workorder: 432189

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1699093										
QC1203871104	431769002	DUP									
Total Organic Carbon Average		12.1		11.8	mg/L	2.14		(0%-20%)	TSM	09/12/17	22:10
QC1203871105	432105005	DUP									
Total Organic Carbon Average	U	ND	U	ND	mg/L	N/A				09/13/17	08:43
QC1203871103	LCS										
Total Organic Carbon Average	10.0			10.4	mg/L		104	(80%-120%)		09/12/17	21:35
QC1203871102	MB										
Total Organic Carbon Average			J	0.673	mg/L					09/12/17	21:23
QC1203871107	431769002	PS									
Total Organic Carbon Average	10.0		6.05	16.5	mg/L		105	(75%-125%)		09/12/17	22:33
QC1203871108	432105005	PS									
Total Organic Carbon Average	10.0	U	ND	10.9	mg/L		105	(75%-125%)		09/13/17	09:30
Flow Injection Analysis											
Batch	1698825										
QC1203870421	432185002	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	09/15/17	07:04
QC1203870420	LCS										
Cyanide, Total	50.0			53.1	ug/L		106	(90%-110%)		09/15/17	07:02
QC1203870419	MB										
Cyanide, Total			U	ND	ug/L					09/15/17	07:01
QC1203870422	432185002	MS									
Cyanide, Total	100	U	ND	108	ug/L		108	(90%-110%)		09/15/17	07:05

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QC Summary

Workorder: 432189

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1699909										
QC1203873012	432189001	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MXL2	09/13/17	09:11
Chloride			9.76		9.65	mg/L	1.14	(0%-20%)			
Fluoride			0.149		0.152	mg/L	2.33 ^	(+/-0.100)			
Sulfate			5.85		5.79	mg/L	1.06	(0%-20%)			
QC1203873011	LCS										
Bromide	1.25				1.22	mg/L	97.2	(80%-120%)		09/13/17	02:48
Chloride	5.00				4.78	mg/L	95.5	(80%-120%)			
Fluoride	2.50				2.38	mg/L	95.1	(80%-120%)			
Sulfate	10.0				9.61	mg/L	96.1	(80%-120%)			
QC1203873010	MB										
Bromide			U		ND	mg/L				09/13/17	02:19
Chloride			U		ND	mg/L					
Fluoride			U		ND	mg/L					
Sulfate			U		ND	mg/L					
QC1203873013	432189001	PS									
Bromide	1.25	U	ND		1.32	mg/L	101	(75%-125%)		09/13/17	09:40
Chloride	5.00		9.76		15.3	mg/L	111	(75%-125%)			

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QC Summary

Workorder: 432189

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1699909										
Fluoride	2.50	0.149		2.51	mg/L		94.5	(75%-125%)	MXL2	09/13/17	09:40
Sulfate	10.0	5.85		15.9	mg/L		101	(75%-125%)			
Nutrient Analysis											
Batch	1698273										
QC1203869044	432105001	DUP									
Phosphorus, Total as P		0.116		0.106	mg/L	9.01	^	(+/-0.050)	KLP1	09/07/17	12:16
QC1203869042	LCS										
Phosphorus, Total as P	1.00			1.15	mg/L		115	(80%-124%)		09/07/17	12:03
QC1203869041	MB										
Phosphorus, Total as P			U	ND	mg/L					09/07/17	12:15
QC1203869046	432105001	MS									
Phosphorus, Total as P	1.00	0.116		1.24	mg/L		112	(63%-139%)		09/07/17	12:17
Batch	1698312										
QC1203869131	431899001	DUP									
Nitrogen, Total Kjeldahl		1.59		1.53	mg/L	3.85		(0%-20%)	KLP1	09/07/17	15:19
QC1203869130	LCS										
Nitrogen, Total Kjeldahl	1.00			1.06	mg/L		106	(90%-110%)		09/07/17	15:18
QC1203869129	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					09/07/17	15:17
QC1203869132	431899001	MS									
Nitrogen, Total Kjeldahl	1.00	1.59		2.31	mg/L		72 *	(90%-110%)		09/07/17	15:20
Batch	1698865										
QC1203870530	432185001	DUP									
Nitrogen, Ammonia		U	ND	U	ND	mg/L	N/A		KLP1	09/07/17	14:19

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QC Summary

Workorder: 432189

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1698865										
QC1203870529	LCS										
Nitrogen, Ammonia	1.00			0.996	mg/L		99.6	(90%-110%)	KLP1	09/07/17	13:55
QC1203870528	MB										
Nitrogen, Ammonia			U	ND	mg/L					09/07/17	13:54
QC1203870531	432185001	MS									
Nitrogen, Ammonia	1.00	U	ND	0.908	mg/L		89.2*	(90%-110%)		09/07/17	14:20
Batch	1698870										
QC1203870543	432185001	DUP									
Nitrogen, Nitrate/Nitrite			1.18	1.18	mg/L	0		(0%-20%)	AXH3	09/07/17	08:24
QC1203870541	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.04	mg/L		104	(90%-110%)		09/07/17	08:19
QC1203870540	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					09/07/17	08:18
QC1203870545	432185001	PS									
Nitrogen, Nitrate/Nitrite	1.00		1.18	2.20	mg/L		102	(90%-110%)		09/07/17	08:25
Solids Analysis											
Batch	1698958										
QC1203870780	432189001	DUP									
Total Dissolved Solids			150	141	mg/L	5.88*		(0%-5%)	KLP1	09/07/17	15:11
QC1203870779	LCS										
Total Dissolved Solids	300			290	mg/L		96.7	(95%-105%)		09/07/17	15:11
QC1203870778	MB										
Total Dissolved Solids			U	ND	mg/L					09/07/17	15:11

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QC Summary

Workorder: 432189

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1699718										
QC1203872591	432189001	DUP									
Alkalinity, Total as CaCO3		71.9		74.3	mg/L	3.28		(0%-20%)	RXB5	09/09/17	17:22
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203872589	LCS										
Alkalinity, Total as CaCO3	100			107	mg/L		107	(90%-110%)		09/09/17	17:02
QC1203872593	432189001	MS									
Alkalinity, Total as CaCO3	100	71.9		177	mg/L		105	(80%-120%)		09/09/17	17:23
Batch	1699723										
QC1203872595	432185001	DUP									
pH	H	7.35	H	7.39	SU	0.543		(0%-5%)	RXB5	09/09/17	17:10
QC1203872596	432189001	DUP									
pH	H	7.07	H	7.11	SU	0.564		(0%-5%)		09/09/17	17:19
QC1203872594	LCS										
pH	7.00			7.01	SU		100	(99%-101%)		09/09/17	17:02
Batch	1701648										
QC1203877745	431853001	DUP									
Conductivity		267		268	umhos/cm	0.374		(0%-10%)	VH1	09/20/17	15:07
QC1203877746	432189001	DUP									
Conductivity		199		199	umhos/cm	0		(0%-10%)		09/20/17	15:12
QC1203877744	LCS										
Conductivity	1410			1400	umhos/cm		98.9	(95%-105%)		09/20/17	15:05

Notes:

- < Result is less than value reported
- > Result is greater than value reported

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QC Summary

Workorder: 432189

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

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.