

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-17-142885

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	09/05/2017	ok	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):	1523		MEDIA:	UA	
PRS ID:	ok		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-48		FIELD PREP:	F	
LOCATION TYPE:	mon		FIELD QC TYPE:	REG	
TOP DEPTH:	NA		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	NA	✓	EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS: none

LOCATION COMMENTS: none

## FIELD PARAMETERS:

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

COLLECTED BY (PRINT): K. Tow, A. Stanfield

RELINQUISHED BY (Printed Name) <i>Maurice Shenelo</i> (Signature) <i>Maurice Shenelo</i>	Date/Time 9/5/17 1615	RECEIVED BY (Printed Name) <i>M. Mark</i> (Signature) <i>M. Mark</i>	Date/Time 9/5/17 1615
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-17-142920

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	09/05/2017	ok	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):	1523		MEDIA:	UA	
PRS ID:	ok		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-48		FIELD PREP:	UF	
LOCATION TYPE:	Mon		FIELD QC TYPE:	REG	
TOP DEPTH:	NA		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	NA		EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	1000 500 ML POLY 1/5/17	1	HNO3	y	NA
	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	2	HCL		
	WSP-8330B-NMED HEXMOD	1 LITER AMBER GLASS	3	ICE		
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: generator Running at about 50' away.

LOCATION COMMENTS: none

## FIELD PARAMETERS:

Sample Time	1523	HH:MM	Dissolved Oxygen	6.59 mg/L	Flow (in gpm)	6.25 gpm
Oxidation-Reduction Potential	240.8 mV		pH	8.06 SU	Specific Conductance	124.8 us/cm
Temperature	21.2°C		Turbidity	1.31 NTU		

COLLECTED BY (PRINT): K. Tow, A. Stanfield

RELINQUISHED BY (Printed Name) <u>Maurice Stanfield</u> (Signature) <u>[Signature]</u>	Date/Time 9/5/17 1615	RECEIVED BY (Printed Name) <u>M. Martin</u> (Signature) <u>[Signature]</u>	Date/Time 9/5/17 1615
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-17-143034

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	09/05/2017	ok	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):	1523		MEDIA:	UA	
PRS ID:	ok		SAMPLE TECH CODE:	DC	
LOCATION ID:	R-48		FIELD PREP:	UF	
LOCATION TYPE:	ok		FIELD QC TYPE:	FTB	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B- VOA	40 ML SEPTUM AMBER GLASS	1 295/17	HCL	y	NA

SAMPLE COMMENTS: none

LOCATION COMMENTS: none

## FIELD PARAMETERS:

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

COLLECTED BY (PRINT): A. Stanfield

RELINQUISHED BY (Printed Name) Maurice Shendo (Signature)	Date/Time 9/5/17 1615	RECEIVED BY (Printed Name) M. Stanfield (Signature)	Date/Time 9/5/17 1415
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 08/24/2017



coc: 2017-2692

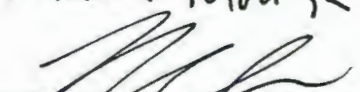
TEST - Field Screen		YES	NO	NA
The sample has field screening measurements of alpha activity and beta activity.			X	
Activity (dpm/100cm <sup>2</sup> )	Sampled Location			
Alpha detectable and < 20,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49			X
Alpha > 125 and < 20,000	other locations			
Beta > 1,500 and < 100,000	any location			
Alpha activity ≥ 20,000 dpm/100cm <sup>2</sup> and beta activity ≥ 100,000 dpm/100cm <sup>2</sup> 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"> <li>Am-241 &gt; 27 and &lt; 27,000</li> <li>Cs-137 &gt; 270 and &lt; 270,000</li> <li>Pu-238 &gt; 27 and &lt; 27,000</li> <li>Pu-239/240 &gt; 27 and &lt; 27,000</li> <li>Th-228 &gt; 27 and &lt; 27,000</li> <li>U-238 &gt; 270 and &lt; 270,000</li> <li>H-3 &gt; 27,000,000 and &lt; 27,000,000,000</li> </ul>	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.			
<ul style="list-style-type: none"> <li>Am-241, Pu-238, Pu-239/240, or Th-228 ≥ 27,000</li> <li>U-238 ≥ 270,000</li> <li>H-3 ≥ 27,000,000,000</li> </ul>				
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.				

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

HOLD SAMPLES FOR ANALYSIS
The sampling location within TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, Sediment/Soil from Effluent Canyon, Mortandad Canyon from Effluent Canyon to the Soil Contamination Area near the sediment traps, Bayo Canyon at TA-10, TA-35, TA-15, TA-36, TA-39, TA-48 or TA-49 <b>AND</b> does not have usable field screening measurements of alpha and beta activity available <b>AND</b> the sampling location or related sampling location(s) do not have prior reliable analytical measurements of radioactive isotopes available <b>AND</b> 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) Melissa Montoya	9/6/17 3:00
(Signature) 	

## DATA VALIDATION REPORT

Chain Of Custody No. 2017-2692

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
432328	EPA:120.1	1				
432328	EPA:150.1	1				
432328	EPA:160.1	1				
432328	EPA:170.0	2		1		
432328	EPA:245.2	2				
432328	EPA:300.0	1				
432328	EPA:310.1	1				
432328	EPA:335.4	1				
432328	EPA:350.1	1				
432328	EPA:351.2	1				
432328	EPA:353.2	1				
432328	EPA:365.4	1				
432328	SM:A2340B	1				
432328	SW-846:6010C	1				
432328	SW-846:6020	1				
432328	SW-846:6850	1				
432328	SW-846:8260B	1		1		
432328	SW-846:8330B	1				
432328	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
432328	EPA:120.1	1703142	1703142	1										1			1				
432328	EPA:150.1	1699927	1699927	1										1			1				
432328	EPA:160.1	1699326	1699326	1					1					1			1				
432328	EPA:170.0	NA	NA	2		1															
432328	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
432328	EPA:300.0	1700336	1700336	1					1					1				1			
432328	EPA:310.1	1699923	1699923	1						1				1				1			
432328	EPA:335.4	1698825	1698824	1					1	1				1				1			
432328	EPA:350.1	1699978	1699976	1					1	1	1			1				1			
432328	EPA:351.2	1699984	1699983	1					1	1				1				1			
432328	EPA:353.2	1700075	1700075	1					1					1				1			
432328	EPA:365.4	1699982	1699979	1					1	1	1			1				1			
432328	SM:A2340B	1704101	1704101	1																	
432328	SW-846:6010C	1699193	1699192	1					1	1				1				1			
432328	SW-846:6020	1699218	1699217	1					1	1				1				1			
432328	SW-846:6850	1699246	1699245	1					1	1	1			1							
432328	SW-846:8260B	1700295	1700295	1		1			2					4							
432328	SW-846:8330B	1699047	1699046	1					1	1	1			1							
432328	SW-846:9060	1699918	1699918	1					1					1				1			

### 2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAWA-17-142885	432328001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAWA-17-142886	1203881179	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203881177	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-142885	432328001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CrIN1-17-145287	1203873074	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203873073	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-17-142885	432328001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CrIN2-17-145295	1203871638	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203871637	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203871636	MB	1	0	0	0
EPA:170.0	VOC	CAWA-17-142885	432328001	REG	1	0	0	0
EPA:170.0	VOC	CAWA-17-142920	432328002	REG	1	0	0	0
EPA:170.0	VOC	CAWA-17-143034	432328003	FTB	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-142854	1203877128	DUP	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:245.2	INORGANIC	CAWA-17-142854	1203877130	MS	0	0	1	0
EPA:245.2	INORGANIC	CAWA-17-142885	432328001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-142920	432328002	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-17-142885	432328001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-17-142886	1203874286	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203874285	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203874284	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-142885	432328001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CrIN1-17-145287	1203873070	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CrIN1-17-145287	1203873072	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203873067	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-17-142920	432328002	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-17-142885	432328001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-142886	1203873246	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-142886	1203873250	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-142886	1203873252	MSD	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203873243	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203873242	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-142920	432328002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-142921	1203873270	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-142921	1203873273	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203873269	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203873268	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-17-142885	432328001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CTUA-17-142752	1203873616	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203873615	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203873614	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-142885	432328001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-142886	1203873260	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-142886	1203873262	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-142886	1203873263	MSD	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203873258	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203873257	MB	1	0	0	0
SM:A2340B	INORGANIC	CAWA-17-142885	432328001	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
SW-846:6010C	INORGANIC	CAWA-17-142885	1203871335	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAWA-17-142885	1203871336	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAWA-17-142885	432328001	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203871334	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203871333	MB	17	0	0	0
SW-846:6020	INORGANIC	CAWA-17-142885	1203871396	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAWA-17-142885	1203871397	MS	0	0	11	0
SW-846:6020	INORGANIC	CAWA-17-142885	432328001	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203871395	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203871394	MB	11	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-17-142885	432328001	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-17-142920	432328002	REG	80	3	0	0
SW-846:8260B	VOC	CAWA-17-143034	432328003	FTB	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-17-142920	432328002	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	CAWA-17-142920	432328002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-17-142921	1203873016	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203873015	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203873014	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

## DATA VALIDATION REPORT

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	1203871636	METHOD BLANK	EPA:160.1	W	Total Dissolved Solids	5.71	J	mg/L	14.3
MB	1203873242	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0304	J	mg/L	0.050
CAWA-17-143034	432328003	TRIP BLANK	EPA:170.0	W	Temperature	4		Deg C	

Field Sample ID	Blank Lab	Blank Type	Analytical Method	Parameter Name	Blank Lab Result	Blank Lab Units	Lab Result	Lab Qualifier	Lab Detection Limit	Detect Flag	Detect to Nondetect Factor	Detect to Estimated Factor	Use Factors
CAWA-17-142885	1203873242	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0304	mg/L	0.0401	J	0.050	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

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

No.

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

No.



## DATA VALIDATION REPORT

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-48	2017-2692	CAWA-17-142885	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J	U	I4	N	0.0401	mg/L	0.0401	mg/L			W	09/05/2017	1699978	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-17-142885	R-48	REG	EPA:120.1	0	1
CAWA-17-142885	R-48	REG	EPA:150.1	0	1
CAWA-17-142885	R-48	REG	EPA:160.1	0	1

## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-17-142885	R-48	REG	EPA:170.0	0	1
CAWA-17-142885	R-48	REG	EPA:245.2	0	1
CAWA-17-142885	R-48	REG	EPA:300.0	0	4
CAWA-17-142885	R-48	REG	EPA:310.1	0	2
CAWA-17-142885	R-48	REG	EPA:350.1	0	1
CAWA-17-142885	R-48	REG	EPA:353.2	0	1
CAWA-17-142885	R-48	REG	EPA:365.4	0	1
CAWA-17-142885	R-48	REG	SM:A2340B	0	1
CAWA-17-142885	R-48	REG	SW-846:6010C	0	17
CAWA-17-142885	R-48	REG	SW-846:6020	0	11
CAWA-17-142885	R-48	REG	SW-846:6850	0	1
CAWA-17-142920	R-48	REG	EPA:170.0	0	1
CAWA-17-142920	R-48	REG	EPA:245.2	0	1
CAWA-17-142920	R-48	REG	EPA:335.4	0	1
CAWA-17-142920	R-48	REG	EPA:351.2	0	1
CAWA-17-142920	R-48	REG	SW-846:8260B	0	80
CAWA-17-142920	R-48	REG	SW-846:8330B	0	23
CAWA-17-142920	R-48	REG	SW-846:9060	0	1
CAWA-17-143034	R-48	FTB	EPA:170.0	0	1
CAWA-17-143034	R-48	FTB	SW-846:8260B	0	80

September 19, 2017

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

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

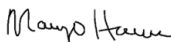
Re: LANL- WQH Water Samples  
Work Order: 432328  
SDG: 2017-2692

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on September 07, 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: 2017-2692  
Enclosures





**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 432328**  
**SDG: 2017-2692**

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# Case Narrative

**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 432328  
SDG # : 2017-2692**

**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 07, 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. Both vials received with head space 432328002(CAWA-17-142920).

**Sample Identification** The laboratory received the following samples:

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
432328001	CAWA-17-142885
432328002	CAWA-17-142920
432328003	CAWA-17-143034

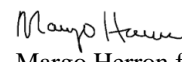
**Case Narrative**

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 for  
Valerie Davis  
Project Manager

**List of current GEL Certifications as of 19 September 2017**

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





COC: 2017-2692


TEST – Field Screen		YES	NO	NA
The sample has field screening measurements of alpha activity and beta activity.			X	
Activity (dpm/100cm <sup>2</sup> )	Sampled Location			
Alpha detectable and < 20,000	TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, TA-48, or TA-49			X
Alpha > 125 and < 20,000	other locations			
Beta > 1,500 and < 100,000	any location			
Alpha activity ≥ 20,000 dpm/100cm <sup>2</sup> and beta activity ≥ 100,000 dpm/100cm <sup>2</sup> 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"> <li>Am-241 &gt; 27 and &lt; 27,000</li> <li>Cs-137 &gt; 270 and &lt; 270,000</li> <li>Pu-238 &gt; 27 and &lt; 27,000</li> <li>Pu-239/240 &gt; 27 and &lt; 27,000</li> <li>Th-228 &gt; 27 and &lt; 27,000</li> <li>U-238 &gt; 270 and &lt; 270,000</li> <li>H-3 &gt; 27,000,000 and &lt; 27,000,000,000</li> </ul>	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.			
<ul style="list-style-type: none"> <li>Am-241, Pu-238, Pu-239/240, or Th-228 ≥ 27,000</li> <li>U-238 ≥ 270,000</li> <li>H-3 ≥ 27,000,000,000</li> </ul>				
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.				

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

HOLD SAMPLES FOR ANALYSIS
The sampling location within TA-1 and adjacent hillsides, TA-21, Acid Canyon, MDA C at TA-50, Area G at TA-54, Sediment/Soil from Effluent Canyon, Mortandad Canyon from Effluent Canyon to the Soil Contamination Area near the sediment traps, Bayo Canyon at TA-10, TA-35, TA-15, TA-36, TA-39, TA-48 or TA-49 <b>AND</b> does not have usable field screening measurements of alpha and beta activity available <b>AND</b> the sampling location or related sampling location(s) do not have prior reliable analytical measurements of radioactive isotopes available <b>AND</b> 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) <u>Melissa Montoya</u>	<u>7/6/17 3:00</u>
(Signature) 	

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  
ACTW  
CAD:

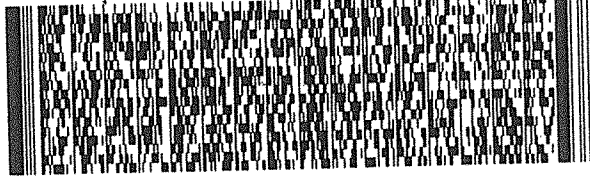
BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWEO



FedEx  
Express



J151315061301W

1 of 3  
TRK# 5908 1782 6870  
0201  
## MASTER ##

X7 RBWA

THU - 07 SEP 10:30A  
PRIORITY OVERNIGHT

29407  
SC-US CHS



KEITH GREENE  
LOS ALAMOS NATL LAB.  
TA00 BLDG 1237 DPU 03  
LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 06SEP17  
ACTWGT: 51.0 LB MAN  
CAD: 0014176/CAFE2916

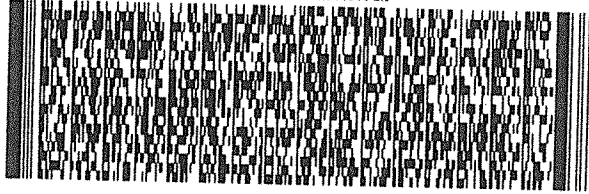
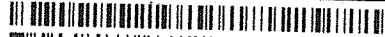
BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWEO



FedEx  
Express



2 of 3

MPS# 5908 1782 6880  
0263

Mstr# 5908 1782 6870

0201

X7 RBWA

2940  
SC-US CH

THU - 07 SEP 10:30A  
PRIORITY OVERNIGHT



SHS SC-US CHS  
29407

X7 RBWA

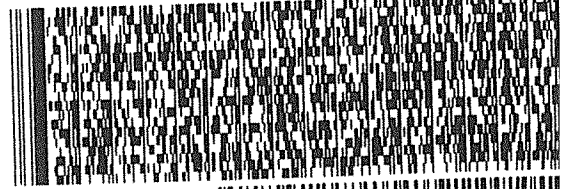
0201

Mstr# 5908 1782 6870

5908 1782 6891

3 of 3

THU - 07 SEP 10:30A  
PRIORITY OVERNIGHT



REF: 21PD0ASRGW04BAGWEO

(843) 666-8171

CHARLESTON SC 29407

VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

BILL SENDER

SHIP DATE: 06SEP17  
ACTWGT: 28.0 LB MAN  
CAD: 0014176/CAFE2916

GIN ID:SAFA (505) 665-9966

ALAMOS, NM 87545  
TA00 BLDG 1237 DPU 03  
LOS ALAMOS NATL LAB.



Laboratories LLC

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <b>ESHL</b>		SDG/AR/COC/Work Order: <b>432328</b>	
Received By: <b>ZKW</b>		Date Received: <b>9/7/17</b>	
Carrier and Tracking Number		Circle Applicable: <input checked="" type="radio"/> FedEx Express <input type="radio"/> FedEx Ground <input type="radio"/> UPS <input type="radio"/> Field Services <input type="radio"/> Courier <input type="radio"/> Other <b>5908 1782 6870</b> <b>5908 1782 6891</b> <b>5908 1782 6880</b>	
Suspected Hazard Information	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <b>0</b> <b>CPM/mR/Hr</b> Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, select Hazards below, and contact the GEL Safety Group. <input 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		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> NA <input type="checkbox"/> No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	Preservation Method: Wet Ice <input checked="" type="checkbox"/> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius <b>TEMP: 4°C</b>
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	Temperature Device Serial #: <b>IR3-16</b> Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes ___ No <input checked="" type="checkbox"/> N/A ___ Sample ID's and containers affected: <b>Both vials for -142920 rec'd w/headspace</b>
8	Samples received within holding time?	<input checked="" type="checkbox"/>	ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	Sample ID's affected:
12	Are sample containers identifiable as GEL provided?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	
Comments (Use Continuation Form if needed):			

PM (or PMA) review: Initials

**K Hall**

Date

**9/7/17**

Page

**1** of **1**

GL-CHL-SR-001 Rev 5

# **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 #: 2017-2692  
Work Order #: 432328**

**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:

<b>Sample ID</b>	<b>Client ID</b>
432328002	CAWA-17-142920
432328003	CAWA-17-143034
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:

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>	<b>P &amp; T Trap</b>
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: 2017-2692 GEL Work Order: 432328

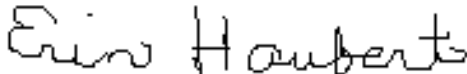
#### The Qualifiers in this report are defined as follows:

- \* 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: 03 OCT 2017

Title: Data Validator

# **Sample Data Summary**

**Volatile  
Certificate of Analysis  
Sample Summary**

**SDG Number:** 2017-2692  
**Lab Sample ID:** 432328002  
  
**Client ID:** CAWA-17-142920  
**Batch ID:** 1700295  
**Run Date:** 09/14/2017 16:55  
**Prep Date:** 09/14/2017 16:55  
**Data File:** 091417V6\6Y417.D

**Date Collected:** 09/05/2017 15:23  
**Date Received:** 09/07/2017 09:05  
**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
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: 2017-2692

Lab Sample ID: 432328002

Date Collected: 09/05/2017 15:23

Date Received: 09/07/2017 09:05

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: 09/14/2017 16:55

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 09/14/2017 16:55

Data File: 091417V6\6Y417.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:** 2017-2692  
**Lab Sample ID:** 432328002  
  
**Client ID:** CAWA-17-142920  
**Batch ID:** 1700295  
**Run Date:** 09/14/2017 16:55  
**Prep Date:** 09/14/2017 16:55  
**Data File:** 091417V6\6Y417.D

**Date Collected:** 09/05/2017 15:23  
**Date Received:** 09/07/2017 09:05  
**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	58.6	50.0	ug/L 117	(71%-134%)
Bromofluorobenzene	53.5	50.0	ug/L 107	(70%-131%)
Toluene-d8	52.9	50.0	ug/L 106	(74%-124%)

**Tentatively Identified Compound Summary**

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	3.6	6.45	ug/L	0	J

**Volatile  
Certificate of Analysis  
Sample Summary**

SDG Number: 2017-2692

Lab Sample ID: 432328003

Date Collected: 09/05/2017 15:23

Date Received: 09/07/2017 09:05

Matrix: W

Client ID: CAWA-17-143034

Batch ID: 1700295

Run Date: 09/14/2017 17:23

Prep Date: 09/14/2017 17:23

Data File: 091417V6\6Y418.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	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: 2017-2692

Lab Sample ID: 432328003

Date Collected: 09/05/2017 15:23

Date Received: 09/07/2017 09:05

Matrix: W

Client ID: CAWA-17-143034

Batch ID: 1700295

Run Date: 09/14/2017 17:23

Prep Date: 09/14/2017 17:23

Data File: 091417V6\6Y418.D

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Project: ESHL00114

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

Column: DB-624

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

**Volatile  
Certificate of Analysis  
Sample Summary**

SDG Number: 2017-2692

Lab Sample ID: 432328003

Date Collected: 09/05/2017 15:23

Date Received: 09/07/2017 09:05

Matrix: W

Client: ARSL004

Project: ESHL00114

Client ID: CAWA-17-143034

Method: SW-846:8260B

SOP Ref: GL-OA-E-038

Batch ID: 1700295

Inst: VOA6.I

Dilution: 1

Run Date: 09/14/2017 17:23

Analyst: JP1

Purge Vol: 5 mL

Prep Date: 09/14/2017 17:23

Column: DB-624

Data File: 091417V6\6Y418.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	53.9	50.0	ug/L 108	(71%-134%)
Bromofluorobenzene	49.7	50.0	ug/L 99	(70%-131%)
Toluene-d8	48.7	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	5.1	ug/L	0	J
	unknown siloxane	13.75	5.6	ug/L	0	J

# **Quality Control Summary**

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

Page 1 of 1

**SDG Number: 2017-2692****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
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
432328002	CAWA-17-142920	117	106	107
432328003	CAWA-17-143034	108	97	99

**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: 2017-2692

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

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SDG Number: 2017-2692

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: 2017-2692

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
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: 2017-2692

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: 2017-2692

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

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SDG Number: 2017-2692

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
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

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SDG Number: 2017-2692

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

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SDG Number: 2017-2692

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: 2017-2692

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

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SDG Number: 2017-2692

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: 2017-2692

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: 2017-2692

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

Page 3 of 8

SDG Number: 2017-2692

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: 2017-2692

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

Page 5 of 8

SDG Number: 2017-2692

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: 2017-2692

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: 2017-2692

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

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SDG Number: 2017-2692

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

Page 1 of 2

Quality Control Summary  
Spike Recovery Report

SDG Number: 2017-2692

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: 2017-2692

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: 2017-2692

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 CAPA-17-142953PS	1203874204	091317V6\6Y321.D	09/13/17	2137
04 CAPA-17-142953PSD	1203874206	091317V6\6Y322.D	09/13/17	2205
05 CAPA-17-142953PS	1203874205	091317V6\6Y325.D	09/13/17	2329
06 CAPA-17-142953PSD	1203874207	091317V6\6Y326.D	09/13/17	2357

## Method Blank Summary

Page 1 of 1

SDG Number:	2017-2692	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
08 LCS for batch 1700295	1203874202	091417V6\6Y403LA95.D	09/14/17	1024
09 LCS for batch 1700295	1203874203	091417V6\6Y406LA95.D	09/14/17	1148
10 CAWA-17-142920	432328002	091417V6\6Y417.D	09/14/17	1655
11 CAWA-17-143034	432328003	091417V6\6Y418.D	09/14/17	1723

# Quality Control Data

**Volatile  
Certificate of Analysis  
Sample Summary**

SDG Number: 2017-2692

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: 2017-2692

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**

Page 3 of 3

<b>SDG Number:</b> 2017-2692	<b>Matrix:</b> WATER	
<b>Lab Sample ID:</b> 1203874198		
<b>Client Sample:</b> QC for batch 1700295	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> MB for batch 1700295	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1700295	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 09/13/2017 14:35	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 09/13/2017 14:35		
<b>Data File:</b> 091317V6\6Y306BA.D	<b>Column:</b> 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: 2017-2692

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: 2017-2692

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

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SDG Number: 2017-2692

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

Matrix: WATER

Client: ARSL004

Method: SW-846:8260B

Inst: VOA6.I

Analyst: JP1

Column: DB-624

Project: QC

SOP Ref: GL-OA-E-038

Dilution: 1

Purge Vol: 5 mL

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	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: 2017-2692

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

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: 2017-2692

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**

Page 3 of 3

<b>SDG Number:</b>	<b>2017-2692</b>	<b>Matrix:</b>	<b>WATER</b>
<b>Lab Sample ID:</b>	<b>1203874200</b>		
<b>Client Sample:</b>	<b>QC for batch 1700295</b>	<b>Client:</b>	<b>ARSL004</b>
<b>Client ID:</b>	<b>LCS for batch 1700295</b>	<b>Method:</b>	<b>SW-846:8260B</b>
<b>Batch ID:</b>	<b>1700295</b>	<b>Inst:</b>	<b>VOA6.I</b>
<b>Run Date:</b>	<b>09/13/2017 13:12</b>	<b>Analyst:</b>	<b>JP1</b>
<b>Prep Date:</b>	<b>09/13/2017 13:12</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Data File:</b>	<b>091317V6\6Y303LA.D</b>	<b>Column:</b>	<b>DB-624</b>

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		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: 2017-2692

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

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	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: 2017-2692

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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<b>SDG Number:</b>	2017-2692	<b>Matrix:</b>	WATER
<b>Lab Sample ID:</b>	1203874201		
<b>Client Sample:</b>	QC for batch 1700295	<b>Client:</b>	ARSL004
<b>Client ID:</b>	LCS for batch 1700295	<b>Method:</b>	SW-846:8260B
<b>Batch ID:</b>	1700295	<b>Inst:</b>	VOA6.I
<b>Run Date:</b>	09/13/2017 14:08	<b>Analyst:</b>	JP1
<b>Prep Date:</b>	09/13/2017 14:08		
<b>Data File:</b>	091317V6\6Y305LA.D	<b>Column:</b>	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**

Page 1 of 3

SDG Number: 2017-2692

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: 2017-2692

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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<b>SDG Number:</b>	2017-2692	<b>Matrix:</b>	WATER
<b>Lab Sample ID:</b>	1203874202		
<b>Client Sample:</b>	QC for batch 1700295	<b>Client:</b>	ARSL004
<b>Client ID:</b>	LCS for batch 1700295	<b>Method:</b>	SW-846:8260B
<b>Batch ID:</b>	1700295	<b>Inst:</b>	VOA6.I
<b>Run Date:</b>	09/14/2017 10:24	<b>Analyst:</b>	JP1
<b>Prep Date:</b>	09/14/2017 10:24	<b>Purge Vol:</b>	5 mL
<b>Data File:</b>	091417V6\6Y403LA95.D	<b>Column:</b>	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: 2017-2692

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**

SDG Number: 2017-2692

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
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**

<b>SDG Number:</b>	<b>2017-2692</b>	<b>Matrix:</b>	<b>WATER</b>
<b>Lab Sample ID:</b>	<b>1203874203</b>		
<b>Client Sample:</b>	<b>QC for batch 1700295</b>	<b>Client:</b>	<b>ARSL004</b>
<b>Client ID:</b>	<b>LCS for batch 1700295</b>	<b>Method:</b>	<b>SW-846:8260B</b>
<b>Batch ID:</b>	<b>1700295</b>	<b>Inst:</b>	<b>VOA6.I</b>
<b>Run Date:</b>	<b>09/14/2017 11:48</b>	<b>Analyst:</b>	<b>JP1</b>
<b>Prep Date:</b>	<b>09/14/2017 11:48</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Data File:</b>	<b>091417V6\6Y406LA95.D</b>	<b>Column:</b>	<b>DB-624</b>

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	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**

<b>SDG Number:</b> 2017-2692	<b>Date Collected:</b> 09/06/2017 10:56	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203874204	<b>Date Received:</b> 09/08/2017 09:20	
<b>Client Sample:</b> QC for batch 1700295	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAPA-17-142953PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1700295	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 09/13/2017 21:37	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 09/13/2017 21:37		
<b>Data File:</b> 091317V6\6Y321.D	<b>Column:</b> 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**

<b>SDG Number:</b> 2017-2692	<b>Date Collected:</b> 09/06/2017 10:56	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203874204	<b>Date Received:</b> 09/08/2017 09:20	
<b>Client Sample:</b> QC for batch 1700295	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAPA-17-142953PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1700295	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 09/13/2017 21:37	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 09/13/2017 21:37		
<b>Data File:</b> 091317V6\6Y321.D	<b>Column:</b> 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**

<b>SDG Number:</b>	2017-2692	<b>Date Collected:</b>	09/06/2017 10:56	<b>Matrix:</b>	W
<b>Lab Sample ID:</b>	1203874204	<b>Date Received:</b>	09/08/2017 09:20		
<b>Client Sample:</b>	QC for batch 1700295	<b>Client:</b>	ARSL004	<b>Project:</b>	QC
<b>Client ID:</b>	CAPA-17-142953PS	<b>Method:</b>	SW-846:8260B	<b>SOP Ref:</b>	GL-OA-E-038
<b>Batch ID:</b>	1700295	<b>Inst:</b>	VOA6.I	<b>Dilution:</b>	1
<b>Run Date:</b>	09/13/2017 21:37	<b>Analyst:</b>	JP1	<b>Purge Vol:</b>	5 mL
<b>Prep Date:</b>	09/13/2017 21:37				
<b>Data File:</b>	091317V6\6Y321.D	<b>Column:</b>	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**

<b>SDG Number:</b>	<b>2017-2692</b>	<b>Date Collected:</b>	<b>09/06/2017 10:56</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203874205</b>	<b>Date Received:</b>	<b>09/08/2017 09:20</b>		
<b>Client Sample:</b>	<b>QC for batch 1700295</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAPA-17-142953PS</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1700295</b>	<b>Inst:</b>	<b>VOA6.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>09/13/2017 23:29</b>	<b>Analyst:</b>	<b>JP1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>09/13/2017 23:29</b>				
<b>Data File:</b>	<b>091317V6\6Y325.D</b>	<b>Column:</b>	<b>DB-624</b>		

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**

<b>SDG Number:</b> 2017-2692	<b>Date Collected:</b> 09/06/2017 10:56	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203874205	<b>Date Received:</b> 09/08/2017 09:20	
<b>Client Sample:</b> QC for batch 1700295	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAPA-17-142953PS	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1700295	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 09/13/2017 23:29	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 09/13/2017 23:29		
<b>Data File:</b> 091317V6\6Y325.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		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**

<b>SDG Number:</b>	<b>2017-2692</b>	<b>Date Collected:</b>	<b>09/06/2017 10:56</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203874205</b>	<b>Date Received:</b>	<b>09/08/2017 09:20</b>		
<b>Client Sample:</b>	<b>QC for batch 1700295</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAPA-17-142953PS</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1700295</b>	<b>Inst:</b>	<b>VOA6.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>09/13/2017 23:29</b>	<b>Analyst:</b>	<b>JP1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>09/13/2017 23:29</b>				
<b>Data File:</b>	<b>091317V6\6Y325.D</b>	<b>Column:</b>	<b>DB-624</b>		

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	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**

<b>SDG Number:</b> 2017-2692	<b>Date Collected:</b> 09/06/2017 10:56	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203874206	<b>Date Received:</b> 09/08/2017 09:20	
<b>Client Sample:</b> QC for batch 1700295	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAPA-17-142953PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1700295	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 09/13/2017 22:05	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 09/13/2017 22:05		
<b>Data File:</b> 091317V6\6Y322.D	<b>Column:</b> 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**

<b>SDG Number:</b> 2017-2692	<b>Date Collected:</b> 09/06/2017 10:56	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203874206	<b>Date Received:</b> 09/08/2017 09:20	
<b>Client Sample:</b> QC for batch 1700295	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAPA-17-142953PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1700295	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 09/13/2017 22:05	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 09/13/2017 22:05		
<b>Data File:</b> 091317V6\6Y322.D	<b>Column:</b> 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**

<b>SDG Number:</b>	<b>2017-2692</b>	<b>Date Collected:</b>	<b>09/06/2017 10:56</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203874206</b>	<b>Date Received:</b>	<b>09/08/2017 09:20</b>		
<b>Client Sample:</b>	<b>QC for batch 1700295</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAPA-17-142953PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1700295</b>	<b>Inst:</b>	<b>VOA6.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>09/13/2017 22:05</b>	<b>Analyst:</b>	<b>JP1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>09/13/2017 22:05</b>				
<b>Data File:</b>	<b>091317V6\6Y322.D</b>	<b>Column:</b>	<b>DB-624</b>		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
1634-04-4	tert-Butyl methyl ether		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**

<b>SDG Number:</b>	<b>2017-2692</b>	<b>Date Collected:</b>	<b>09/06/2017 10:56</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203874207</b>	<b>Date Received:</b>	<b>09/08/2017 09:20</b>		
<b>Client Sample:</b>	<b>QC for batch 1700295</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAPA-17-142953PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1700295</b>	<b>Inst:</b>	<b>VOA6.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>09/13/2017 23:57</b>	<b>Analyst:</b>	<b>JP1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>09/13/2017 23:57</b>				
<b>Data File:</b>	<b>091317V6\6Y326.D</b>	<b>Column:</b>	<b>DB-624</b>		

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**

<b>SDG Number:</b> 2017-2692	<b>Date Collected:</b> 09/06/2017 10:56	<b>Matrix:</b> W
<b>Lab Sample ID:</b> 1203874207	<b>Date Received:</b> 09/08/2017 09:20	
<b>Client Sample:</b> QC for batch 1700295	<b>Client:</b> ARSL004	<b>Project:</b> QC
<b>Client ID:</b> CAPA-17-142953PSD	<b>Method:</b> SW-846:8260B	<b>SOP Ref:</b> GL-OA-E-038
<b>Batch ID:</b> 1700295	<b>Inst:</b> VOA6.I	<b>Dilution:</b> 1
<b>Run Date:</b> 09/13/2017 23:57	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Prep Date:</b> 09/13/2017 23:57		
<b>Data File:</b> 091317V6\6Y326.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
74-83-9	Bromomethane	U	0.300	ug/L	0.300	1.00
75-15-0	Carbon disulfide	U	1.50	ug/L	1.50	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	1.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	1.00
75-00-3	Chloroethane	U	0.300	ug/L	0.300	1.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	1.00
74-87-3	Chloromethane	U	0.300	ug/L	0.300	1.00
124-48-1	Dibromochloromethane	U	0.300	ug/L	0.300	1.00
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	1.00
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	1.00
60-29-7	Ethyl ether	U	0.300	ug/L	0.300	1.00
97-63-2	Ethyl methacrylate		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**

<b>SDG Number:</b>	<b>2017-2692</b>	<b>Date Collected:</b>	<b>09/06/2017 10:56</b>	<b>Matrix:</b>	<b>W</b>
<b>Lab Sample ID:</b>	<b>1203874207</b>	<b>Date Received:</b>	<b>09/08/2017 09:20</b>		
<b>Client Sample:</b>	<b>QC for batch 1700295</b>	<b>Client:</b>	<b>ARSL004</b>	<b>Project:</b>	<b>QC</b>
<b>Client ID:</b>	<b>CAPA-17-142953PSD</b>	<b>Method:</b>	<b>SW-846:8260B</b>	<b>SOP Ref:</b>	<b>GL-OA-E-038</b>
<b>Batch ID:</b>	<b>1700295</b>	<b>Inst:</b>	<b>VOA6.I</b>	<b>Dilution:</b>	<b>1</b>
<b>Run Date:</b>	<b>09/13/2017 23:57</b>	<b>Analyst:</b>	<b>JP1</b>	<b>Purge Vol:</b>	<b>5 mL</b>
<b>Prep Date:</b>	<b>09/13/2017 23:57</b>				
<b>Data File:</b>	<b>091317V6\6Y326.D</b>	<b>Column:</b>	<b>DB-624</b>		

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

Surrogate/Tracer recovery	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	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 #: 2017-2692  
Work Order #: 432328**

**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**

<b>Sample ID</b>	<b>Client ID</b>
432328001	432328001 (CAWA-17-142885)
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: 2017-2692 GEL Work Order: 432328

#### 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: 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-17-142885Date Received: 07-SEP-17GEL Job No (SDG): 2017-2692GEL Sample ID: 432328001Date 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	0.367	ug/L		1	08-SEP-17 20:01	per0908026a
	Perchlorate Isotope Ratio			3			1	08-SEP-17 20:01	per0908026a
14797-73-0	Perchlorate-101	.05	.2	0.366	ug/L		1	08-SEP-17 20:01	per0908026a
	Perchlorate-O(18)			0.405	ug/L		1	08-SEP-17 20:01	per0908026a

^ 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):** 2017-2692

**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):** 2017-2692

**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): 2017-2692GEL 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): 2017-2692GEL 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): 2017-2692GEL 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): 2017-2692GEL 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): 2017-2692GEL 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 #: 2017-2692  
Work Order #: 432328**

**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:

<b>Sample ID</b>	<b>Client ID</b>
432328002	CAWA-17-142920
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: 2017-2692 GEL Work Order: 432328

#### 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-17-142920

Lab Code: GEL

GEL Job No (SDG) 2017-2692

Matrix: WATER

GEL Sample ID: 432328002

Sample Amount 900 mL

Date Received: 07-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: EXP0907079.wiff

Date Analyzed: 09-SEP-17 07:51

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.0889	U	0.0889	0.278
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.0889	U	0.0889	0.278
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.0889	U	0.0889	0.278
<i>121-82-4</i>	<i>RDX</i>				
13980-04-6	TNX	.0889	U	0.0889	0.278
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.0889	U	0.0889	0.278
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.0889	U	0.0889	0.278
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.0889	U	0.0889	0.278
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
479-45-8	Tetryl	.0889	U	0.0889	0.556
<i>479-45-8</i>	<i>Tetryl</i>				
5755-27-1	MNX	.0889	U	0.0889	0.278
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.0889	U	0.0889	0.278
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.0889	U	0.0889	0.278
<i>80251-29-2</i>	<i>DNX</i>				
98-95-3	Nitrobenzene	.0889	U	0.0889	0.278
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.0889	U	0.0889	0.278
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-142920

Lab Code: GEL

GEL Job No (SDG) 2017-2692

Matrix: WATER

GEL Sample ID: 432328002

Sample Amount 900 mL

Date Received: 07-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	.0889	U	0.0889	0.278
99-35-4	1,3,5-Trinitrobenzene				
99-65-0	m-Dinitrobenzene	.0889	U	0.0889	0.278
99-65-0	m-Dinitrobenzene				
88-72-2	o-Nitrotoluene	.0911	U	0.0911	0.278
88-72-2	o-Nitrotoluene				
78-11-5	PETN	.111	U	0.111	0.556
78-11-5	PETN				
99-99-0	p-Nitrotoluene	.167	U	0.167	0.556
99-99-0	p-Nitrotoluene				
3058-38-6	TATB	.333	U	0.333	1.11
3058-38-6	TATB				
618-87-1	3,5-Dinitroaniline	.333	U	0.333	1.11
618-87-1	3,5-Dinitroaniline				
78-30-8	tris(o-cresyl) phosphate	.333	U	0.333	1.11
78-30-8	tris(o-cresyl) phosphate				
59229-75-3	2,6-Diamino-4-nitrotoluene	.556	U	0.556	2.78
59229-75-3	2,6-Diamino-4-nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	.556	U	0.556	2.78
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):** 2017-2692**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
432328002	CAWA-17-142920	76	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)** 2017-2692

**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
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
MXN	.5	.49	98					66 - 114
Nitrobenzene	5	3.65	73					64 - 115
PETN	5	5	100					57 - 126
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

# 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)** 2017-2692

**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-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
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

#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) 2017-2692

Matrix: WATER

GEL Sample ID: 1203870911

Sample Amount 1000 mL

Date Received: 07-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) 2017-2692

Matrix: WATER

GEL Sample ID: 1203870911

Sample Amount 1000 mL

Date Received: 07-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) 2017-2692

Matrix: WATER

GEL Sample ID: 1203870912

Sample Amount 1000 mL

Date Received: 07-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	MNX	.49		0.080	0.250
<i>5755-27-1</i>	<i>MNX</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) 2017-2692

Matrix: WATER

GEL Sample ID: 1203870912

Sample Amount 1000 mL

Date Received: 07-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) 2017-2692

Matrix: WATER

GEL Sample ID: 1203870913

Sample Amount 940 mL

Date Received: 07-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) 2017-2692

Matrix: WATER

GEL Sample ID: 1203870913

Sample Amount 940 mL

Date Received: 07-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) 2017-2692

Matrix: WATER

GEL Sample ID: 1203870914

Sample Amount 920 mL

Date Received: 07-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) 2017-2692

Matrix: WATER

GEL Sample ID: 1203870914

Sample Amount 920 mL

Date Received: 07-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): 2017-2692Lab 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): 2017-2692Lab 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)
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):** 2017-2692

**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)
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): 2017-2692

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)
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): 2017-2692

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)
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): 2017-2692

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)
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): 2017-2692

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)
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): 2017-2692

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)
3,4-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): 2017-2692

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)
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):** 2017-2692

**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): 2017-2692

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)
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): 2017-2692

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): 2017-2692

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)
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): 2017-2692

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): 2017-2692

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)
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):** 2017-2692

**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): 2017-2692

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)
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): 2017-2692

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)
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): 2017-2692

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

# **Metals Analysis**



# Case Narrative

**Metals**  
**Technical Case Narrative**  
**ARS International, LLC (ARSL)**  
**SDG #: 2017-2692**  
**Work Order #: 432328**

<b>Sample ID</b>	<b>Client ID</b>
432328001	CAWA-17-142885
432328002	CAWA-17-142920
1203871333	Method Blank (MB) <b>ICP</b>
1203871334	Laboratory Control Sample (LCS)
1203871337	432328001(CAWA-17-142885L) Serial Dilution (SD)
1203871335	432328001(CAWA-17-142885D) Sample Duplicate (DUP)
1203871336	432328001(CAWA-17-142885S) Matrix Spike (MS)
1203871394	Method Blank (MB) <b>ICP-MS</b>
1203871395	Laboratory Control Sample (LCS)
1203871398	432328001(CAWA-17-142885L) Serial Dilution (SD)
1203871396	432328001(CAWA-17-142885D) Sample Duplicate (DUP)
1203871397	432328001(CAWA-17-142885S) Matrix Spike (MS)
1203877126	Method Blank (MB) <b>CVAA</b>
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 432328001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

**Method/Analysis Information**

<b>Analytical Batch:</b>	1699193, 1699218, 1701447 and 1704101
<b>Prep Batch :</b>	1699192, 1699217 and 1701439
<b>Standard Operating Procedures:</b>	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
<b>Analytical Method:</b>	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
<b>Prep Method :</b>	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 CaCO<sub>3</sub> is calculated from Calcium and Magnesium results.

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

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

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

### **Calibration Information**

#### **Instrument Calibration**

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

#### **CRDL/PQL Requirements**

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of silica. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 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: 432328001 (CAWA-17-142885)-ICP 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**

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

#### **Technical Information**

##### **Holding Time Specifications**

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

##### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

##### **Sample Dilutions**

The samples in this SDG did not require dilutions.

##### **Preparation Information**

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

#### **Miscellaneous Information**

##### **Electronic Packaging Comment**

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

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

##### **Additional Comments**

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

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

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

#### **Certification Statement**

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

## **GEL LABORATORIES LLC**

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

### **Qualifier Definition Report for**

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

Client SDG: 2017-2692 GEL Work Order: 432328

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

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

#### **Review/Validation**

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

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

**Signature:**



**Name: Nik-Cole Elmore**

**Date: 03 OCT 2017**

**Title: Data Validator**

# **Sample Data Summary**

---

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

**SDG No:** 2017-2692**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 432328001**BASIS:** As Received**DATE COLLECTED** 05-SEP-17**CLIENT ID:** CAWA-17-142885**LEVEL:** Low**DATE RECEIVED** 07-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 11:02	091917W1-7	1701447

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

SDG No: 2017-2692

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 432328001

BASIS: As Received

DATE COLLECTED 05-SEP-17

CLIENT ID: CAWA-17-142885

LEVEL: Low

DATE RECEIVED 07-SEP-17

MATRIX: W

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	68	ug/L	U	68	200	200	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	09/18/17 14:01	170918-2	1699218
7440-38-2	Arsenic	2.15	ug/L	J	2	5	5	1	MS	BAJ	09/18/17 20:39	170918-6	1699218
7440-39-3	Barium	7.48	ug/L		1	5	5	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	09/18/17 20:39	170918-6	1699218
7440-70-2	Calcium	9800	ug/L		50	200	200	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	BAJ	09/18/17 20:39	170918-6	1699218
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	09/18/17 20:39	170918-6	1699218
7439-95-4	Magnesium	3150	ug/L		110	300	300	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7439-98-7	Molybdenum	2.49	ug/L		0.2	0.5	0.5	1	MS	BAJ	09/18/17 20:39	170918-6	1699218
7440-02-0	Nickel	0.923	ug/L	J	0.6	2	2	1	MS	BAJ	09/18/17 20:39	170918-6	1699218
7440-09-7	Potassium	1140	ug/L		50	150	150	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	BAJ	09/18/17 20:39	170918-6	1699218
7631-86-9	Silica	51400	ug/L		53	213	213	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	BAJ	09/18/17 20:39	170918-6	1699218
7440-23-5	Sodium	11000	ug/L		100	300	300	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7440-24-6	Strontium	49.4	ug/L		1	5	5	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	09/18/17 20:39	170918-6	1699218
7440-31-5	Tin	2.5	ug/L	U	2.5	10	10	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7440-61-1	Uranium	0.488	ug/L		0.067	0.2	0.2	1	MS	BAJ	09/18/17 20:39	170918-6	1699218
7440-62-2	Vanadium	10.1	ug/L		1	5	5	1	P	JWJ	09/20/17 18:15	092017-1	1699193
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	JWJ	09/20/17 18:15	092017-1	1699193



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

**SDG No:** 2017-2692**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 432328001**BASIS:** As Received**DATE COLLECTED** 05-SEP-17**CLIENT ID:** CAWA-17-142885**LEVEL:** Low**DATE RECEIVED** 07-SEP-17**MATRIX:** W**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	37.4	mg/L		0.453	1.24	1.24	1		TXT1	09/26/17 17:03		1704101

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1699193	1699192	SW846 3005A	50	mL	50	mL	09/08/17	SXW1
1699218	1699217	SW846 3005A	50	mL	50	mL	09/08/17	SXW1
1701447	1701439	EPA 245.1/245.2 Prep	20	mL	20	mL	09/18/17	AXS5

**\*Analytical Methods:**

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

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

**SDG No:** 2017-2692**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 432328002**BASIS:** As Received**DATE COLLECTED** 05-SEP-17**CLIENT ID:** CAWA-17-142920**LEVEL:** Low**DATE RECEIVED** 07-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 11:03	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**  
**-3b-**  
**PREPARATION BLANK SUMMARY**

SDG NO. 2017-2692

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>
1203871333	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203871394	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	2	ug/L	+/-5	U	MS	2	5
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203877126	Mercury	0.067	ug/L	+/-0.2	U	AV	0.067	0.2

## \*Analytical Methods:

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

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2017-2692 Client ID: CAWA-17-142885S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 432328001 Spike ID: 1203871336

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Aluminum	ug/L	75-125	5100		68	U	5000	102		P
Barium	ug/L	75-125	499		7.48		500	98.3		P
Beryllium	ug/L	75-125	491		1	U	500	98.2		P
Boron	ug/L	75-125	502		15	U	500	97.9		P
Calcium	ug/L	75-125	14700		9800		5000	98		P
Cobalt	ug/L	75-125	504		1	U	500	101		P
Copper	ug/L	75-125	500		3	U	500	100		P
Iron	ug/L	75-125	5100		30	U	5000	102		P
Magnesium	ug/L	75-125	8360		3150		5000	104		P
Manganese	ug/L	75-125	492		2	U	500	98.4		P
Potassium	ug/L	75-125	6110		1140		5000	99.2		P
Silica	ug/L		61300		51400		10700	92.2	N/A	P
Sodium	ug/L	75-125	16000		11000		5000	99.8		P
Strontium	ug/L	75-125	543		49.4		500	98.7		P
Tin	ug/L	75-125	485		2.5	U	500	96.9		P
Vanadium	ug/L	75-125	507		10.1		500	99.3		P
Zinc	ug/L	75-125	496		3.3	U	500	98.8		P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2017-2692 Client ID CAWA-17-142885S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 432328001 Spike ID: 1203871397

<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	52		1	U	50	103		MS
Arsenic	ug/L	75-125	56.1		2.15	J	50	108		MS
Cadmium	ug/L	75-125	56.4		0.3	U	50	113		MS
Chromium	ug/L	75-125	54.6		3	U	50	106		MS
Lead	ug/L	75-125	53.7		0.5	U	50	107		MS
Molybdenum	ug/L	75-125	58.2		2.49		50	112		MS
Nickel	ug/L	75-125	54.3		0.923	J	50	107		MS
Selenium	ug/L	75-125	55.2		2	U	50	110		MS
Silver	ug/L	75-125	56.3		0.3	U	50	113		MS
Thallium	ug/L	75-125	51.6		0.6	U	50	103		MS
Uranium	ug/L	75-125	54.3		0.488		50	108		MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2017-2692 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**  
**-6-**  
**Duplicate Sample Summary**

SDG No.: 2017-2692

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-142885D

Matrix: WATER

Level: Low

Sample ID: 432328001

Duplicate ID: 1203871335

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-5	7.48		7.47		.11		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	9800		9920		1.26		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	3150		3200		1.46		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1140		1310		13.3		P
Silica	ug/L	+/-20%	51400		51700		.477		P
Sodium	ug/L	+/-20%	11000		11100		.299		P
Strontium	ug/L	+/-20%	49.4		49.9		.905		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	10.1		10.3		1.52		P
Zinc	ug/L		3.3 U		3.3 U				P

\*Analytical Methods:

P SW846 3005A/6010C



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

SDG No.: 2017-2692

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-142885D

Matrix: WATER

Level: Low

Sample ID: 432328001

Duplicate ID: 1203871396

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L	+/-5	2.15 J		2.47 J		13.8		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	2.49		2.45		1.5		MS
Nickel	ug/L	+/-2	0.923 J		0.725 J		24		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	0.488		0.494		1.22		MS

\*Analytical Methods:

MS SW846 3005A/6020A

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

**SDG No.:** 2017–2692**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

-7-

## Laboratory Control Sample Summary

SDG NO. 2017-2692

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>
1203871334								
	Aluminum	ug/L	5000	5020		100	80-120	P
	Barium	ug/L	500	475		95	80-120	P
	Beryllium	ug/L	500	463		92.7	80-120	P
	Boron	ug/L	500	469		93.7	80-120	P
	Calcium	ug/L	5000	4940		98.7	80-120	P
	Cobalt	ug/L	500	483		96.6	80-120	P
	Copper	ug/L	500	474		94.7	80-120	P
	Iron	ug/L	5000	4900		98	80-120	P
	Magnesium	ug/L	5000	5060		101	80-120	P
	Manganese	ug/L	500	475		95.1	80-120	P
	Potassium	ug/L	5000	4970		99.3	80-120	P
	Silica	ug/L	10700	9860		92.1	80-120	P
	Sodium	ug/L	5000	5000		100	80-120	P
	Strontium	ug/L	500	480		96.1	80-120	P
	Tin	ug/L	500	465		93	80-120	P
	Vanadium	ug/L	500	468		93.6	80-120	P
	Zinc	ug/L	500	475		95.1	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2017-2692

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>
1203871395								
	Arsenic	ug/L	50	53.1		106	80-120	MS
	Cadmium	ug/L	50	53.8		108	80-120	MS
	Chromium	ug/L	50	51.3		103	80-120	MS
	Lead	ug/L	50	50.7		101	80-120	MS
	Molybdenum	ug/L	50	52.7		105	80-120	MS
	Nickel	ug/L	50	53.4		107	80-120	MS
	Selenium	ug/L	50	53.1		106	80-120	MS
	Silver	ug/L	50	53.4		107	80-120	MS
	Thallium	ug/L	50	48.3		96.6	80-120	MS
	Uranium	ug/L	50	50.6		101	80-120	MS
	Antimony	ug/L	50	48.6		97.2	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2017-2692

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

-9-

## Serial Dilution Sample Summary

SDG NO. 2017-2692

Client ID: CAWA-17-142885L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 432328001

Serial Dilution ID: 1203871337

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	7.48		8.05	J	7.683			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	9800		9710		.882		10	P
Cobalt	1	U	6.09	J				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3150		3360		6.511			P
Manganese	2	U	10	U				P
Potassium	1140		1500		31.074			P
Silica	51400		53000		3.058		10	P
Sodium	11000		11600		5.544		10	P
Strontium	49.4		50.1		1.362			P
Tin	2.5	U	12.5	U				P
Vanadium	10.1		7.63	J	24.667			P
Zinc	3.3	U	16.5	U				P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-9-

## Serial Dilution Sample Summary

**SDG NO.** 2017-2692 **Client ID:** CAWA-17-142885L

**Contract:** ESHL00114

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

**Sample ID:** 432328001 **Serial Dilution ID:** 1203871398

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	2.15	J	10	U	15.689			MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	2.49		2.44	J	1.969			MS
Nickel	.923	J	3	U	16.576			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.488		.53	J	8.607			MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-9-

## Serial Dilution Sample Summary

SDG NO. 2017-2692 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



# **General Chem Analysis**

# Case Narrative

**General Chemistry  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2017-2692  
Work Order #: 432328**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1699918

**Method:** SW 9060 Total Organic Carbon

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
432328002	CAWA-17-142920
1203873014	Method Blank (MB)
1203873015	Laboratory Control Sample (LCS)
1203873016	432325003(CAWA-17-142921) Sample Duplicate (DUP)
1203873018	432325003(CAWA-17-142921) Post Spike (PS)

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

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-093 REV# 15.

**Preparation/Analytical Method Verification**

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

**Calibration Information**

The Carbon analysis was performed on a O-I Analytical 1030W Carbon Analyzer.

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

acceptance limits.

#### **Quality Control (QC) Information**

##### **Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

##### **Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

##### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

##### **Quality Control (QC) Designation**

Sample 432325003 (CAWA-17-142921) 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**

<b>Product:</b>	<b>Cyanide and Total</b>		
<b>Analytical Batch:</b>	1698825	<b>Method:</b>	WSP-CN(T)
<b>Prep Batch :</b>	1698824	<b>Method:</b>	EPA 335.4

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
432328002	CAWA-17-142920
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:

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

### **Method/Analysis Information**

**Product:** Ion Chromatography  
**Analytical Batch:** 1700336 **Method:** WSP-ANIONS

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
432328001	CAWA-17-142885
1203874284	Method Blank (MB)
1203874285	Laboratory Control Sample (LCS)
1203874286	432325001(CAWA-17-142886) Sample Duplicate (DUP)
1203874287	432325001(CAWA-17-142886) Post Spike (PS)

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

### **SOP Reference**

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

### **Preparation/Analytical Method Verification**

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

### **Calibration Information**

The Ion Chromatography analysis was performed on a Dionex ICS-5000 Ion Chromatograph.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

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

### **Calibration Verification Information (CCV)**

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

### **Y Intercept Rule**

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



### **Quality Control (QC) Information**

#### **Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

#### **Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

#### **Quality Control (QC) Designation**

Sample 432325001 (CAWA-17-142886) 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 1203874286 (CAWA-17-142886DUP), 1203874287 (CAWA-17-142886PS) and 432328001 (CAWA-17-142885) were manually integrated to correctly position the baseline as set in the calibration standards.

#### **Additional Comments**

Additional comments were not required for this SDG.

#### **Electronic Packaging Comment**

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

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

scanned and inserted into the electronic package.

### **Method/Analysis Information**

<b>Product:</b>	<b>Ammonia Nitrogen</b>		
<b>Analytical Batch:</b>	1699978	<b>Method:</b>	NH3
<b>Prep Batch :</b>	1699976	<b>Method:</b>	EPA 350.1 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
432328001	CAWA-17-142885
1203873242	Method Blank (MB)
1203873243	Laboratory Control Sample (LCS)
1203873246	432325001(CAWA-17-142886) Sample Duplicate (DUP)
1203873250	432325001(CAWA-17-142886) Matrix Spike (MS)
1203873252	432325001(CAWA-17-142886) Matrix Spike Duplicate (MSD)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-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 432325001 (CAWA-17-142886) was selected for QC analysis.

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

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

**MS/MSD Relative Percent Difference (RPD) Statement**

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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**

<b>Product:</b>	<b>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1699984	<b>Method:</b>	TKN
<b>Prep Batch :</b>	1699983	<b>Method:</b>	EPA 351.2 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
432328002	CAWA-17-142920
1203873268	Method Blank (MB)
1203873269	Laboratory Control Sample (LCS)
1203873270	432325003(CAWA-17-142921) Sample Duplicate (DUP)
1203873273	432325003(CAWA-17-142921) 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 432325003 (CAWA-17-142921) 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**

Sample1203873269 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

**Miscellaneous Information**

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

electronically. The following change from traditional packages should be noted:

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



### **Method/Analysis Information**

**Product:** Nitrate Nitrite by Cadmium Reduction

**Analytical Batch:** 1700075

**Method:** NO3NO2

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
432328001	CAWA-17-142885
1203873614	Method Blank (MB)
1203873615	Laboratory Control Sample (LCS)
1203873616	432318001(CTUA-17-142752) Sample Duplicate (DUP)
1203873620	432318001(CTUA-17-142752) 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 432318001 (CTUA-17-142752) was selected for QC analysis.

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Total Phosphorus</b>		
<b>Analytical Batch:</b>	1699982	<b>Method:</b>	PO4
<b>Prep Batch :</b>	1699979	<b>Method:</b>	EPA 365.4 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
432328001	CAWA-17-142885
1203873257	Method Blank (MB)
1203873258	Laboratory Control Sample (LCS)
1203873260	432325001(CAWA-17-142886) Sample Duplicate (DUP)
1203873262	432325001(CAWA-17-142886) Matrix Spike (MS)
1203873263	432325001(CAWA-17-142886) Matrix Spike Duplicate (MSD)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-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 432325001 (CAWA-17-142886) was selected for QC analysis.

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

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

**MS/MSD Relative Percent Difference (RPD) Statement**

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

Sample1203873257 (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:** 1699326

**Method:** TDS

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
432328001	CAWA-17-142885
1203871636	Method Blank (MB)
1203871637	Laboratory Control Sample (LCS)
1203871638	432305001(CrIN2-17-145295) 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 432305001 (CrIN2-17-145295) was selected for QC analysis.

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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



### **Method/Analysis Information**

**Product:** Specific Conductivity

**Analytical Batch:** 1703142

**Method:** EPA120.1 Specific Conductivity

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
432328001	CAWA-17-142885
1203881177	Laboratory Control Sample (LCS)
1203881179	432325001(CAWA-17-142886) Sample Duplicate (DUP)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-009 REV# 14.

### **Preparation/Analytical Method Verification**

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Initial Standardization**

The titrant was properly standardized

### **Calibration Verification Information**

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

### **Quality Control (QC) Information**

#### **Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 432325001 (CAWA-17-142886) was selected for QC analysis.

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

**Product:** pH

**Analytical Batch:** 1699927 **Method:** PH

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
432328001	CAWA-17-142885
1203873073	Laboratory Control Sample (LCS)
1203873074	432546001(CrIN1-17-145287) 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**

Sample 432546001 (CrIN1-17-145287) was selected for QC analysis.

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

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

**Technical Information**

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

**Holding Times**

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

Sample	Analyte	Value
1203873074 (CrIN1-17-145287DUP)	pH	Received 08-SEP-17, out of holding 06-SEP-17
432328001 (CAWA-17-142885)	pH	Received 07-SEP-17, out of holding 05-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:** 1699923      **Method:** EPA 310.1 Total Alkalinity

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
432328001	CAWA-17-142885
1203873067	Laboratory Control Sample (LCS)
1203873070	432546001(CrIN1-17-145287) Sample Duplicate (DUP)
1203873072	432546001(CrIN1-17-145287) 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 432546001 (CrIN1-17-145287) was selected for QC analysis.

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Certification Statement**

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

## **GEL LABORATORIES LLC**

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### **Qualifier Definition Report for**

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

Client SDG: 2017-2692 GEL Work Order: 432328


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

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

#### **Review/Validation**

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

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

**Signature:** 

**Name:** Aubrey Kingsbury

**Date:** 29 SEP 2017

**Title:** Analyst I

# Sample Data Summary



# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: September 29, 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: 2017-2692

Client Sample ID: CAWA-17-142885  
Sample ID: 432328001  
Matrix: W  
Collect Date: 05-SEP-17 15:23  
Receive Date: 07-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	09/14/17	2327	1700336	1
Chloride		2.42	0.067	0.200	mg/L		1					
Fluoride	J	0.0964	0.033	0.100	mg/L		1					
Sulfate		2.23	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0401	0.017	0.050	mg/L	1.00	1	KLP1	09/13/17	1051	1699978	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.355	0.017	0.050	mg/L		1	KLP1	09/13/17	1124	1700075	3
PO4 "As Received"												
Phosphorus, Total as P		0.0822	0.020	0.050	mg/L	1.00	1	KLP1	09/13/17	1422	1699982	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		126	3.40	14.3	mg/L			KLP1	09/08/17	0935	1699326	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		57.1	1.45	4.00	mg/L			RXB5	09/13/17	1610	1699923	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		149	1.00	1.00	umhos/cm		1	VH1	09/28/17	1107	1703142	7
PH "As Received"												
pH at Temp 18.0C	H	8.23	0.010	0.100	SU		1	RXB5	09/13/17	1608	1699927	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	09/13/17	0803	1699976
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	09/13/17	1300	1699979

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: September 29, 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: 2017-2692

Client Sample ID: CAWA-17-142885  
Sample ID: 432328001

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 29, 2017

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

Los Alamos, New Mexico 87545

Contact: Ms. Nita Patel

Client SDG: 2017-2692

Project: LANL- WQH Water Samples

Client Sample ID: CAWA-17-142920

Project: ESHL00114

Sample ID: 432328002

Client ID: ARSL004

Matrix: W

Collect Date: 05-SEP-17 15:23

Receive Date: 07-SEP-17

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L		1	TSM	09/16/17	0116	1699918	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	0733	1698825	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	U	ND	0.033	0.100	mg/L	1.00	1	KLP1	09/14/17	1015	1699984	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	KLP1	09/13/17	1300	1699983

The following Analytical Methods were performed:

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

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

Lc/LC: Critical Level

DL: Detection Limit

PF: Prep Factor

MDA: Minimum Detectable Activity

RL: Reporting Limit

MDC: Minimum Detectable Concentration

SQL: Sample Quantitation Limit

# **Quality Control Summary**

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: September 29, 2017

Page 1 of 6

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

Contact: Ms. Nita Patel

Workorder: 432328

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1699918										
QC1203873016	432325003	DUP									
Total Organic Carbon Average		U	ND	U	ND	mg/L	N/A		TSM	09/15/17	23:19
QC1203873015	LCS										
Total Organic Carbon Average	10.0				9.90	mg/L	99	(80%-120%)		09/15/17	10:13
QC1203873014	MB										
Total Organic Carbon Average			U		ND	mg/L				09/15/17	10:01
QC1203873018	432325003	PS									
Total Organic Carbon Average	10.0	U	ND		10.5	mg/L	103	(75%-125%)		09/16/17	00:06
<b>Flow Injection Analysis</b>											
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
<b>Ion Chromatography</b>											
Batch	1700336										
QC1203874286	432325001	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MXL2	09/14/17	22:29

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## QC Summary

Workorder: 432328

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1700336										
Chloride		1.66		1.64	mg/L	1.06		(0%-20%)	MXL2	09/14/17	22:29
Fluoride		0.112		0.109	mg/L	2.9	^	(+/-0.100)			
Sulfate		4.43		4.42	mg/L	0.296		(0%-20%)			
QC1203874285 LCS											
Bromide	1.25			1.27	mg/L		102	(80%-120%)		09/14/17	21:31
Chloride	5.00			4.76	mg/L		95.1	(80%-120%)			
Fluoride	2.50			2.47	mg/L		98.9	(80%-120%)			
Sulfate	10.0			9.73	mg/L		97.3	(80%-120%)			
QC1203874284 MB											
Bromide			U	ND	mg/L					09/14/17	21:02
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203874287 432325001 PS											
Bromide	1.25	U	ND	1.24	mg/L		96.2	(75%-125%)		09/14/17	22:58
Chloride	5.00		1.66	6.43	mg/L		95.5	(75%-125%)			
Fluoride	2.50		0.112	2.48	mg/L		94.9	(75%-125%)			
Sulfate	10.0		4.43	14.3	mg/L		98.8	(75%-125%)			

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## QC Summary

Workorder: 432328

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1699978										
QC1203873246	432325001	DUP									
Nitrogen, Ammonia	J	0.0214	J	0.0208	mg/L	2.84	^	(+/-0.050)	KLP1	09/13/17	10:48
QC1203873243	LCS										
Nitrogen, Ammonia	1.00			1.02	mg/L			102	(90%-110%)		09/13/17 10:46
QC1203873242	MB										
Nitrogen, Ammonia			J	0.0304	mg/L						09/13/17 10:45
QC1203873250	432325001	MS									
Nitrogen, Ammonia	1.00	J	0.0214	0.960	mg/L			93.9	(90%-110%)		09/13/17 10:49
QC1203873252	432325001	MSD									
Nitrogen, Ammonia	1.00	J	0.0214	0.979	mg/L	1.96		95.8	(0%-15%)		09/13/17 10:50
Batch	1699982										
QC1203873260	432325001	DUP									
Phosphorus, Total as P		0.0966		0.0909	mg/L	6.08	^	(+/-0.050)	KLP1	09/13/17	14:15
QC1203873258	LCS										
Phosphorus, Total as P	1.00			1.10	mg/L			110	(80%-124%)		09/13/17 14:10
QC1203873257	MB										
Phosphorus, Total as P			U	ND	mg/L						09/13/17 14:35
QC1203873262	432325001	MS									
Phosphorus, Total as P	1.00	0.0966		1.11	mg/L			101	(63%-139%)		09/13/17 14:16
QC1203873263	432325001	MSD									
Phosphorus, Total as P	1.00	0.0966		1.12	mg/L	0.897		102	(0%-20%)		09/13/17 14:17
Batch	1699984										
QC1203873270	432325003	DUP									
Nitrogen, Total Kjeldahl	U	ND	U	ND	mg/L	N/A			KLP1	09/14/17	10:13

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## QC Summary

Workorder: 432328

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1699984										
QC1203873269	LCS										
Nitrogen, Total Kjeldahl	1.00			1.03	mg/L		103	(90%-110%)	KLP1	09/14/17	10:37
QC1203873268	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					09/14/17	10:11
QC1203873273	432325003	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND	1.10	mg/L		110	(90%-110%)		09/14/17	10:14
<hr/>											
Batch	1700075										
QC1203873616	432318001	DUP									
Nitrogen, Nitrate/Nitrite			0.0558	0.0553	mg/L	0.9 ^		(+/-0.050)	KLP1	09/13/17	11:16
QC1203873615	LCS										
Nitrogen, Nitrate/Nitrite	1.00			0.999	mg/L		99.9	(90%-110%)		09/13/17	11:09
QC1203873614	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					09/13/17	11:07
QC1203873620	432318001	PS									
Nitrogen, Nitrate/Nitrite	1.00		0.0558	1.11	mg/L		105	(90%-110%)		09/13/17	11:17
<hr/>											
<b>Solids Analysis</b>											
Batch	1699326										
QC1203871638	432305001	DUP									
Total Dissolved Solids			246	257	mg/L	4.55		(0%-5%)	KLP1	09/08/17	09:35
QC1203871637	LCS										
Total Dissolved Solids	300			304	mg/L		101	(95%-105%)		09/08/17	09:35
QC1203871636	MB										
Total Dissolved Solids			J	5.71	mg/L					09/08/17	09:35



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## QC Summary

Workorder: 432328

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1699923										
QC1203873070	432546001	DUP									
Alkalinity, Total as CaCO3		75.0		73.3	mg/L	2.42		(0%-20%)	RXB5	09/13/17	16:28
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203873067	LCS										
Alkalinity, Total as CaCO3	100			106	mg/L		106	(90%-110%)		09/13/17	15:33
QC1203873072	432546001	MS									
Alkalinity, Total as CaCO3	100	75.0		178	mg/L		103	(80%-120%)		09/13/17	16:29
Batch	1699927										
QC1203873074	432546001	DUP									
pH	H	8.12	H	8.12	SU	0		(0%-5%)	RXB5	09/13/17	16:27
QC1203873073	LCS										
pH	7.00			7.02	SU		100	(99%-101%)		09/13/17	16:04
Batch	1703142										
QC1203881179	432325001	DUP									
Conductivity		162		159	umhos/cm	2.18		(0%-10%)	VH1	09/28/17	11:06
QC1203881177	LCS										
Conductivity	1410			1410	umhos/cm		99.7	(95%-105%)		09/28/17	11:00

### Notes:

- < Result is less than value reported
- > Result is greater than value reported
- B The target analyte was detected in the associated blank.
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- H Analytical holding time was exceeded
- J Value is estimated
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 432328

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

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

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

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

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

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