

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:

Revised data begins on page 152.

[illegible]

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11258

EVENT NAME: Water/CdV (TA16 260) Q3 MY2017

SAMPLE ID: CAWA-17-133301

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	06/05/2017	ok	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):	1323		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	ASP	
LOCATION ID:	R-48		FIELD PREP:	UF	
LOCATION TYPE:	NA		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	MSGP-Hg	1 LITER POLY	1	HNO3	y	NA
	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 50' away

LOCATION COMMENTS: none

## FIELD PARAMETERS:

Sample Time	1323	HH:MM	Dissolved Oxygen	7.60 mg/L	Flow (in gpm)	6 gpm
Oxidation-Reduction Potential	143.6 mV		pH	8.20	Specific Conductance	125.0 µS/cm
Temperature	20.8 °C		Turbidity	2.81 NTU		

COLLECTED BY (PRINT): K. Tow

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>[Signature]</i>	Date/Time 6/5/17 1440	RECEIVED BY (Printed Name) (Signature)	S. Sherwood <i>[Signature]</i>	Date/Time 6/5/17 14:40
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11258

EVENT NAME: Water/CdV (TA16 260) Q3 MY2017

SAMPLE ID: CAWA-17-133329

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	06/05/2017	ok	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):	1323		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-48		FIELD PREP:	F	
LOCATION TYPE:	NA		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	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

RELINQUISHED BY (Printed Name) (Signature)	Katrina Tow <i>[Signature]</i>	Date/Time 6/5/17 1440	RECEIVED BY (Printed Name) (Signature)	Sherwood <i>[Signature]</i>	Date/Time 6/5/17 14:40
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

Report Date: 05/30/2017

## DATA VALIDATION REPORT

Chain Of Custody No. 2017-1657

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
424916	EPA:120.1	1				
424916	EPA:150.1	1				
424916	EPA:160.1	1				
424916	EPA:170.0	2				
424916	EPA:245.2	2				
424916	EPA:300.0	1				
424916	EPA:310.1	1				
424916	EPA:335.4	1				
424916	EPA:350.1	1				
424916	EPA:351.2	1				
424916	EPA:353.2	1				
424916	EPA:365.4	1				
424916	SM:A2340B	1				
424916	SW-846:6010C	1				
424916	SW-846:6020	1				
424916	SW-846:6850	1				
424916	SW-846:8330B	1				
424916	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
424916	EPA:120.1	1678861	1678861	1										1				1			
424916	EPA:150.1	1673523	1673523	1										1				1			
424916	EPA:160.1	1673398	1673398	1					1					1				1			
424916	EPA:170.0	NA	NA	2																	
424916	EPA:245.2	1673477	1673474	2					1	2				1				2			
424916	EPA:300.0	1672927	1672927	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
424916	EPA:310.1	1673522	1673522	1						1				1				1			
424916	EPA:335.4	1671991	1671990	1					1	1				1				1			
424916	EPA:350.1	1671935	1671933	1					1	1				1				1			
424916	EPA:351.2	1671942	1671941	1					1	1				1				1			
424916	EPA:353.2	1671832	1671832	1					1					1				2			
424916	EPA:365.4	1672160	1672159	1					1	1				1				1			
424916	SM:A2340B	1677435	1677435	1																	
424916	SW-846:6010C	1671891	1671890	1					1	1				1				1			
424916	SW-846:6020	1671895	1671894	1					1	1				1				1			
424916	SW-846:6850	1673882	1673881	1					1	1	1			1							
424916	SW-846:8330B	1672553	1672551	1					1	1	1			1							
424916	SW-846:9060	1671529	1671529	1					1					1	1			1			

### 2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAWA-17-133329	424916002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAWA-17-133347	1203822828	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203822826	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-133329	424916002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-133347	1203810238	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203811672	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-17-133329	1203806142	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-17-133329	424916002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203809793	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203809792	MB	1	0	0	0
EPA:170.0	VOC	CAWA-17-133301	424916001	REG	1	0	0	0
EPA:170.0	VOC	CAWA-17-133329	424916002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-17133354	1203810088	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAPA-17133354	1203810090	MS	0	0	1	0
EPA:245.2	INORGANIC	CAWA-17-133278	1203810087	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-133278	1203810089	MS	0	0	1	0

## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:245.2	INORGANIC	CAWA-17-133301	424916001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-133329	424916002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203810086	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203810085	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-17-133313	1203808702	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-17-133329	424916002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203808701	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203808700	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-133329	424916002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-133347	1203810232	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-133347	1203810235	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203810229	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-133301	424916001	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203806300	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203806299	MB	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	SWWS46-17-136913	1203806301	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	SWWS46-17-136913	1203806302	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-17-133353	1203806103	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAPA-17-133353	1203806104	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-133329	424916002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203806102	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203806101	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-17-133355	1203806128	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAPA-17-133355	1203806129	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-133301	424916001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203806127	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203806126	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-17-133329	424916002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-17-134176	1203805866	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203805864	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203805863	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	MSGP-17-132059	1203805867	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-133329	1203806695	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-133329	1203806696	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-133329	424916002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203806694	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203806693	MB	1	0	0	0
SM:A2340B	INORGANIC	CAWA-17-133329	424916002	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAWA-17-133329	424916002	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203806010	LCS	0	0	17	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	MB	1203806009	MB	17	0	0	0
SW-846:6010C	INORGANIC	SWWS46-17-136913	1203806011	DUP	17	0	0	0
SW-846:6010C	INORGANIC	SWWS46-17-136913	1203806012	MS	0	0	17	0
SW-846:6020	INORGANIC	CAWA-17-133329	424916002	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203806019	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203806018	MB	11	0	0	0
SW-846:6020	INORGANIC	SWWS46-17-136913	1203806020	DUP	11	0	0	0
SW-846:6020	INORGANIC	SWWS46-17-136913	1203806021	MS	0	0	11	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-133329	1203811122	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-133329	1203811123	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-133329	424916002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203811121	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203811120	MB	1	0	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-133301	1203807733	MS	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-133301	1203807734	MSD	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-133301	424916001	REG	20	1	0	0
SW-846:8330B	LCMS/MS HIGH	LCS	1203807732	LCS	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	MB	1203807731	MB	20	1	0	0
SW-846:9060	GENERAL CHEMISTRY	CAPA-17133356	1203805984	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-17-133301	424916001	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203805982	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	LCSD	1203805983	LCSD	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203805981	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?



## DATA VALIDATION REPORT

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203806009	METHOD BLANK	SW-846:6010C	W	Sodium	107	J	ug/L	300
MB	1203806009	METHOD BLANK	SW-846:6010C	W	Zinc	-3.38	J	ug/L	10.0
MB	1203806101	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0385	J	mg/L	0.050
MB	1203806126	METHOD BLANK	EPA:351.2	W	Total Kjeldahl Nitrogen	0.0715	J	mg/L	0.100
MB	1203809792	METHOD BLANK	EPA:160.1	W	Total Dissolved Solids	4.29	J	mg/L	14.3

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-17-133329	1203806101	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0385	mg/L	0.0482	J	0.050	Y	5	100	Y
CAWA-17-133301	1203806126	METHOD BLANK	EPA:351.2	Total Kjeldahl Nitrogen	0.0715	mg/L	0.150		0.100	Y	5	100	Y
CAWA-17-133329	1203806009	METHOD BLANK	SW-846:6010C	Zinc	-3.38	ug/L	10.0	U	10.0	N			

6. Any surrogate recoveries outside the control limits?

No.

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

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
SWWS46-17-136913	1203806012		SW-846:6010C	Sodium	1671890	06-13-2017	W	52		125	75			

## DATA VALIDATION REPORT

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CAWA-17-133301	1203807733	1203807734	SW-846:8330B	TATB	1672551	06-16-2017	W	157	144	149	38		10	30

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

LCS Lab Sample	LCSD Lab	Analytical Method	Parameter Name	Lab Lot ID	Analysis	Sample Matrix	LCS Spike Recovery	LCSD Spike Recovery	Upper Limit	Lower Limit	Upper Rejection Limit	Lower Rejection Limit	RPD	RPD Limit
1203807732		SW-846:8330B	2,6-Diamino-4-nitrotoluene	1672551	06-16-2017	W	137		127	53				
1203807732		SW-846:8330B	TATB	1672551	06-16-2017	W	148		135	47				

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

Field Sample ID	Lab Sample ID	LD Lab Sample ID	Analytical Method	Parameter Name	Sample Matrix	Lab Result	LD Lab Result	Lab Units	Detect Flag	LD Detect Flag	RPD	RPD Limit
CAWA-17-133329	424916002	1203806142	EPA:160.1	Total Dissolved	W	121	137	mg/L	Y	Y	12.2	5

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

## DATA VALIDATION REPORT

### 13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-48	2017-1657	CAWA-17-133301	REG	INIT	GENERAL CHEMISTRY	EPA:351.2	Total Kjeldahl Nitrogen	U	I4	N	0.150	mg/L	0.150	mg/L			W	06/05/2017		1671942	VAL	Y	
R-48	2017-1657	CAWA-17-133329	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J	I4	N	0.0482	mg/L	0.0482	mg/L			W	06/05/2017		1671935	VAL	Y	
R-48	2017-1657	CAWA-17-133329	REG	INIT	GENERAL CHEMISTRY	EPA:160.1	Total Dissolved Solids	J	I10b	Y	121	mg/L	121	mg/L			W	06/05/2017		1673398	VAL	Y	

### Reason Code

### Description

I10b	The sample and/or the duplicate sample results RPD is not within the acceptance limits. Follow the external laboratory limits located within the associated data package
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-17-133301	R-48	REG	EPA:170.0	0	1
CAWA-17-133301	R-48	REG	EPA:245.2	0	1
CAWA-17-133301	R-48	REG	EPA:335.4	0	1
CAWA-17-133301	R-48	REG	EPA:351.2	0	1
CAWA-17-133301	R-48	REG	SW-846:8330B	0	20
CAWA-17-133301	R-48	REG	SW-846:9060	0	1
CAWA-17-133329	R-48	REG	EPA:120.1	0	1
CAWA-17-133329	R-48	REG	EPA:150.1	0	1
CAWA-17-133329	R-48	REG	EPA:160.1	0	1
CAWA-17-133329	R-48	REG	EPA:170.0	0	1
CAWA-17-133329	R-48	REG	EPA:245.2	0	1
CAWA-17-133329	R-48	REG	EPA:300.0	0	4
CAWA-17-133329	R-48	REG	EPA:310.1	0	2
CAWA-17-133329	R-48	REG	EPA:350.1	0	1

## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-17-133329	R-48	REG	EPA:353.2	0	1
CAWA-17-133329	R-48	REG	EPA:365.4	0	1
CAWA-17-133329	R-48	REG	SM:A2340B	0	1
CAWA-17-133329	R-48	REG	SW-846:6010C	0	17
CAWA-17-133329	R-48	REG	SW-846:6020	0	11
CAWA-17-133329	R-48	REG	SW-846:6850	0	1

## DATA VALIDATION REPORT

Chain Of Custody No. 2017-1657 - Rev

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
424916	SW-846:8330B	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
424916	EPA:245.2	1673477	1673474							1							1				
424916	SW-846:8330B	1672553	1672551	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:245.2	INORGANIC	CAPA-17133354	1203810088	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAPA-17133354	1203810090	MS	0	0	1	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-133301	424916001	REG	3	0	0	0
SW-846:8330B	LCMS/MS HIGH	MB	1203807731	MB	3	0	0	0

### 3. Are any analytes missing?

No.

### 4. Were any holding times exceeded?

No.

### 5. Any contaminants in blanks?

No.



## DATA VALIDATION REPORT

6. Any surrogate recoveries outside the control limits?

No.

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

No.

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

None.

<u>Reason Code</u>	<u>Description</u>
U_LAB	The analytical laboratory qualified the analyte as not detected.

## DATA VALIDATION REPORT

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-17-133301	R-48	REG	SW-846:8330B	0	3

June 30, 2017

Mr. Keith Greene  
Los Alamos National Laboratory  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico 87545

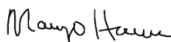
Re: LANL- WQH Water Samples  
Work Order: 424916  
SDG: 2017-1657

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on June 07, 2017, and analyzed for Explosives by LCMSMS, 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: 2017-1657  
Enclosures



**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 424916**  
**SDG: 2017-1657**

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# Case Narrative

**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 424916  
SDG # : 2017-1657**

**June 30, 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 June 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. There are no additional comments concerning sample receipt.

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

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
424916001	CAWA-17-133301
424916002	CAWA-17-133329

**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, General Chemistry, Metals and Perchlorates by LCMSMS.

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

*Margo Herron*  
Margo Herron for  
Valerie Davis  
Project Manager

**List of current GEL Certifications as of 30 June 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	SC000122017-1
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
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-22
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404



# **Chain of Custody and Supporting Documentation**

**COC/Lab Request #:**  
2017-1657  
Page 1 of 1

1

[illegible]

Special Instructions:			
Relinquished by:	Print Name: <u>Michelle Mack</u>	Date/Time: <u>10/17 3:00</u>	Received by: <u>[Signature]</u>
Relinquished by:	Print Name:	Date/Time:	Received by:
Relinquished by:	Print Name:	Date/Time:	Received by:
Relinquished by:	Print Name:	Date/Time:	Received by:



Laboratories LLC

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <u>ESH</u>		SDG/AR/COC/Work Order:	
Received By: <u>ZKW</u>		Date Received: <u>06/07/17</u>	
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	
		<u>5908 1782 1764</u> <u>5908 1782 1786</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <u>CPM</u> mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input 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"/>	<input checked="" type="checkbox"/>		
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Preservation Method: Wet Ice <input checked="" type="checkbox"/> Ice Packs <input type="checkbox"/> Dry ice <input type="checkbox"/> None <input type="checkbox"/> Other: _____ *all temperatures are recorded in Celsius
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Temperature Device Serial #: <u>IR3-16</u> Secondary Temperature Device Serial # (If Applicable): _____
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input 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"/>	<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"/>	<input checked="" type="checkbox"/>		If Yes, Are Encores or Soil Kits present? Yes ___ No ___ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No ___ N/A ___ (If unknown, select No) <input checked="" type="checkbox"/> VOA vials free of headspace? Yes ___ No ___ N/A ___ Sample ID's and containers affected: _____
8	Samples received within holding area?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		ID's and tests affected: _____
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Sample ID's and containers affected: _____
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Sample ID's affected: _____
11	Number of containers received match number indicated on COC? <u>See Below</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Sample ID's affected: <u>See Below</u>
12	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

Comments (Use Continuation Form if needed):

\* We only rec'd samples -136913, -133301, and -133329

PM (or PMA) review: Initials AM Date 6/9/17 Page \_\_\_\_ of \_\_\_\_

GL-CHL-SR-001 Rev 5

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

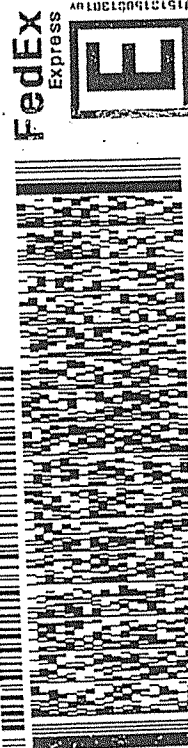
SHIP DATE: 06 JUN 7  
ACTWGT: 46.0 LB MAN  
CAD: 0014176/CAFE2916

BILL SENDER:

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171  
REF: 21PD0ASRGW04BAGWEO

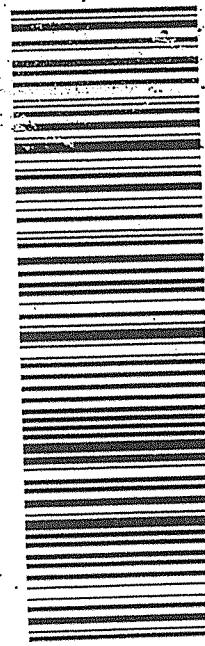


WED - 07 JUN 10:30A  
PRIORITY OVERNIGHT

TRK# 5908 1782 1764

X7 RBWA

29407  
SC-US CHS



Part # 156148V-434 RIT2 06/15

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

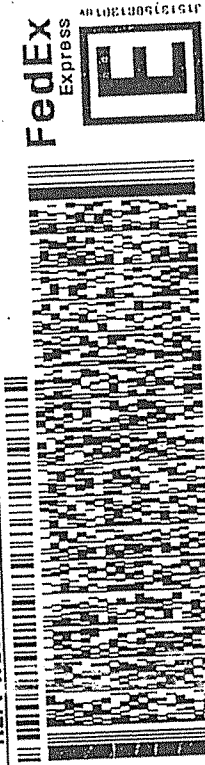
SHIP DATE: 06 JUN 17  
ACTWGT: 35.0 LB MAN  
CAD: 0014176/CAFE2916

BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171  
REF: WE6L11551000

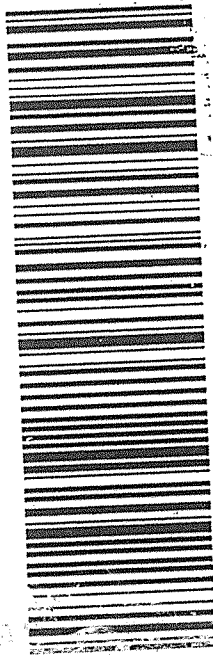


WED - 07 JUN 10:30A  
PRIORITY OVERNIGHT

TRK# 5908 1782 1786

X7 RBWA

29407  
SC-US CHS



Part # 156148V-434 RIT2 06/15

# **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.

# **Perchlorates by LCMSMS Analysis**

# Case Narrative

**Perchlorates by LCMSMS  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2017-1657  
Work Order #: 424916**

**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: 1673882

Prep Batch Number: 1673881

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
424916002	424916002 (CAWA-17-133329)
1203811124	Interference Check Sample (ICS)
1203811120	Method Blank (MB)
1203811121	Laboratory Control Sample (LCS)
1203811122	424916002(CAWA-17-133329) Matrix Spike (MS)
1203811123	424916002(CAWA-17-133329) 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 424916002 (CAWA-17-133329) 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****Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**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: 2017-1657 GEL Work Order: 424916

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

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

#### Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 16 JUN 2017

Title: Group Leader

# **Sample Data Summary**

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample No.

CAWA-17-133329Lab Code: GELInstrument: LCMSMSDate Received: 07-JUN-17Method: SW846 6850 ModifiedGEL Job No (SDG): 2017-1657Matrix: WATERGEL Sample ID: 424916002Extraction Batch ID: 1673881Date Filtered: 14-JUN-17Extraction Type: Filter/DAIInjection Volume (uL): 20Sample Volume/Weight: 10.0 mL%Solids:     Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.331	ug/L		1	14-JUN-17 20:15	per0614016a
	Perchlorate Isotope Ratio			2.92			1	14-JUN-17 20:15	per0614016a
14797-73-0	Perchlorate-101	.05	.2	0.338	ug/L		1	14-JUN-17 20:15	per0614016a
	Perchlorate-O(18)			0.398	ug/L		1	14-JUN-17 20:15	per0614016a

^ 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):** 2017-1657

**Extract Batch Code:** 1673881

**Date Filtered:** 14-JUN-17

**Matrix:** WATER

**Sample ID:** 1203811121

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.19	ug/L	95		85 - 115
Perchlorate Isotope Ratio		2.75				-
Perchlorate-101	0.200	.206	ug/L	103		85 - 115
Perchlorate-O(18)		.441	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):** 2017-1657

**Extract Batch Code:** 1673881

**Date Extracted:** 14-JUN-17

**GEL MS/PS ID:** 1203811122

**Client ID:** CAWA-17-133329

**GEL MSD/PSD ID:** 1203811123

**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	0.331	ug/L	0.515	92	.509	89	1	30	75 - 125
Perchlorate Isotope Ratio	0	2.92		2.81		2.93		4		-
Perchlorate-101	0.200	0.338	ug/L	0.548	105	.52	91	5	30	75 - 125
Perchlorate-O(18)	0	0.398	ug/L	0.406		.41		1		-

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

# Quality Control Data

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1673881Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 14-JUN-17GEL Job No (SDG): 2017-1657GEL Sample ID: 1203811120Date Filtered: 14-JUN-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	0.200	ug/L	U	1	14-JUN-17 19:36	per0614013a
	Perchlorate Isotope Ratio						1	14-JUN-17 19:36	per0614013a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	14-JUN-17 19:36	per0614013a
	Perchlorate-O(18)			0.457	ug/L		1	14-JUN-17 19:36	per0614013a

^ 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: 1673881Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 14-JUN-17GEL Job No (SDG): 2017-1657GEL Sample ID: 1203811121Date Filtered: 14-JUN-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	0.190	ug/L	J	1	14-JUN-17 19:49	per0614014a
	Perchlorate Isotope Ratio			2.75			1	14-JUN-17 19:49	per0614014a
14797-73-0	Perchlorate-101	.05	.2	0.206	ug/L		1	14-JUN-17 19:49	per0614014a
	Perchlorate-O(18)			0.441	ug/L		1	14-JUN-17 19:49	per0614014a

^ 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: 1673881Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-1657GEL Sample ID: 1203811124Date Filtered: 14-JUN-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	0.209	ug/L		1	14-JUN-17 20:02	per0614015a
	Perchlorate Isotope Ratio			3.1			1	14-JUN-17 20:02	per0614015a
14797-73-0	Perchlorate-101	.05	.2	0.202	ug/L		1	14-JUN-17 20:02	per0614015a
	Perchlorate-O(18)			0.435	ug/L		1	14-JUN-17 20:02	per0614015a

^ 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: 1673881Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133329MSDate Received: 07-JUN-17GEL Job No (SDG): 2017-1657GEL Sample ID: 1203811122Date Filtered: 14-JUN-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	0.515	ug/L		1	14-JUN-17 20:28	per0614017a
	Perchlorate Isotope Ratio			2.81			1	14-JUN-17 20:28	per0614017a
14797-73-0	Perchlorate-101	.05	.2	0.548	ug/L		1	14-JUN-17 20:28	per0614017a
	Perchlorate-O(18)			0.406	ug/L		1	14-JUN-17 20:28	per0614017a

^ 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: 1673881Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133329MSDDate Received: 07-JUN-17GEL Job No (SDG): 2017-1657GEL Sample ID: 1203811123Date Filtered: 14-JUN-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	0.509	ug/L		1	14-JUN-17 20:41	per0614018a
	Perchlorate Isotope Ratio			2.93			1	14-JUN-17 20:41	per0614018a
14797-73-0	Perchlorate-101	.05	.2	0.520	ug/L		1	14-JUN-17 20:41	per0614018a
	Perchlorate-O(18)			0.410	ug/L		1	14-JUN-17 20:41	per0614018a

^ 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 #: 2017-1657  
Work Order #: 424916**

**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: 1672553

Prep Batch Number: 1672551

**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>
424916001	CAWA-17-133301
1203807731	Method Blank (MB)
1203807732	Laboratory Control Sample (LCS)
1203807733	424916001(CAWA-17-133301) Matrix Spike (MS)
1203807734	424916001(CAWA-17-133301) 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 calibration verification standards (ICV or CCV) have not met requirements of 80-120% for samples 1203807731 (MB), 1203807732 (LCS), 1203807733 (CAWA-17-133301MS), 1203807734 (CAWA-17-133301MSD) and 424916001 (CAWA-17-133301) in this SDG. Please refer to Form 7 of the data package for a list of recoveries. Since the recoveries are biased high and target analytes were not detected in the associated samples, the data are considered unaffected. The data are Q qualified and 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**

One or more of the required spiking analytes were not within the acceptance limits in the laboratory control sample (See Below). While the LCS exhibited a high bias, the analyte was/were not detected in the associated samples, the data are reported.

Sample	Analyte	Value
1203807732 (LCS)	2,6-Diamino-4-nitrotoluene	137* (53%-127%)
	TATB	148* (47%-135%)

##### **QC Sample Designation**

Client sample 424916001 (CAWA-17-133301) was chosen for matrix spike and matrix spike duplicate analysis.

##### **Matrix Spike (MS) Recovery Statement**

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

Sample	Analyte	Value
1203807733 (CAWA-17-133301MS)	TATB	157* (38%-149%)

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

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

##### **Internal Standard (ISTD) Acceptance**

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

#### **Technical Information**

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

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



**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

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

**Sample Re-extraction/Re-analysis**

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

**Miscellaneous Information****Data Exception (DER) Documentation**

Data exception report (DER) 1646371 was generated for samples 1203807732 (LCS) and 1203807733 (CAWA-17-133301MS) in this SDG/batch.

**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: 2017-1657 GEL Work Order: 424916

#### 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
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- 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: 28 JUN 2017

Title: Group Leader

# **Sample Data Summary**

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133301

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 424916001

Sample Amount 920 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0616018.wiff

Date Analyzed: 16-JUN-17 21:11

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.272	U	0.087	0.272
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.272	U	0.087	0.272
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.272	U	0.087	0.272
<i>121-82-4</i>	<i>RDX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.272	U	0.087	0.272
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.272	U	0.087	0.272
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.272	U	0.087	0.272
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	.272	U	0.087	0.272
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
88-72-2	o-Nitrotoluene	.272	U	0.0891	0.272
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
98-95-3	Nitrobenzene	.272	U	0.087	0.272
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.272	U	0.087	0.272
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.272	U	0.087	0.272
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	.272	U	0.087	0.272
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
479-45-8	Tetryl	.543	U	0.087	0.543
<i>479-45-8</i>	<i>Tetryl</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133301

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 424916001

Sample Amount 920 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-11-5	PETN	.543	U	0.109	0.543
<i>78-11-5</i>	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.543	U	0.163	0.543
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	1.09	U	0.326	1.09
<i>3058-38-6</i>	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	1.09	U	0.326	1.09
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	1.09	QU	0.326	1.09
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	2.72	QU	0.543	2.72
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	2.72	QU	0.543	2.72
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				

# **Quality Control Summary**

**High Explosives Surrogate Recovery Summary****Lab Name:** GEL Laboratories LLC**GEL Job No (SDG):** 2017-1657**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
424916001	CAWA-17-133301	98	55 - 115	
1203807731	MB for batch 1672551	102	55 - 115	
1203807732	LCS for batch 1672551	85	55 - 115	
1203807733	CAWA-17-133301MS	81	55 - 115	
1203807734	CAWA-17-133301MSD	97	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)** 2017-1657

**Extract Batch Code:** 1672551

**Date Extracted:** 09-JUN-17

**GEL LCS ID:** 1203807732

**GEL LCSDUP ID:** .

**Analysis Date/Time:** 16-JUN-17 20:35

**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
m-Dinitrobenzene	5	4.86	97					74 - 117
m-Nitrotoluene	5	4.03	81					66 - 114
o-Nitrotoluene	5	4.65	93					64 - 115
p-Nitrotoluene	5	4.76	95					66 - 127
tris(o-cresyl) phosphate	5	3.89	78					43 - 104
1,3,5-Trinitrobenzene	5	4.42	88					70 - 110
2,4,6-Trinitrotoluene	5	4.25	85					69 - 113
2,4-Diamino-6-nitrotoluene	5	5.89	118					50 - 121
2,4-Dinitrotoluene	5	4.44	89					71 - 110
2,6-Diamino-4-nitrotoluene	5	6.85	137 *					53 - 127
2,6-Dinitrotoluene	5	4.16	83					72 - 105
2-Amino-4,6-dinitrotoluene	5	4.44	89					70 - 112
3,5-Dinitroaniline	5	5.38	108					70 - 121
4-Amino-2,6-dinitrotoluene	5	4.42	88					74 - 116
HMX	5	4	80					58 - 113
Nitrobenzene	5	4.65	93					64 - 115
PETN	5	5.39	108					57 - 126
RDX	5	4.27	85					64 - 117
TATB	2.5	3.7	148 *					47 - 135
Tetryl	5	4.27	85					64 - 122

# 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-17-133301

**Lab Code:** GEL

**GEL Job No (SDG)** 2017-1657

**Extract Batch Code:** 1672551

**Date Extracted:** 09-JUN-17

**GEL Spike ID:** 1203807733

**GEL SpikeDup ID:** 1203807734

**Analysis Date/Time:** 16-JUN-17 21:46

**MSD Analysis Date/Time:** 16-JUN-17 22:21

**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
1,3,5-Trinitrobenzene	5.43478	0	5.23	96	4.95	93	6	30	67 - 111
2,4,6-Trinitrotoluene	5.43478	0	4.29	79	5.4	102	23	30	66 - 112
2,4-Diamino-6-nitrotoluene	5.43478	0	5.9	109	5.58	105	6	30	50 - 121
2,4-Dinitrotoluene	5.43478	0	4.3	79	5.2	98	19	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.43478	0	6.8	125	5.72	108	17	30	53 - 127
2,6-Dinitrotoluene	5.43478	0	4.25	78	5	94	16	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.43478	0	4.32	79	4.94	93	13	30	67 - 115
3,5-Dinitroaniline	5.43478	0	5.27	97	5.94	112	12	30	70 - 121
4-Amino-2,6-dinitrotoluene	5.43478	0	4.48	83	4.95	93	10	30	65 - 120
HMX	5.43478	.0391	4.69	86	4.25	79	10	30	44 - 128
Nitrobenzene	5.43478	0	5.4	99	5.1	96	6	30	62 - 116
PETN	5.43478	0	4.72	87	5.35	101	12	30	51 - 131
RDX	5.43478	0	4.35	80	4.5	85	3	30	57 - 125
Tetryl	5.43478	0	3.63	67	3.42	64	6	30	50 - 126
m-Dinitrobenzene	5.43478	0	5.18	95	5.04	95	3	30	74 - 117
m-Nitrotoluene	5.43478	0	4.95	91	5.41	102	9	30	59 - 120
o-Nitrotoluene	5.43478	0	4.81	89	5.43	102	12	30	56 - 119
p-Nitrotoluene	5.43478	0	4.93	91	5.92	111	18	30	61 - 129
tris(o-cresyl) phosphate	5.43478	0	4.52	83	4.88	92	8	30	38 - 105
TATB	2.71739	0	4.26	157 *	3.84	144	10	30	38 - 149

#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 1672551

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807731

Sample Amount 1000 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0616016.wiff

Date Analyzed: 16-JUN-17 20:00

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.25	U	0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.25	U	0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.25	U	0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.25	U	0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.25	U	0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.25	U	0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	.25	U	0.080	0.250
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
88-72-2	o-Nitrotoluene	.25	U	0.082	0.250
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
98-95-3	Nitrobenzene	.25	U	0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.25	U	0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.25	U	0.080	0.250
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	.25	U	0.080	0.250
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
479-45-8	Tetryl	.5	U	0.080	0.500
<i>479-45-8</i>	<i>Tetryl</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: MB for batch 1672551

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807731

Sample Amount 1000 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-11-5	PETN	.5	U	0.100	0.500
<i>78-11-5</i>	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.5	U	0.150	0.500
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	1	U	0.300	1.00
<i>3058-38-6</i>	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	1	U	0.300	1.00
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	1	QU	0.300	1.00
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	2.5	QU	0.500	2.50
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	2.5	QU	0.500	2.50
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1672551

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807732

Sample Amount 1000 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0616017.wiff

Date Analyzed: 16-JUN-17 20:35

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	3.7		0.300	1.00
<i>3058-38-6</i>	<i>TATB</i>				
78-30-8	tris(o-cresyl) phosphate	3.89	Q	0.300	1.00
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
2691-41-0	HMX	4		0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
99-08-1	m-Nitrotoluene	4.03		0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	4.16		0.080	0.250
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	4.25		0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-82-4	RDX	4.27		0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
479-45-8	Tetryl	4.27		0.080	0.500
<i>479-45-8</i>	<i>Tetryl</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.42		0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	4.42		0.080	0.250
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
121-14-2	2,4-Dinitrotoluene	4.44		0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.44		0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
88-72-2	o-Nitrotoluene	4.65		0.082	0.250
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1672551

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807732

Sample Amount 1000 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
98-95-3	Nitrobenzene	4.65		0.080	0.250
98-95-3	<i>Nitrobenzene</i>				
99-99-0	p-Nitrotoluene	4.76		0.150	0.500
99-99-0	<i>p-Nitrotoluene</i>				
99-65-0	m-Dinitrobenzene	4.86		0.080	0.250
99-65-0	<i>m-Dinitrobenzene</i>				
618-87-1	3,5-Dinitroaniline	5.38		0.300	1.00
618-87-1	<i>3,5-Dinitroaniline</i>				
78-11-5	PETN	5.39		0.100	0.500
78-11-5	<i>PETN</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	5.89	Q	0.500	2.50
6629-29-4	<i>2,4-Diamino-6-nitrotoluene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	6.85	Q	0.500	2.50
59229-75-3	<i>2,6-Diamino-4-nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133301(424916001MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807733

Sample Amount 920 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0616019.wiff

Date Analyzed: 16-JUN-17 21:46

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
479-45-8	Tetryl	3.63		0.087	0.543
<i>479-45-8</i>	<i>Tetryl</i>				
606-20-2	2,6-Dinitrotoluene	4.25		0.087	0.272
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
3058-38-6	TATB	4.26		0.326	1.09
<i>3058-38-6</i>	<i>TATB</i>				
118-96-7	2,4,6-Trinitrotoluene	4.29		0.087	0.272
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	4.3		0.087	0.272
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.32		0.087	0.272
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
121-82-4	RDX	4.35		0.087	0.272
<i>121-82-4</i>	<i>RDX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.48		0.087	0.272
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
78-30-8	tris(o-cresyl) phosphate	4.52	Q	0.326	1.09
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
2691-41-0	HMX	4.69		0.087	0.272
<i>2691-41-0</i>	<i>HMX</i>				
78-11-5	PETN	4.72		0.109	0.543
<i>78-11-5</i>	<i>PETN</i>				
88-72-2	o-Nitrotoluene	4.81		0.0891	0.272
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
99-99-0	p-Nitrotoluene	4.93		0.163	0.543
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				



1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133301(424916001MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807733

Sample Amount 920 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-08-1	m-Nitrotoluene	4.95		0.087	0.272
99-08-1	m-Nitrotoluene				
99-65-0	m-Dinitrobenzene	5.18		0.087	0.272
99-65-0	m-Dinitrobenzene				
99-35-4	1,3,5-Trinitrobenzene	5.23		0.087	0.272
99-35-4	1,3,5-Trinitrobenzene				
618-87-1	3,5-Dinitroaniline	5.27		0.326	1.09
618-87-1	3,5-Dinitroaniline				
98-95-3	Nitrobenzene	5.4		0.087	0.272
98-95-3	Nitrobenzene				
6629-29-4	2,4-Diamino-6-nitrotoluene	5.9	Q	0.543	2.72
6629-29-4	2,4-Diamino-6-nitrotoluene				
59229-75-3	2,6-Diamino-4-nitrotoluene	6.8	Q	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-17-133301(424916001MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807734

Sample Amount 940 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0616020.wiff

Date Analyzed: 16-JUN-17 22:21

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
479-45-8	Tetryl	3.42		0.0851	0.532
<i>479-45-8</i>	<i>Tetryl</i>				
3058-38-6	TATB	3.84		0.319	1.06
<i>3058-38-6</i>	<i>TATB</i>				
2691-41-0	HMX	4.25		0.0851	0.266
<i>2691-41-0</i>	<i>HMX</i>				
121-82-4	RDX	4.5		0.0851	0.266
<i>121-82-4</i>	<i>RDX</i>				
78-30-8	tris(o-cresyl) phosphate	4.88	Q	0.319	1.06
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.94		0.0851	0.266
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.95		0.0851	0.266
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	4.95		0.0851	0.266
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
606-20-2	2,6-Dinitrotoluene	5		0.0851	0.266
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.04		0.0851	0.266
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
98-95-3	Nitrobenzene	5.1		0.0851	0.266
<i>98-95-3</i>	<i>Nitrobenzene</i>				
121-14-2	2,4-Dinitrotoluene	5.2		0.0851	0.266
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
78-11-5	PETN	5.35		0.106	0.532
<i>78-11-5</i>	<i>PETN</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133301(424916001MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807734

Sample Amount 940 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	5.4		0.0851	0.266
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
99-08-1	m-Nitrotoluene	5.41		0.0851	0.266
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
88-72-2	o-Nitrotoluene	5.43		0.0872	0.266
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	5.58	Q	0.532	2.66
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	5.72	Q	0.532	2.66
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
99-99-0	p-Nitrotoluene	5.92		0.160	0.532
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
618-87-1	3,5-Dinitroaniline	5.94		0.319	1.06
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				

## Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-1657Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 16-JUN-17 11:14GEL Data File: EXP0616001.wiffInstrument ID: LCMSMS5Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
Picric acid	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

## Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-1657Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 16-JUN-17 11:49GEL Data File: EXP0616002.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
Nitroglycerin	0	0
PETN	0	0
Picric acid	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): 2017-1657

Lab Code: GEL

Lab Sample ID: XIBLK02

Analysis Date: 16-JUN-17 16:30

GEL Data File: EXP0616010.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
Nitroglycerin	0	0
PETN	0	0
Picric acid	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	1.69
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	5.72
2,6-Diamino-4-nitrotoluene	0	1.79

4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1657

Lab Code: GEL

Lab Sample ID: XIBLK03

Analysis Date: 16-JUN-17 18:50

GEL Data File: EXP0616014.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
Nitroglycerin	0	0
PETN	0	0
Picric acid	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):** 2017-1657

**Lab Code:** GEL

**Lab Sample ID:** XIBLK04

**Analysis Date:** 17-JUN-17 00:41

**GEL Data File:** EXP0616024.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
Nitroglycerin	0	0
PETN	0	0
Picric acid	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): 2017-1657

Lab Code: GEL

Lab Sample ID: XIBLK05

Analysis Date: 17-JUN-17 01:51

GEL Data File: EXP0616026.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

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

# Miscellaneous

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 27-JUN-17	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LC-MS/MS	<b>Test / Method:</b> SW846 3535A/8330B	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1672553	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 424916(2017-1657),425075(2017-1667),425079(2017-1664)</b> <b>Application Issues:</b> Failed Recovery for MS/MSD, or PS/PSD Failed Recovery for LCS/LCSD			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. One or more of the required spiking analytes were not within the acceptance limits in the laboratory control sample (See Below). 1203807732 (LCS) recovered 2,6-Diamino-4-nitrotoluene at 137% (53%-127%) and TATB at 148% (47%-135%).  2. The MS (See Below) recovered spiked analytes outside of the established acceptance limits. 1203807733 (CAWA-17-133301MS) recovered TATB at 157% (38%-149%).		1. While the LCS exhibited a high bias, the analyte was/were not detected in the associated samples, the data are reported.  2. Because the recoveries were biased high and target analytes were not detected in the associated samples above the reporting limit, the data are reported.	

**Originator's Name:**

Michael Penny 27-JUN-17

**Data Validator/Group Leader:**

Charles Wilson 27-JUN-17

# **Metals Analysis**

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**ARS International, LLC (ARSL)**  
**SDG #: 2017-1657**  
**Work Order #: 424916**

<b>Sample ID</b>	<b>Client ID</b>
424916001	CAWA-17-133301
424916002	CAWA-17-133329
1203806009	Method Blank (MB) <b>ICP</b>
1203806010	Laboratory Control Sample (LCS)
1203806013	424904001(NonSDGL) Serial Dilution (SD)
1203806011	424904001(NonSDGD) Sample Duplicate (DUP)
1203806012	424904001(NonSDGS) Matrix Spike (MS)
1203806018	Method Blank (MB) <b>ICP-MS</b>
1203806019	Laboratory Control Sample (LCS)
1203806022	424904001(NonSDGL) Serial Dilution (SD)
1203806020	424904001(NonSDGD) Sample Duplicate (DUP)
1203806021	424904001(NonSDGS) Matrix Spike (MS)
1203810085	Method Blank (MB) <b>CVAA</b>
1203810086	Laboratory Control Sample (LCS)
1203810092	424739001(CAPA-17133354L) Serial Dilution (SD)
1203810088	424739001(CAPA-17133354D) Sample Duplicate (DUP)
1203810090	424739001(CAPA-17133354S) Matrix Spike (MS)

**Sample Analysis**

Samples 424916001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

**Method/Analysis Information**

<b>Analytical Batch:</b>	1671891, 1671895, 1673477 and 1677435
<b>Prep Batch :</b>	1671890, 1671894 and 1673474
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 28, GL-MA-E-006 REV# 13, GL-MA-E-014 REV# 29, GL-MA-E-010 REV# 34 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 P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

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

The Metals analysis - ICPMS was performed on a PerkinElmer NexION 300X ICPMS. The instrument is equipped with a ESI PFA-ST nebulizer, quadrupole mass spectrometer, dual mode electron multiplier detector, and Kinetic Energy Discrimination (KED) technology. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

### **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 sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 424916002 (CAWA-17-133329)-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: 424904001 (NonSDG)-ICP and ICP-MS and 424739001 (CAPA-17133354)-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.

##### **Data Exception (DER) Documentation**

A data exception report was not required for this SDG.

##### **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: 2017-1657 GEL Work Order: 424916

#### **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: 26 JUN 2017**

**Title: Data Validator**

# **Sample Data Summary**

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

**SDG No:** 2017-1657**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 424916001**BASIS:** As Received**DATE COLLECTED** 05-JUN-17**CLIENT ID:** CAWA-17-133301**LEVEL:** Low**DATE RECEIVED** 07-JUN-17**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	06/14/17 10:50	061417W1-7	1673477

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1673477	1673474	EPA 245.1/245.2 Prep	20	mL	20	mL	06/13/17	AXS5

**\*Analytical Methods:**

AV EPA 245.2 1974

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

**SDG No:** 2017-1657**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 424916002**BASIS:** As Received**DATE COLLECTED** 05-JUN-17**CLIENT ID:** CAWA-17-133329**LEVEL:** Low**DATE RECEIVED** 07-JUN-17**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	06/14/17 10:52	061417W1-7	1673477

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

SDG No: 2017-1657

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 424916002

BASIS: As Received

DATE COLLECTED 05-JUN-17

CLIENT ID: CAWA-17-133329

LEVEL: Low

DATE RECEIVED 07-JUN-17

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	200	ug/L	U	68	200	200	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-38-2	Arsenic	2.58	ug/L	J	2	5	5	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-39-3	Barium	7.57	ug/L		1	5	5	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-70-2	Calcium	10200	ug/L		50	200	200	1	P	HSC	06/13/17 07:41	061317A-2	1671891
7440-47-3	Chromium	10	ug/L	U	3	10	10	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	06/13/17 07:41	061317A-2	1671891
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	06/09/17 00:24	170608-6	1671895
7439-95-4	Magnesium	3280	ug/L		110	300	300	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7439-98-7	Molybdenum	2.37	ug/L		0.2	0.5	0.5	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-02-0	Nickel	2	ug/L	U	0.6	2	2	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-09-7	Potassium	1290	ug/L		50	150	150	1	P	HSC	06/13/17 07:41	061317A-2	1671891
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7631-86-9	Silica	53100	ug/L		53	213	213	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-23-5	Sodium	10600	ug/L		100	300	300	1	P	HSC	06/13/17 07:41	061317A-2	1671891
7440-24-6	Strontium	55.2	ug/L		1	5	5	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	06/09/17 00:24	170608-6	1671895
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-61-1	Uranium	0.456	ug/L		0.067	0.2	0.2	1	MS	PRB	06/09/17 00:24	170608-6	1671895
7440-62-2	Vanadium	11	ug/L		1	5	5	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	06/13/17 07:41	061317A-2	1671891

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

**SDG No:** 2017-1657**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 424916002**BASIS:** As Received**DATE COLLECTED** 05-JUN-17**CLIENT ID:** CAWA-17-133329**LEVEL:** Low**DATE RECEIVED** 07-JUN-17**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	38.9	mg/L		0.453	1.24	1.24	1		TXT1	06/26/17 14:05		1677435

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1671891	1671890	SW846 3005A	50	mL	50	mL	06/07/17	CXW4
1671895	1671894	SW846 3005A	50	mL	50	mL	06/07/17	CXW4
1673477	1673474	EPA 245.1/245.2 Prep	20	mL	20	mL	06/13/17	AXS5

**\*Analytical Methods:**

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

# **Quality Control Summary**



**METALS**  
**-3b-**  
**PREPARATION BLANK SUMMARY**

SDG NO. 2017-1657

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>
1203806009	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	107	ug/L	+/-300	J	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	-3.38	ug/L	+/-10	J	P	3.3	10
1203806018	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
1203810085	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. 2017-1657 Client ID: SWWS46-17-136913S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 424904001 Spike ID: 1203806012

<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	4700		68	U	5000	92.8		P
Barium	ug/L	75-125	500		17		500	96.5		P
Beryllium	ug/L	75-125	496		1	U	500	99.3		P
Boron	ug/L	75-125	580		61		500	104		P
Calcium	ug/L	75-125	21300		16300		5000	98.7		P
Cobalt	ug/L	75-125	493		1	U	500	98.5		P
Copper	ug/L	75-125	526		3.75	J	500	104		P
Iron	ug/L	75-125	5160		69.2	J	5000	102		P
Magnesium	ug/L	75-125	9510		4620		5000	97.9		P
Manganese	ug/L	75-125	492		11.6		500	96.1		P
Potassium	ug/L	75-125	15300		10300		5000	101		P
Silica	ug/L		92300		82700		10700	89	N/A	P
Sodium	ug/L		61100		58500		5000	52	N/A	P
Strontium	ug/L	75-125	562		32.3		500	106		P
Tin	ug/L	75-125	490		2.5	U	500	97.6		P
Vanadium	ug/L	75-125	513		5.53		500	102		P
Zinc	ug/L	75-125	545		41		500	101		P

\*Analytical Methods:

P SW846 3005A/6010C

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2017-1657

Client ID: SWWS46-17-136913S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 424904001

Spike ID: 1203806021

<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	50.4		1	U	50	99.9		MS
Arsenic	ug/L	75-125	52.5		2.29	J	50	100		MS
Cadmium	ug/L	75-125	48.4		0.3	U	50	96.8		MS
Chromium	ug/L	75-125	52.6		3	U	50	99.2		MS
Lead	ug/L	75-125	47.4		0.5	U	50	94.6		MS
Molybdenum	ug/L	75-125	53.2		1.76		50	103		MS
Nickel	ug/L	75-125	48.4		0.6	U	50	95.7		MS
Selenium	ug/L	75-125	47.6		2	U	50	93.1		MS
Silver	ug/L	75-125	49.9		0.3	U	50	99.7		MS
Thallium	ug/L	75-125	43.8		0.6	U	50	87.4		MS
Uranium	ug/L	75-125	48		0.147	J	50	95.7		MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-5a-

## Matrix Spike Summary

**SDG NO.** 2017-1657 **Client ID:** CAPA-17133354S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 424739001 **Spike ID:** 1203810090

<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	2.09		0.067	U	2	104		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

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

SDG No.: 2017-1657

Lab Code: GEL

Contract: ESHL00114

Client ID: SWWS46-17-136913D

Matrix: WATER

Level: Low

Sample ID: 424904001

Duplicate ID: 1203806011

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	17		16.9		.378		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	61		60.7		.561		P
Calcium	ug/L	+/-20%	16300		16400		.288		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L	+/-10	3.75 J		3.87 J		3.23		P
Iron	ug/L	+/-100	69.2 J		80.9 J		15.6		P
Magnesium	ug/L	+/-20%	4620		4660		.912		P
Manganese	ug/L	+/-10	11.6		11.6		.233		P
Potassium	ug/L	+/-20%	10300		10300		.194		P
Silica	ug/L	+/-20%	82700		82200		.627		P
Sodium	ug/L	+/-20%	58500		58200		.453		P
Strontium	ug/L	+/-20%	32.3		32.6		.804		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	5.53		5.61		1.47		P
Zinc	ug/L	+/-10	41		36.3		12.1		P

\*Analytical Methods:

P SW846 3005A/6010C

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

SDG No.: 2017-1657

Lab Code: GEL

Contract: ESHL00114

Client ID: SWWS46-17-136913D

Matrix: WATER

Level: Low

Sample ID: 424904001

Duplicate ID: 1203806020

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	2.29 J		2.67 J		15.2		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L		3 U		3.1 J		200		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.76		1.7		3.42		MS
Nickel	ug/L		0.6 U		0.6 U				MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.3 U		0.3 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L	+/- .2	0.147 J		0.146 J		.683		MS

\*Analytical Methods:

MS SW846 3005A/6020A

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

**SDG No.:** 2017-1657**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAPA-17133354D**Matrix:** WATER**Level:** Low**Sample ID:** 424739001**Duplicate ID:** 1203810088**Percent Solids for Dup:** N/A

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

\*Analytical Methods:

AV EPA 245.1/245.2

## METALS

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## Laboratory Control Sample Summary

SDG NO. 2017-1657

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>
1203806010								
	Vanadium	ug/L	500	517		103	80-120	P
	Zinc	ug/L	500	496		99.2	80-120	P
	Aluminum	ug/L	5000	5170		103	80-120	P
	Barium	ug/L	500	505		101	80-120	P
	Beryllium	ug/L	500	505		101	80-120	P
	Boron	ug/L	500	520		104	80-120	P
	Calcium	ug/L	5000	5120		102	80-120	P
	Cobalt	ug/L	500	516		103	80-120	P
	Copper	ug/L	500	526		105	80-120	P
	Iron	ug/L	5000	5060		101	80-120	P
	Magnesium	ug/L	5000	5400		108	80-120	P
	Manganese	ug/L	500	511		102	80-120	P
	Potassium	ug/L	5000	5010		100	80-120	P
	Silica	ug/L	10700	10700		99.9	80-120	P
	Sodium	ug/L	5000	4810		96.1	80-120	P
	Strontium	ug/L	500	572		114	80-120	P
	Tin	ug/L	500	510		102	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C



## METALS

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## Laboratory Control Sample Summary

SDG NO. 2017-1657

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>
1203806019								
	Antimony	ug/L	50	49.4		98.7	80-120	MS
	Arsenic	ug/L	50	52.1		104	80-120	MS
	Cadmium	ug/L	50	50.5		101	80-120	MS
	Chromium	ug/L	50	50.1		100	80-120	MS
	Lead	ug/L	50	49.4		98.8	80-120	MS
	Molybdenum	ug/L	50	49.3		98.7	80-120	MS
	Nickel	ug/L	50	50.4		101	80-120	MS
	Selenium	ug/L	50	51.6		103	80-120	MS
	Silver	ug/L	50	51.5		103	80-120	MS
	Thallium	ug/L	50	45		90	80-120	MS
	Uranium	ug/L	50	48.7		97.4	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2017-1657

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>
1203810086	Mercury	ug/L	2	2.04		102	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

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## Serial Dilution Sample Summary

SDG NO. 2017-1657 Client ID: SWWS46-17-136913L

Contract: ESHL00114

Matrix: LIQUID Level: Low

Sample ID: 424904001 Serial Dilution ID: 1203806013

<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	17		17	J	.386			P
Beryllium	1	U	5	U				P
Boron	61		75	U	3.411			P
Calcium	16300		16800		3.16		10	P
Cobalt	1	U	5	U				P
Copper	3.75	J	15	U	3.812			P
Iron	69.2	J	212	J	207.006			P
Magnesium	4620		5030		8.852			P
Manganese	11.6		12.2	J	4.659			P
Potassium	10300		10400		1.615		10	P
Silica	82700		82300		.568		10	P
Sodium	58500		63600		8.822		10	P
Strontium	32.3		36.6		13.289			P
Tin	2.5	U	12.5	U				P
Vanadium	5.53		5	U	37.07			P
Zinc	41		47.8	J	16.505			P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2017-1657 **Client ID:** SWWS46-17-136913L

**Contract:** ESHL00114

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

**Sample ID:** 424904001 **Serial Dilution ID:** 1203806022

<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	2.29	J	10	U	2.749			MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.76		2.09	J	19.088			MS
Nickel	.6	U	3	U				MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.147	J	.335	U	12.245			MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2017-1657 **Client ID:** CAPA-17133354L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 424739001 **Serial Dilution ID:** 1203810092

<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 #: 2017-1657  
Work Order #: 424916**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1671529

**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>
424916001	CAWA-17-133301
1203805981	Method Blank (MB)
1203805982	Laboratory Control Sample (LCS)
1203805984	424739002(CAPA-17133356) Sample Duplicate (DUP)
1203805986	424739002(CAPA-17133356) 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 424739002 (CAPA-17133356) 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**

##### **Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

##### **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>	1671991	<b>Method:</b>	WSP-CN(T)
<b>Prep Batch :</b>	1671990	<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>
424916001	CAWA-17-133301
1203806299	Method Blank (MB)
1203806300	Laboratory Control Sample (LCS)
1203806301	424904001(NonSDG) Sample Duplicate (DUP)
1203806302	424904001(NonSDG) Matrix Spike (MS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 19.

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

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

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

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

### **Y Intercept Rule**

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

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

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

The MB analyzed with this SDG met the acceptance criteria.

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

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.

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

Sample 424904001 (NonSDG) 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**

##### **Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

##### **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:** 1672927

**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>
424916002	CAWA-17-133329
1203808700	Method Blank (MB)
1203808701	Laboratory Control Sample (LCS)
1203808702	425075004(CAWA-17-133313) Sample Duplicate (DUP)
1203808703	425075004(CAWA-17-133313) 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-1600 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 425075004 (CAWA-17-133313) 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**

#### **Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

#### **Manual Integrations**

Samples 1203808702 (CAWA-17-133313DUP), 1203808703 (CAWA-17-133313PS) and 424916002 (CAWA-17-133329) 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>	1671935	<b>Method:</b>	NH3
<b>Prep Batch :</b>	1671933	<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>
424916002	CAWA-17-133329
1203806101	Method Blank (MB)
1203806102	Laboratory Control Sample (LCS)
1203806103	424741001(CAPA-17-133353) Sample Duplicate (DUP)
1203806104	424741001(CAPA-17-133353) Matrix Spike (MS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

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

### **Continuing Calibration Blanks**

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

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

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

acceptance limits.

**Y Intercept Rule**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 424741001 (CAPA-17-133353) 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**

**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**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>	1671942	<b>Method:</b>	TKN
<b>Prep Batch :</b>	1671941	<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>
424916001	CAWA-17-133301
1203806126	Method Blank (MB)
1203806127	Laboratory Control Sample (LCS)
1203806128	424741002(CAPA-17-133355) Sample Duplicate (DUP)
1203806129	424741002(CAPA-17-133355) 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 424741002 (CAPA-17-133355) 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**

Samples 1203806126 (MB) and 1203806127 (LCS) were re-analyzed due to instrument failure. The results from the reanalysis are reported. Sample 424916001 (CAWA-17-133301) was re-analyzed due to CCB failure. The reanalysis data with passing instrument QC was reported.

**Miscellaneous Information****Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**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:** 1671832

**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>
424916002	CAWA-17-133329
1203805863	Method Blank (MB)
1203805864	Laboratory Control Sample (LCS)
1203805866	424735002(CAWA-17-134176) Sample Duplicate (DUP)
1203805867	424853003(NonSDG) Sample Duplicate (DUP)
1203805871	424735002(CAWA-17-134176) Post Spike (PS)
1203805872	424853003(NonSDG) Post Spike (PS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-128 REV# 8.

### **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**

Samples 424735002 (CAWA-17-134176) and 424853003 (NonSDG) were selected for QC analysis.

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**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>	1672160	<b>Method:</b>	PO4
<b>Prep Batch :</b>	1672159	<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>
424916002	CAWA-17-133329
1203806693	Method Blank (MB)
1203806694	Laboratory Control Sample (LCS)
1203806695	424916002(CAWA-17-133329) Sample Duplicate (DUP)
1203806696	424916002(CAWA-17-133329) Matrix Spike (MS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

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

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

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

### **Y Intercept Rule**

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

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

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

The MB analyzed with this SDG met the acceptance criteria.

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

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.

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

Sample 424916002 (CAWA-17-133329) 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**

##### **Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

##### **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:** 1673398

**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>
424916002	CAWA-17-133329
1203809792	Method Blank (MB)
1203809793	Laboratory Control Sample (LCS)
1203806142	424916002(CAWA-17-133329) 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 424916002 (CAWA-17-133329) was selected for QC analysis.

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

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

Analyte	Sample	Value
Total Dissolved Solids	1203806142 (CAWA-17-133329DUP)	12.2* (0%-5%)

#### **Technical Information**

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

#### **Holding Times**

All samples in this SDG met the specified holding time.

#### **Sample Dilutions**

The samples in this SDG did not require dilutions.

#### **Sample Re-analysis**

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

#### **Miscellaneous Information**

##### **Data Exception (DER) Documentation**

A data exception report (DER) 1641693 was generated for sample 1203806142 (CAWA-17-133329DUP) in this SDG/batch.

#### **Additional Comments**

Additional comments were not required for this SDG.

#### **Electronic Packaging Comment**

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

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### **Method/Analysis Information**

**Product:** Specific Conductivity

**Analytical Batch:** 1678861

**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>
424916002	CAWA-17-133329
1203822826	Laboratory Control Sample (LCS)
1203822828	425121001(CAWA-17-133347) Sample Duplicate (DUP)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Initial Standardization**

The titrant was properly standardized

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

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

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.

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

Sample 425121001 (CAWA-17-133347) 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****Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**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:** 1673523 **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>
424916002	CAWA-17-133329
1203811672	Laboratory Control Sample (LCS)
1203810238	425121001(CAWA-17-133347) 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 425121001 (CAWA-17-133347) 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
1203810238 (CAWA-17-133347DUP)	pH	Received 09-JUN-17, out of holding 07-JUN-17
424916002 (CAWA-17-133329)	pH	Received 07-JUN-17, out of holding 05-JUN-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****Data Exception (DER) Documentation**

A data exception report (DER) 1642299 was generated for samples 424916002 (CAWA-17-133329) and 1203810238 (CAWA-17-133347DUP) in this SDG/batch.

**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:** 1673522      **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>
424916002	CAWA-17-133329
1203810229	Laboratory Control Sample (LCS)
1203810232	425121001(CAWA-17-133347) Sample Duplicate (DUP)
1203810235	425121001(CAWA-17-133347) 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 425121001 (CAWA-17-133347) 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**

**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Certification Statement**

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

## **GEL LABORATORIES LLC**

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

### **Qualifier Definition Report for**

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

Client SDG: 2017-1657 GEL Work Order: 424916


#### **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:** 30 JUN 2017

**Title:** Analyst I

# **Sample Data Summary**

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: June 30, 2017

Company : Los Alamos National Laboratory  
Address : TA-03, SM271, Drop Pt. 02U, Rm111

Los Alamos, New Mexico 87545

Contact: Mr. Keith Greene  
Project: LANL- WQH Water Samples

Client SDG: 2017-1657

Client Sample ID: CAWA-17-133301  
Sample ID: 424916001  
Matrix: W  
Collect Date: 05-JUN-17 13:23  
Receive Date: 07-JUN-17  
Collector: Client

Project: ESHL00114  
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.359	0.330	1.00	mg/L		1	TSM	06/09/17	1405	1671529	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	06/12/17	1112	1671991	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl		0.150	0.033	0.100	mg/L	1.00	1	KLP1	06/09/17	1549	1671942	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	06/12/17	0925	1671990
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	06/08/17	1700	1671941

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

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: June 30, 2017

Company : Los Alamos National Laboratory  
Address : TA-03, SM271, Drop Pt. 02U, Rm111

Los Alamos, New Mexico 87545  
Contact: Mr. Keith Greene  
Project: LANL- WQH Water Samples

Client SDG: 2017-1657

Client Sample ID: CAWA-17-133329  
Sample ID: 424916002  
Matrix: W  
Collect Date: 05-JUN-17 13:23  
Receive Date: 07-JUN-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	06/10/17	0023	1672927	1
Chloride		2.47	0.067	0.200	mg/L		1					
Fluoride		0.144	0.033	0.100	mg/L		1					
Sulfate		2.30	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0482	0.017	0.050	mg/L	1.00	1	KLP1	06/09/17	1029	1671935	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.346	0.017	0.050	mg/L		1	AXH3	06/09/17	1041	1671832	3
PO4 "As Received"												
Phosphorus, Total as P		0.053	0.020	0.050	mg/L	1.00	1	KLP1	06/09/17	1346	1672160	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		121	3.40	14.3	mg/L			KLP1	06/12/17	1617	1673398	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		63.0	1.45	4.00	mg/L			RXB5	06/14/17	1450	1673522	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		135	1.00	1.00	umhos/cm		1	RXB5	06/30/17	1330	1678861	7
PH "As Received"												
pH at Temp 19.4C	H	8.18	0.010	0.100	SU		1	RXB5	06/14/17	1450	1673523	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	06/08/17	1545	1671933
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	06/08/17	1700	1672159



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## Certificate of Analysis

Report Date: June 30, 2017

Company : Los Alamos National Laboratory  
Address : TA-03, SM271, Drop Pt. 02U, Rm111

Los Alamos, New Mexico 87545  
Contact: Mr. Keith Greene  
Project: LANL- WQH Water Samples

Client SDG: 2017-1657

Client Sample ID: CAWA-17-133329  
Sample ID: 424916002

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

# **Quality Control Summary**

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## QC Summary

Report Date: June 30, 2017

Page 1 of 6

Los Alamos National Laboratory  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico

Contact: Mr. Keith Greene

Workorder: 424916

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1671529										
QC1203805984	424739002	DUP									
Total Organic Carbon Average		J	0.455	J	0.416	mg/L	8.96	^	(+/-1.00)	TSM	06/09/17 03:57
QC1203805982	LCS										
Total Organic Carbon Average	10.0				10.6	mg/L			106	(80%-120%)	06/09/17 00:26
QC1203805981	MB										
Total Organic Carbon Average				U	ND	mg/L					06/09/17 00:15
QC1203805986	424739002	PS									
Total Organic Carbon Average	10.0	J	0.455		11.6	mg/L			111	(75%-125%)	06/09/17 04:44
<b>Flow Injection Analysis</b>											
Batch	1671991										
QC1203806301	424904001	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A			AXH3	06/12/17 11:10
QC1203806300	LCS										
Cyanide, Total	50.0				50.2	ug/L			100	(90%-110%)	06/12/17 11:08
QC1203806299	MB										
Cyanide, Total				U	ND	ug/L					06/12/17 11:07
QC1203806302	424904001	MS									
Cyanide, Total	100	U	ND		102	ug/L			101	(90%-110%)	06/12/17 11:11
<b>Ion Chromatography</b>											
Batch	1672927										
QC1203808702	425075004	DUP									
Bromide		J	0.0828	J	0.0829	mg/L	0.121	^	(+/-0.200)	MXL2	06/10/17 01:49

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## QC Summary

Workorder: 424916

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1672927										
Chloride		3.64		3.64	mg/L	0.0962		(0%-20%)	MXL2	06/10/17	01:49
Fluoride	J	0.0877	J	0.090	mg/L	2.59	^	(+/-0.100)			
Sulfate		3.88		3.85	mg/L	0.787		(0%-20%)			
QC1203808701 LCS											
Bromide	1.25			1.31	mg/L		105	(80%-120%)		06/09/17	23:25
Chloride	5.00			4.93	mg/L		98.5	(80%-120%)			
Fluoride	2.50			2.57	mg/L		103	(80%-120%)			
Sulfate	10.0			10.2	mg/L		102	(80%-120%)			
QC1203808700 MB											
Bromide			U	ND	mg/L					06/09/17	22:56
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203808703 425075004 PS											
Bromide	1.25	J	0.0828	1.31	mg/L		98.5	(75%-125%)		06/10/17	02:18
Chloride	5.00		3.64	8.91	mg/L		105	(75%-125%)			
Fluoride	2.50	J	0.0877	2.54	mg/L		98.2	(75%-125%)			
Sulfate	10.0		3.88	14.0	mg/L		101	(75%-125%)			

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## QC Summary

Workorder: 424916

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1671832										
QC1203805866	424735002	DUP									
Nitrogen, Nitrate/Nitrite	J	0.0222	J	0.0219	mg/L	1.36	^	(+/-0.050)	AXH3	06/09/17	10:00
QC1203805867	424853003	DUP									
Nitrogen, Nitrate/Nitrite		1.12		1.11	mg/L	0.897		(0%-20%)		06/09/17	10:28
QC1203805864	LCS										
Nitrogen, Nitrate/Nitrite	1.00			0.997	mg/L			99.7	(90%-110%)	06/09/17	09:52
QC1203805863	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					06/09/17	09:51
QC1203805871	424735002	PS									
Nitrogen, Nitrate/Nitrite	1.00	J	0.0222	1.02	mg/L			99.8	(90%-110%)	06/09/17	10:01
QC1203805872	424853003	PS									
Nitrogen, Nitrate/Nitrite	1.00		1.12	2.04	mg/L			92	(90%-110%)	06/09/17	10:29
Batch	1671935										
QC1203806103	424741001	DUP									
Nitrogen, Ammonia		0.0858		0.0733	mg/L	15.7	^	(+/-0.050)	KLP1	06/09/17	10:13
QC1203806102	LCS										
Nitrogen, Ammonia	1.00			1.01	mg/L			101	(90%-110%)	06/09/17	10:02
QC1203806101	MB										
Nitrogen, Ammonia			J	0.0385	mg/L					06/09/17	10:01
QC1203806104	424741001	MS									
Nitrogen, Ammonia	1.00		0.0858	1.03	mg/L			94.4	(90%-110%)	06/09/17	10:14
Batch	1671942										
QC1203806128	424741002	DUP									
Nitrogen, Total Kjeldahl		0.336		0.308	mg/L	8.7	^	(+/-0.100)	KLP1	06/09/17	15:06

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## QC Summary

Workorder: 424916

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1671942										
QC1203806127	LCS										
Nitrogen, Total Kjeldahl	1.00			0.953	mg/L		95.3	(90%-110%)	KLP1	06/09/17	15:14
QC1203806126	MB										
Nitrogen, Total Kjeldahl			J	0.0715	mg/L					06/09/17	15:13
QC1203806129	424741002	MS									
Nitrogen, Total Kjeldahl	1.00	0.336		1.35	mg/L		101	(90%-110%)		06/09/17	15:07
Batch	1672160										
QC1203806695	424916002	DUP									
Phosphorus, Total as P		0.053	J	0.0499	mg/L	6.03	^	(+/-0.050)	KLP1	06/09/17	13:47
QC1203806694	LCS										
Phosphorus, Total as P	1.00			1.00	mg/L		100	(80%-124%)		06/09/17	13:45
QC1203806693	MB										
Phosphorus, Total as P			U	ND	mg/L					06/09/17	13:44
QC1203806696	424916002	MS									
Phosphorus, Total as P	1.00	0.053		0.944	mg/L		89.1	(63%-139%)		06/09/17	13:48
<b>Solids Analysis</b>											
Batch	1673398										
QC1203806142	424916002	DUP									
Total Dissolved Solids		121		137	mg/L	12.2*		(0%-5%)	KLP1	06/12/17	16:17
QC1203809793	LCS										
Total Dissolved Solids	300			306	mg/L		102	(95%-105%)		06/12/17	16:17
QC1203809792	MB										
Total Dissolved Solids			J	4.29	mg/L					06/12/17	16:17

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## QC Summary

Workorder: 424916

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1673522										
QC1203810232	425121001	DUP									
Alkalinity, Total as CaCO3		62.0		61.8	mg/L	0.323		(0%-20%)	RXB5	06/14/17	15:10
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203810229	LCS										
Alkalinity, Total as CaCO3	100			105	mg/L		105	(90%-110%)		06/14/17	13:54
QC1203810235	425121001	MS									
Alkalinity, Total as CaCO3	100	62.0		166	mg/L		104	(80%-120%)		06/14/17	15:12
Batch	1673523										
QC1203810238	425121001	DUP									
pH	H	8.04	H	8.05	SU	0.124		(0%-5%)	RXB5	06/14/17	15:10
QC1203811672	LCS										
pH	7.00			7.00	SU		100	(99%-101%)		06/14/17	14:49
Batch	1678861										
QC1203822828	425121001	DUP									
Conductivity		190		197	umhos/cm	3.31		(0%-10%)	RXB5	06/30/17	13:39
QC1203822826	LCS										
Conductivity	1410			1410	umhos/cm		99.4	(95%-105%)		06/30/17	13:23

- 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

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## QC Summary

Workorder: 424916

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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.



# Miscellaneous

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 14-JUN-17	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> BALANCE ANALYTICAL	<b>Test / Method:</b> EPA 160.1, SM 2540C	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> BRKL, ESHL
<b>Batch ID:</b> 1673398	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 424746(38791),424916(2017-1657)</b> <b>Application Issues:</b> Failed RPD for DUP			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>  1. Failed RPD for DUP:  QC   1203806142DUP,1203807493DUP		1. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: Total Dissolved Solids 1203806142 (CAWA-17-133329DUP) [12.2* (0%-5%)] and 1203807493 (38791-001DUP) [7.84* (0%-5%)].	

**Originator's Name:**  
Kristen Mizzell      14-JUN-17

**Data Validator/Group Leader:**  
Aubrey Kingsbury      14-JUN-17

### DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 15-JUN-17	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ELECTRODE	<b>Test / Method:</b> EPA 150.1, SM 4500-H B, SW846 9040C	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> BELI, ESHL, UCOR
<b>Batch ID:</b> 1673523	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 423944(2017-1573),423945(2017-1572),424030(2017-1589),424080,424916(2017-1657),424952,425075(2017-1667),425079(2017-1664),425115(2017-1690),425121(2017-1689) <b>Application Issues:</b> Sample received out of holding			
<b>Specification and Requirements</b> <b>Exception Description:</b>		<b>DER Disposition:</b>	
1. Sample received out of holding:  423944 001  423945 001  424030 001  424080 004  424916 002  424952 001,002,003  425075 002,004  425079 002,004  425115 002  425121 001  QC 1203810237DUP,1203810238DUP		1. Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified. 1203810237 (EMWGW7913DUP) [Received 25-MAY-17, out of holding 24-MAY-17]. 1203810238 (CAWA-17-133347DUP) [Received 09-JUN-17, out of holding 07-JUN-17]. 423944001 (WST35-17-135774) [Received 24-MAY-17, out of holding 22-MAY-17]. 423945001 (WST35-17-135775) [Received 24-MAY-17, out of holding 22-MAY-17]. 424030001 (WST03-17-135771) [Received 25-MAY-17, out of holding 23-MAY-17]. 424080004 (EMWGW7913) [Received 25-MAY-17, out of holding 24-MAY-17]. 424916002 (CAWA-17-133329) [Received 07-JUN-17, out of holding 05-JUN-17]. 424952001 (1. Kaiser Capitol Hill - Cold Water) [Received 07-JUN-17, out of holding 06-JUN-17]. 424952002 (2. Kaiser Capitol Hill - Hot Water) [Received 07-JUN-17, out of holding 06-JUN-17]. 424952003 (3. Kaiser Capitol Hill - RO/DI) [Received 07-JUN-17, out of holding 06-JUN-17]. 425075002 (CAWA-17-133312) [Received 08-JUN-17, out of holding 06-JUN-17]. 425075004 (CAWA-17-133313) [Received 08-JUN-17, out of holding 06-JUN-17]. 425079002 (CAWA-17-133314) [Received 08-JUN-17, out of holding 06-JUN-17]. 425079004 (CAWA-17-133315) [Received 08-JUN-17, out of holding 06-JUN-17]. 425115002 (CAWA-17-133326) [Received 09-JUN-17, out of holding 07-JUN-17]. 425121001 (CAWA-17-133347) [Received 09-JUN-17, out of holding 07-JUN-17].	

**Originator's Name:**

Rachael Bell 15-JUN-17

**Data Validator/Group Leader:**

Elzbieta Szulc 15-JUN-17

July 19, 2017

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

Mr. Keith Greene  
Los Alamos National Laboratory  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico 87545

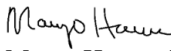
Re: LANL- WQH Water Samples  
Work Order: 424916  
SDG: 2017-1657

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on June 07, 2017, and analyzed for Explosives by LCMSMS, General Chemistry, Metals and Perchlorates by LCMSMS. This revised data report has been prepared and reviewed in accordance with GEL's standard operating procedures. This package has been revised to include the results for HMX, DNX, and TNX on the HE Form 1s.

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: 2017-1657  
Enclosures



**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 424916**  
**SDG: 2017-1657**

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# Case Narrative



**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 424916  
SDG # : 2017-1657**

**June 30, 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 June 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. There are no additional comments concerning sample receipt.

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

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
424916001	CAWA-17-133301
424916002	CAWA-17-133329

**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, General Chemistry, Metals and Perchlorates by LCMSMS.

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

*Margo Herron*  
Margo Herron for  
Valerie Davis  
Project Manager

**List of current GEL Certifications as of 30 June 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	SC000122017-1
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
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-22
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# **Chain of Custody and Supporting Documentation**

**COC/Lab Request #:**  
2017-1657  
Page 1 of 1

--	--

[illegible]

<b>Special Instructions:</b>					
Relinquished by:	[Signature]	Print Name: [Signature]	Date/Time: 6/7/95	Received by: [Signature]	Print Name: Zach Woshinski
Relinquished by:		Print Name:	Date/Time:	Received by:	Print Name:
Relinquished by:		Print Name:	Date/Time:	Received by:	Print Name:



Laboratories LLC

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <u>ESH</u>		SDG/AR/COC/Work Order:	
Received By: <u>ZKW</u>		Date Received: <u>06/07/17</u>	
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	
		<u>5908 1782 1764</u> <u>5908 1782 1786</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <u>CPM</u> mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input 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"/>	<input checked="" type="checkbox"/>		
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Preservation Method: Wet Ice <input checked="" type="checkbox"/> Ice Packs <input type="checkbox"/> Dry ice <input type="checkbox"/> None <input type="checkbox"/> Other: _____ *all temperatures are recorded in Celsius
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Temperature Device Serial #: <u>IR3-16</u> Secondary Temperature Device Serial # (If Applicable): _____
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input 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"/>	<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"/>	<input checked="" type="checkbox"/>		If Yes, Are Encores or Soil Kits present? Yes ___ No ___ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes ___ No ___ N/A ___ Sample ID's and containers affected: _____
8	Samples received within holding area?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		ID's and tests affected: _____
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Sample ID's and containers affected: _____
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Sample ID's affected: _____
11	Number of containers received match number indicated on COC? <u>See Below</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Sample ID's affected: <u>See Below</u>
12	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

Comments (Use Continuation Form if needed):

\* We only rec'd samples -136913, -133301, and -133329

PM (or PMA) review: Initials AM Date 6/9/17 Page \_\_\_\_ of \_\_\_\_

GL-CHL-SR-001 Rev 5

ORIGIN ID: SAFA (505) 865-9966  
KEITH GREENE  
LOS ALAMOS NATL LAB  
TA00 BLDG 1237 DPU 03  
LOS ALAMOS, NM 87545  
UNITED STATES US

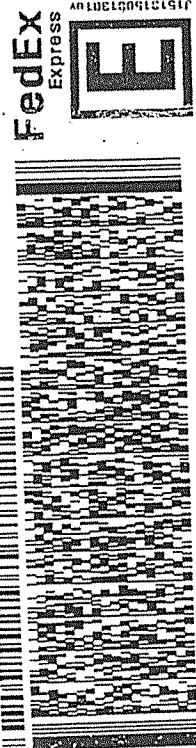
SHIP DATE: 06 JUN 7  
ACTWGT: 46.0 LB MAN  
CAD: 0014176/CAFE2916

BILL SENDER:

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

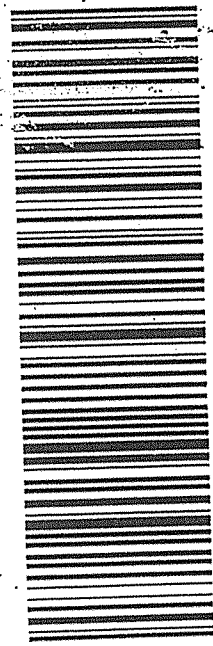
(843) 556-8171  
REF: 21PD0ASRGW04BAGWEO



WED - 07 JUN 10:30A  
PRIORITY OVERNIGHT

TRK# 5908 1782 1764

X7 RBWA 29407  
SC-US CHS



Part # 156148V-434 RIT2 06/15

ORIGIN ID: SAFA (505) 865-9966  
KEITH GREENE  
LOS ALAMOS NATL LAB  
TA00 BLDG 1237 DPU 03  
LOS ALAMOS, NM 87545  
UNITED STATES US

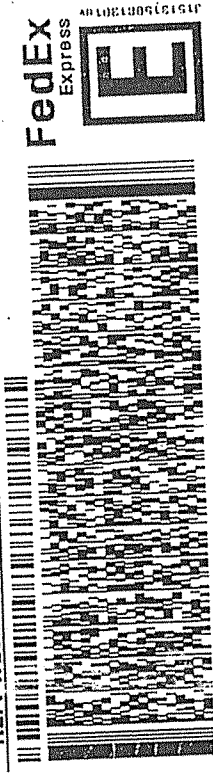
SHIP DATE: 06 JUN 17  
ACTWGT: 35.0 LB MAN  
CAD: 0014176/CAFE2916

BILL SENDER

TO VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

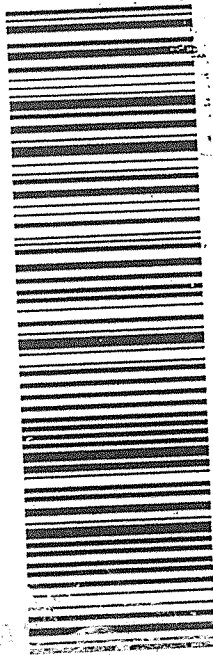
(843) 556-8171  
REF: WE6L11551000



WED - 07 JUN 10:30A  
PRIORITY OVERNIGHT

TRK# 5908 1782 1786

X7 RBWA 29407  
SC-US CHS



Part # 156148V-434 RIT2 06/15

# **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.

# **Perchlorates by LCMSMS Analysis**

# Case Narrative

**Perchlorates by LCMSMS  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2017-1657  
Work Order #: 424916**

**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: 1673882

Prep Batch Number: 1673881

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
424916002	424916002 (CAWA-17-133329)
1203811124	Interference Check Sample (ICS)
1203811120	Method Blank (MB)
1203811121	Laboratory Control Sample (LCS)
1203811122	424916002(CAWA-17-133329) Matrix Spike (MS)
1203811123	424916002(CAWA-17-133329) 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 424916002 (CAWA-17-133329) 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****Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**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: 2017-1657 GEL Work Order: 424916

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

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

#### Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 16 JUN 2017

Title: Group Leader

# **Sample Data Summary**

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample No.

CAWA-17-133329Lab Code: GELInstrument: LCMSMSDate Received: 07-JUN-17Method: SW846 6850 ModifiedGEL Job No (SDG): 2017-1657Matrix: WATERGEL Sample ID: 424916002Extraction Batch ID: 1673881Date Filtered: 14-JUN-17Extraction Type: Filter/DAIInjection Volume (uL): 20Sample Volume/Weight: 10.0 mL%Solids:     Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.331	ug/L		1	14-JUN-17 20:15	per0614016a
	Perchlorate Isotope Ratio			2.92			1	14-JUN-17 20:15	per0614016a
14797-73-0	Perchlorate-101	.05	.2	0.338	ug/L		1	14-JUN-17 20:15	per0614016a
	Perchlorate-O(18)			0.398	ug/L		1	14-JUN-17 20:15	per0614016a

^ 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):** 2017-1657

**Extract Batch Code:** 1673881

**Date Filtered:** 14-JUN-17

**Matrix:** WATER

**Sample ID:** 1203811121

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.19	ug/L	95		85 - 115
Perchlorate Isotope Ratio		2.75				-
Perchlorate-101	0.200	.206	ug/L	103		85 - 115
Perchlorate-O(18)		.441	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):** 2017-1657

**Extract Batch Code:** 1673881

**Date Extracted:** 14-JUN-17

**GEL MS/PS ID:** 1203811122

**Client ID:** CAWA-17-133329

**GEL MSD/PSD ID:** 1203811123

**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	0.331	ug/L	0.515	92	.509	89	1	30	75 - 125
Perchlorate Isotope Ratio	0	2.92		2.81		2.93		4		-
Perchlorate-101	0.200	0.338	ug/L	0.548	105	.52	91	5	30	75 - 125
Perchlorate-O(18)	0	0.398	ug/L	0.406		.41		1		-

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

# Quality Control Data

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1673881Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 14-JUN-17GEL Job No (SDG): 2017-1657GEL Sample ID: 1203811120Date Filtered: 14-JUN-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	0.200	ug/L	U	1	14-JUN-17 19:36	per0614013a
	Perchlorate Isotope Ratio						1	14-JUN-17 19:36	per0614013a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	14-JUN-17 19:36	per0614013a
	Perchlorate-O(18)			0.457	ug/L		1	14-JUN-17 19:36	per0614013a

^ 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: 1673881Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 14-JUN-17GEL Job No (SDG): 2017-1657GEL Sample ID: 1203811121Date Filtered: 14-JUN-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	0.190	ug/L	J	1	14-JUN-17 19:49	per0614014a
	Perchlorate Isotope Ratio			2.75			1	14-JUN-17 19:49	per0614014a
14797-73-0	Perchlorate-101	.05	.2	0.206	ug/L		1	14-JUN-17 19:49	per0614014a
	Perchlorate-O(18)			0.441	ug/L		1	14-JUN-17 19:49	per0614014a

^ 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: 1673881Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-1657GEL Sample ID: 1203811124Date Filtered: 14-JUN-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	0.209	ug/L		1	14-JUN-17 20:02	per0614015a
	Perchlorate Isotope Ratio			3.1			1	14-JUN-17 20:02	per0614015a
14797-73-0	Perchlorate-101	.05	.2	0.202	ug/L		1	14-JUN-17 20:02	per0614015a
	Perchlorate-O(18)			0.435	ug/L		1	14-JUN-17 20:02	per0614015a

^ 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: 1673881Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133329MSDate Received: 07-JUN-17GEL Job No (SDG): 2017-1657GEL Sample ID: 1203811122Date Filtered: 14-JUN-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	0.515	ug/L		1	14-JUN-17 20:28	per0614017a
	Perchlorate Isotope Ratio			2.81			1	14-JUN-17 20:28	per0614017a
14797-73-0	Perchlorate-101	.05	.2	0.548	ug/L		1	14-JUN-17 20:28	per0614017a
	Perchlorate-O(18)			0.406	ug/L		1	14-JUN-17 20:28	per0614017a

^ 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: 1673881Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133329MSDDate Received: 07-JUN-17GEL Job No (SDG): 2017-1657GEL Sample ID: 1203811123Date Filtered: 14-JUN-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	0.509	ug/L		1	14-JUN-17 20:41	per0614018a
	Perchlorate Isotope Ratio			2.93			1	14-JUN-17 20:41	per0614018a
14797-73-0	Perchlorate-101	.05	.2	0.520	ug/L		1	14-JUN-17 20:41	per0614018a
	Perchlorate-O(18)			0.410	ug/L		1	14-JUN-17 20:41	per0614018a

^ 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 #: 2017-1657  
Work Order #: 424916**

**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: 1672553

Prep Batch Number: 1672551

**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>
424916001	CAWA-17-133301
1203807731	Method Blank (MB)
1203807732	Laboratory Control Sample (LCS)
1203807733	424916001(CAWA-17-133301) Matrix Spike (MS)
1203807734	424916001(CAWA-17-133301) 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 calibration verification standards (ICV or CCV) have not met requirements of 80-120% for samples 1203807731 (MB), 1203807732 (LCS), 1203807733 (CAWA-17-133301MS), 1203807734 (CAWA-17-133301MSD) and 424916001 (CAWA-17-133301) in this SDG. Please refer to Form 7 of the data package for a list of recoveries. Since the recoveries are biased high and target analytes were not detected in the associated samples, the data are considered unaffected. The data are Q qualified and 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**

One or more of the required spiking analytes were not within the acceptance limits in the laboratory control sample (See Below). While the LCS exhibited a high bias, the analyte was/were not detected in the associated samples, the data are reported.

Sample	Analyte	Value
1203807732 (LCS)	2,6-Diamino-4-nitrotoluene	137* (53%-127%)
	TATB	148* (47%-135%)

##### **QC Sample Designation**

Client sample 424916001 (CAWA-17-133301) was chosen for matrix spike and matrix spike duplicate analysis.

##### **Matrix Spike (MS) Recovery Statement**

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

Sample	Analyte	Value
1203807733 (CAWA-17-133301MS)	TATB	157* (38%-149%)

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

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

##### **Internal Standard (ISTD) Acceptance**

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

#### **Technical Information**

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

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



**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

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

**Sample Re-extraction/Re-analysis**

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

**Miscellaneous Information****Data Exception (DER) Documentation**

Data exception report (DER) 1646371 was generated for samples 1203807732 (LCS) and 1203807733 (CAWA-17-133301MS) in this SDG/batch.

**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: 2017-1657 GEL Work Order: 424916

#### 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
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- 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: 28 JUN 2017

Title: Group Leader

# **Sample Data Summary**

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133301

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 424916001

Sample Amount 920 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0616018.wiff

Date Analyzed: 16-JUN-17 21:11

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.272	U	0.087	0.272
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.272	U	0.087	0.272
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.272	U	0.087	0.272
<i>121-82-4</i>	<i>RDX</i>				
13980-04-6	TNX	.272	U	0.087	0.272
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.272	U	0.087	0.272
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.272	U	0.087	0.272
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.272	U	0.087	0.272
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
5755-27-1	MNX	.272	U	0.087	0.272
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.272	U	0.087	0.272
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.272	U	0.087	0.272
<i>80251-29-2</i>	<i>DNX</i>				
88-72-2	o-Nitrotoluene	.272	U	0.0891	0.272
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
98-95-3	Nitrobenzene	.272	U	0.087	0.272
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.272	U	0.087	0.272
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133301

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 424916001

Sample Amount 920 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-35-4	1,3,5-Trinitrobenzene	.272	U	0.087	0.272
99-35-4	1,3,5-Trinitrobenzene				
99-65-0	m-Dinitrobenzene	.272	U	0.087	0.272
99-65-0	m-Dinitrobenzene				
479-45-8	Tetryl	.543	U	0.087	0.543
479-45-8	Tetryl				
78-11-5	PETN	.543	U	0.109	0.543
78-11-5	PETN				
99-99-0	p-Nitrotoluene	.543	U	0.163	0.543
99-99-0	p-Nitrotoluene				
3058-38-6	TATB	1.09	U	0.326	1.09
3058-38-6	TATB				
618-87-1	3,5-Dinitroaniline	1.09	U	0.326	1.09
618-87-1	3,5-Dinitroaniline				
78-30-8	tris(o-cresyl) phosphate	1.09	QU	0.326	1.09
78-30-8	tris(o-cresyl) phosphate				
59229-75-3	2,6-Diamino-4-nitrotoluene	2.72	QU	0.543	2.72
59229-75-3	2,6-Diamino-4-nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	2.72	QU	0.543	2.72
6629-29-4	2,4-Diamino-6-nitrotoluene				

# **Quality Control Summary**

**High Explosives Surrogate Recovery Summary****Lab Name:** GEL Laboratories LLC**GEL Job No (SDG):** 2017-1657**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

<b>Lab Sample ID</b>	<b>Client Sample ID</b>	<b>DNT</b>	<b>QC Limits</b>	<b>Flg</b>
424916001	CAWA-17-133301	98	55 - 115	
1203807731	MB for batch 1672551	102	55 - 115	
1203807732	LCS for batch 1672551	85	55 - 115	
1203807733	CAWA-17-133301MS	81	55 - 115	
1203807734	CAWA-17-133301MSD	97	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)** 2017-1657

**Extract Batch Code:** 1672551

**Date Extracted:** 09-JUN-17

**GEL LCS ID:** 1203807732

**GEL LCSDUP ID:** .

**Analysis Date/Time:** 16-JUN-17 20:35

**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
m-Dinitrobenzene	5	4.86	97					74 - 117
m-Nitrotoluene	5	4.03	81					66 - 114
o-Nitrotoluene	5	4.65	93					64 - 115
p-Nitrotoluene	5	4.76	95					66 - 127
tris(o-cresyl) phosphate	5	3.89	78					43 - 104
1,3,5-Trinitrobenzene	5	4.42	88					70 - 110
2,4,6-Trinitrotoluene	5	4.25	85					69 - 113
2,4-Diamino-6-nitrotoluene	5	5.89	118					50 - 121
2,4-Dinitrotoluene	5	4.44	89					71 - 110
2,6-Diamino-4-nitrotoluene	5	6.85	137 *					53 - 127
2,6-Dinitrotoluene	5	4.16	83					72 - 105
2-Amino-4,6-dinitrotoluene	5	4.44	89					70 - 112
3,5-Dinitroaniline	5	5.38	108					70 - 121
4-Amino-2,6-dinitrotoluene	5	4.42	88					74 - 116
HMX	5	4	80					58 - 113
Nitrobenzene	5	4.65	93					64 - 115
PETN	5	5.39	108					57 - 126
RDX	5	4.27	85					64 - 117
TATB	2.5	3.7	148 *					47 - 135
Tetryl	5	4.27	85					64 - 122

# 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-17-133301

**Lab Code:** GEL

**GEL Job No (SDG)** 2017-1657

**Extract Batch Code:** 1672551

**Date Extracted:** 09-JUN-17

**GEL Spike ID:** 1203807733

**GEL SpikeDup ID:** 1203807734

**Analysis Date/Time:** 16-JUN-17 21:46

**MSD Analysis Date/Time:** 16-JUN-17 22:21

**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
1,3,5-Trinitrobenzene	5.43478	0	5.23	96	4.95	93	6	30	67 - 111
2,4,6-Trinitrotoluene	5.43478	0	4.29	79	5.4	102	23	30	66 - 112
2,4-Diamino-6-nitrotoluene	5.43478	0	5.9	109	5.58	105	6	30	50 - 121
2,4-Dinitrotoluene	5.43478	0	4.3	79	5.2	98	19	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.43478	0	6.8	125	5.72	108	17	30	53 - 127
2,6-Dinitrotoluene	5.43478	0	4.25	78	5	94	16	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.43478	0	4.32	79	4.94	93	13	30	67 - 115
3,5-Dinitroaniline	5.43478	0	5.27	97	5.94	112	12	30	70 - 121
4-Amino-2,6-dinitrotoluene	5.43478	0	4.48	83	4.95	93	10	30	65 - 120
HMX	5.43478	.0391	4.69	86	4.25	79	10	30	44 - 128
Nitrobenzene	5.43478	0	5.4	99	5.1	96	6	30	62 - 116
PETN	5.43478	0	4.72	87	5.35	101	12	30	51 - 131
RDX	5.43478	0	4.35	80	4.5	85	3	30	57 - 125
Tetryl	5.43478	0	3.63	67	3.42	64	6	30	50 - 126
m-Dinitrobenzene	5.43478	0	5.18	95	5.04	95	3	30	74 - 117
m-Nitrotoluene	5.43478	0	4.95	91	5.41	102	9	30	59 - 120
o-Nitrotoluene	5.43478	0	4.81	89	5.43	102	12	30	56 - 119
p-Nitrotoluene	5.43478	0	4.93	91	5.92	111	18	30	61 - 129
tris(o-cresyl) phosphate	5.43478	0	4.52	83	4.88	92	8	30	38 - 105
TATB	2.71739	0	4.26	157 *	3.84	144	10	30	38 - 149

#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 1672551

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807731

Sample Amount 1000 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0616016.wiff

Date Analyzed: 16-JUN-17 20:00

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.25	U	0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.25	U	0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.25	U	0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
13980-04-6	TNX	.25	U	0.080	0.250
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.25	U	0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.25	U	0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.25	U	0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
5755-27-1	MNX	.25	U	0.080	0.250
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.25	U	0.080	0.250
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.25	U	0.080	0.250
<i>80251-29-2</i>	<i>DNX</i>				
88-72-2	o-Nitrotoluene	.25	U	0.082	0.250
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
98-95-3	Nitrobenzene	.25	U	0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.25	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 1672551

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807731

Sample Amount 1000 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-35-4	1,3,5-Trinitrobenzene	.25	U	0.080	0.250
99-35-4	1,3,5-Trinitrobenzene				
99-65-0	m-Dinitrobenzene	.25	U	0.080	0.250
99-65-0	m-Dinitrobenzene				
479-45-8	Tetryl	.5	U	0.080	0.500
479-45-8	Tetryl				
78-11-5	PETN	.5	U	0.100	0.500
78-11-5	PETN				
99-99-0	p-Nitrotoluene	.5	U	0.150	0.500
99-99-0	p-Nitrotoluene				
3058-38-6	TATB	1	U	0.300	1.00
3058-38-6	TATB				
618-87-1	3,5-Dinitroaniline	1	U	0.300	1.00
618-87-1	3,5-Dinitroaniline				
78-30-8	tris(o-cresyl) phosphate	1	QU	0.300	1.00
78-30-8	tris(o-cresyl) phosphate				
59229-75-3	2,6-Diamino-4-nitrotoluene	2.5	QU	0.500	2.50
59229-75-3	2,6-Diamino-4-nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	2.5	QU	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 1672551

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807732

Sample Amount 1000 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0616017.wiff

Date Analyzed: 16-JUN-17 20:35

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
13980-04-6 <i>13980-04-6</i>	TNX <i>TNX</i>	.25	U	0.080	0.250
5755-27-1 <i>5755-27-1</i>	MNX <i>MNX</i>	.25	U	0.080	0.250
80251-29-2 <i>80251-29-2</i>	DNX <i>DNX</i>	.25	U	0.080	0.250
3058-38-6 <i>3058-38-6</i>	TATB <i>TATB</i>	3.7		0.300	1.00
78-30-8 <i>78-30-8</i>	tris(o-cresyl) phosphate <i>tris(o-cresyl) phosphate</i>	3.89	Q	0.300	1.00
2691-41-0 <i>2691-41-0</i>	HMX <i>HMX</i>	4		0.080	0.250
99-08-1 <i>99-08-1</i>	m-Nitrotoluene <i>m-Nitrotoluene</i>	4.03		0.080	0.250
606-20-2 <i>606-20-2</i>	2,6-Dinitrotoluene <i>2,6-Dinitrotoluene</i>	4.16		0.080	0.250
118-96-7 <i>118-96-7</i>	2,4,6-Trinitrotoluene <i>2,4,6-Trinitrotoluene</i>	4.25		0.080	0.250
121-82-4 <i>121-82-4</i>	RDX <i>RDX</i>	4.27		0.080	0.250
479-45-8 <i>479-45-8</i>	Tetryl <i>Tetryl</i>	4.27		0.080	0.500
19406-51-0 <i>19406-51-0</i>	4-Amino-2,6-dinitrotoluene <i>4-Amino-2,6-dinitrotoluene</i>	4.42		0.080	0.250
99-35-4 <i>99-35-4</i>	1,3,5-Trinitrobenzene <i>1,3,5-Trinitrobenzene</i>	4.42		0.080	0.250

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1672551

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807732

Sample Amount 1000 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
121-14-2	2,4-Dinitrotoluene	4.44		0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.44		0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
88-72-2	o-Nitrotoluene	4.65		0.082	0.250
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
98-95-3	Nitrobenzene	4.65		0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-99-0	p-Nitrotoluene	4.76		0.150	0.500
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
99-65-0	m-Dinitrobenzene	4.86		0.080	0.250
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
618-87-1	3,5-Dinitroaniline	5.38		0.300	1.00
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-11-5	PETN	5.39		0.100	0.500
<i>78-11-5</i>	<i>PETN</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	5.89	Q	0.500	2.50
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	6.85	Q	0.500	2.50
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133301(424916001MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807733

Sample Amount 920 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0616019.wiff

Date Analyzed: 16-JUN-17 21:46

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
13980-04-6 <i>13980-04-6</i>	TNX <i>TNX</i>	.272	U	0.087	0.272
5755-27-1 <i>5755-27-1</i>	MNX <i>MNX</i>	.272	U	0.087	0.272
80251-29-2 <i>80251-29-2</i>	DNX <i>DNX</i>	.272	U	0.087	0.272
479-45-8 <i>479-45-8</i>	Tetryl <i>Tetryl</i>	3.63		0.087	0.543
606-20-2 <i>606-20-2</i>	2,6-Dinitrotoluene <i>2,6-Dinitrotoluene</i>	4.25		0.087	0.272
3058-38-6 <i>3058-38-6</i>	TATB <i>TATB</i>	4.26		0.326	1.09
118-96-7 <i>118-96-7</i>	2,4,6-Trinitrotoluene <i>2,4,6-Trinitrotoluene</i>	4.29		0.087	0.272
121-14-2 <i>121-14-2</i>	2,4-Dinitrotoluene <i>2,4-Dinitrotoluene</i>	4.3		0.087	0.272
35572-78-2 <i>35572-78-2</i>	2-Amino-4,6-dinitrotoluene <i>2-Amino-4,6-dinitrotoluene</i>	4.32		0.087	0.272
121-82-4 <i>121-82-4</i>	RDX <i>RDX</i>	4.35		0.087	0.272
19406-51-0 <i>19406-51-0</i>	4-Amino-2,6-dinitrotoluene <i>4-Amino-2,6-dinitrotoluene</i>	4.48		0.087	0.272
78-30-8 <i>78-30-8</i>	tris(o-cresyl) phosphate <i>tris(o-cresyl) phosphate</i>	4.52	Q	0.326	1.09
2691-41-0 <i>2691-41-0</i>	HMX <i>HMX</i>	4.69		0.087	0.272



1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133301(424916001MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807733

Sample Amount 920 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-11-5	PETN	4.72		0.109	0.543
<i>78-11-5</i>	<i>PETN</i>				
88-72-2	o-Nitrotoluene	4.81		0.0891	0.272
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
99-99-0	p-Nitrotoluene	4.93		0.163	0.543
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
99-08-1	m-Nitrotoluene	4.95		0.087	0.272
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.18		0.087	0.272
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
99-35-4	1,3,5-Trinitrobenzene	5.23		0.087	0.272
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
618-87-1	3,5-Dinitroaniline	5.27		0.326	1.09
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
98-95-3	Nitrobenzene	5.4		0.087	0.272
<i>98-95-3</i>	<i>Nitrobenzene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	5.9	Q	0.543	2.72
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	6.8	Q	0.543	2.72
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133301(424916001MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807734

Sample Amount 940 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0616020.wiff

Date Analyzed: 16-JUN-17 22:21

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
13980-04-6	TNX	.266	U	0.0851	0.266
<i>13980-04-6</i>	<i>TNX</i>				
5755-27-1	MNX	.266	U	0.0851	0.266
<i>5755-27-1</i>	<i>MNX</i>				
80251-29-2	DNX	.266	U	0.0851	0.266
<i>80251-29-2</i>	<i>DNX</i>				
479-45-8	Tetryl	3.42		0.0851	0.532
<i>479-45-8</i>	<i>Tetryl</i>				
3058-38-6	TATB	3.84		0.319	1.06
<i>3058-38-6</i>	<i>TATB</i>				
2691-41-0	HMX	4.25		0.0851	0.266
<i>2691-41-0</i>	<i>HMX</i>				
121-82-4	RDX	4.5		0.0851	0.266
<i>121-82-4</i>	<i>RDX</i>				
78-30-8	tris(o-cresyl) phosphate	4.88	Q	0.319	1.06
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.94		0.0851	0.266
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.95		0.0851	0.266
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	4.95		0.0851	0.266
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
606-20-2	2,6-Dinitrotoluene	5		0.0851	0.266
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.04		0.0851	0.266
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				

1  
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133301(424916001MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-1657

Matrix: WATER

GEL Sample ID: 1203807734

Sample Amount 940 mL

Date Received: 07-JUN-17

Moisture: .

Extraction Batch ID: 1672551

Extraction Type Sol Exchange

Date Extracted: 09-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
98-95-3	Nitrobenzene	5.1		0.0851	0.266
98-95-3	Nitrobenzene				
121-14-2	2,4-Dinitrotoluene	5.2		0.0851	0.266
121-14-2	2,4-Dinitrotoluene				
78-11-5	PETN	5.35		0.106	0.532
78-11-5	PETN				
118-96-7	2,4,6-Trinitrotoluene	5.4		0.0851	0.266
118-96-7	2,4,6-Trinitrotoluene				
99-08-1	m-Nitrotoluene	5.41		0.0851	0.266
99-08-1	m-Nitrotoluene				
88-72-2	o-Nitrotoluene	5.43		0.0872	0.266
88-72-2	o-Nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	5.58	Q	0.532	2.66
6629-29-4	2,4-Diamino-6-nitrotoluene				
59229-75-3	2,6-Diamino-4-nitrotoluene	5.72	Q	0.532	2.66
59229-75-3	2,6-Diamino-4-nitrotoluene				
99-99-0	p-Nitrotoluene	5.92		0.160	0.532
99-99-0	p-Nitrotoluene				
618-87-1	3,5-Dinitroaniline	5.94		0.319	1.06
618-87-1	3,5-Dinitroaniline				

## Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-1657Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 16-JUN-17 11:14GEL Data File: EXP0616001.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
Nitroglycerin	0	0
PETN	0	0
Picric acid	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): 2017-1657Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 16-JUN-17 11:49GEL Data File: EXP0616002.wiffInstrument ID: LCMSMS5Column: Ultracarb Phenomenex 5u ODS (20)

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

4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1657

Lab Code: GEL

Lab Sample ID: XIBLK02

Analysis Date: 16-JUN-17 16:30

GEL Data File: EXP0616010.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	1.69
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	5.72
2,6-Diamino-4-nitrotoluene	0	1.79
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
Nitroglycerin	0	0
PETN	0	0
Picric acid	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): 2017-1657

Lab Code: GEL

Lab Sample ID: XIBLK03

Analysis Date: 16-JUN-17 18:50

GEL Data File: EXP0616014.wiff

Instrument ID: LCMSMS5

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
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
Nitroglycerin	0	0
PETN	0	0
Picric acid	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

4A  
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1657

Lab Code: GEL

Lab Sample ID: XIBLK04

Analysis Date: 17-JUN-17 00:41

GEL Data File: EXP0616024.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
Nitroglycerin	0	0
PETN	0	0
Picric acid	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):** 2017-1657

**Lab Code:** GEL

**Lab Sample ID:** XIBLK05

**Analysis Date:** 17-JUN-17 01:51

**GEL Data File:** EXP0616026.wiff

**Instrument ID:** LCMSMS5

**Column:** Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
Picric acid	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

# Miscellaneous

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 27-JUN-17	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LC-MS/MS	<b>Test / Method:</b> SW846 3535A/8330B	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1672553	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 424916(2017-1657),425075(2017-1667),425079(2017-1664)</b> <b>Application Issues:</b> Failed Recovery for MS/MSD, or PS/PSD Failed Recovery for LCS/LCSD			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. One or more of the required spiking analytes were not within the acceptance limits in the laboratory control sample (See Below). 1203807732 (LCS) recovered 2,6-Diamino-4-nitrotoluene at 137% (53%-127%) and TATB at 148% (47%-135%).  2. The MS (See Below) recovered spiked analytes outside of the established acceptance limits. 1203807733 (CAWA-17-133301MS) recovered TATB at 157% (38%-149%).		1. While the LCS exhibited a high bias, the analyte was/were not detected in the associated samples, the data are reported.  2. Because the recoveries were biased high and target analytes were not detected in the associated samples above the reporting limit, the data are reported.	

**Originator's Name:**

Michael Penny 27-JUN-17

**Data Validator/Group Leader:**

Charles Wilson 27-JUN-17

# **Metals Analysis**

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**ARS International, LLC (ARSL)**  
**SDG #: 2017-1657**  
**Work Order #: 424916**

<b>Sample ID</b>	<b>Client ID</b>
424916001	CAWA-17-133301
424916002	CAWA-17-133329
1203806009	Method Blank (MB) <b>ICP</b>
1203806010	Laboratory Control Sample (LCS)
1203806013	424904001(NonSDGL) Serial Dilution (SD)
1203806011	424904001(NonSDGD) Sample Duplicate (DUP)
1203806012	424904001(NonSDGS) Matrix Spike (MS)
1203806018	Method Blank (MB) <b>ICP-MS</b>
1203806019	Laboratory Control Sample (LCS)
1203806022	424904001(NonSDGL) Serial Dilution (SD)
1203806020	424904001(NonSDGD) Sample Duplicate (DUP)
1203806021	424904001(NonSDGS) Matrix Spike (MS)
1203810085	Method Blank (MB) <b>CVAA</b>
1203810086	Laboratory Control Sample (LCS)
1203810092	424739001(CAPA-17133354L) Serial Dilution (SD)
1203810088	424739001(CAPA-17133354D) Sample Duplicate (DUP)
1203810090	424739001(CAPA-17133354S) Matrix Spike (MS)

**Sample Analysis**

Samples 424916001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

**Method/Analysis Information**

<b>Analytical Batch:</b>	1671891, 1671895, 1673477 and 1677435
<b>Prep Batch :</b>	1671890, 1671894 and 1673474
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 28, GL-MA-E-006 REV# 13, GL-MA-E-014 REV# 29, GL-MA-E-010 REV# 34 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 P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

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

The Metals analysis - ICPMS was performed on a PerkinElmer NexION 300X ICPMS. The instrument is equipped with a ESI PFA-ST nebulizer, quadrupole mass spectrometer, dual mode electron multiplier detector, and Kinetic Energy Discrimination (KED) technology. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

### **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 sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 424916002 (CAWA-17-133329)-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: 424904001 (NonSDG)-ICP and ICP-MS and 424739001 (CAPA-17133354)-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.

##### **Data Exception (DER) Documentation**

A data exception report was not required for this SDG.

##### **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: 2017-1657 GEL Work Order: 424916

#### **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: 26 JUN 2017**

**Title: Data Validator**

# **Sample Data Summary**

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

**SDG No:** 2017-1657**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 424916001**BASIS:** As Received**DATE COLLECTED** 05-JUN-17**CLIENT ID:** CAWA-17-133301**LEVEL:** Low**DATE RECEIVED** 07-JUN-17**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	06/14/17 10:50	061417W1-7	1673477

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1673477	1673474	EPA 245.1/245.2 Prep	20	mL	20	mL	06/13/17	AXS5

**\*Analytical Methods:**

AV EPA 245.2 1974

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

**SDG No:** 2017-1657**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 424916002**BASIS:** As Received**DATE COLLECTED** 05-JUN-17**CLIENT ID:** CAWA-17-133329**LEVEL:** Low**DATE RECEIVED** 07-JUN-17**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	06/14/17 10:52	061417W1-7	1673477

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

SDG No: 2017-1657

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 424916002

BASIS: As Received

DATE COLLECTED 05-JUN-17

CLIENT ID: CAWA-17-133329

LEVEL: Low

DATE RECEIVED 07-JUN-17

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	200	ug/L	U	68	200	200	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-38-2	Arsenic	2.58	ug/L	J	2	5	5	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-39-3	Barium	7.57	ug/L		1	5	5	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-70-2	Calcium	10200	ug/L		50	200	200	1	P	HSC	06/13/17 07:41	061317A-2	1671891
7440-47-3	Chromium	10	ug/L	U	3	10	10	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	06/13/17 07:41	061317A-2	1671891
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	06/09/17 00:24	170608-6	1671895
7439-95-4	Magnesium	3280	ug/L		110	300	300	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7439-98-7	Molybdenum	2.37	ug/L		0.2	0.5	0.5	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-02-0	Nickel	2	ug/L	U	0.6	2	2	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-09-7	Potassium	1290	ug/L		50	150	150	1	P	HSC	06/13/17 07:41	061317A-2	1671891
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7631-86-9	Silica	53100	ug/L		53	213	213	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	PRB	06/08/17 18:12	170608-3	1671895
7440-23-5	Sodium	10600	ug/L		100	300	300	1	P	HSC	06/13/17 07:41	061317A-2	1671891
7440-24-6	Strontium	55.2	ug/L		1	5	5	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	06/09/17 00:24	170608-6	1671895
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-61-1	Uranium	0.456	ug/L		0.067	0.2	0.2	1	MS	PRB	06/09/17 00:24	170608-6	1671895
7440-62-2	Vanadium	11	ug/L		1	5	5	1	P	HSC	06/08/17 18:20	060817A-1	1671891
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	06/13/17 07:41	061317A-2	1671891

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

**SDG No:** 2017-1657**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 424916002**BASIS:** As Received**DATE COLLECTED** 05-JUN-17**CLIENT ID:** CAWA-17-133329**LEVEL:** Low**DATE RECEIVED** 07-JUN-17**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	38.9	mg/L		0.453	1.24	1.24	1		TXT1	06/26/17 14:05		1677435

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1671891	1671890	SW846 3005A	50	mL	50	mL	06/07/17	CXW4
1671895	1671894	SW846 3005A	50	mL	50	mL	06/07/17	CXW4
1673477	1673474	EPA 245.1/245.2 Prep	20	mL	20	mL	06/13/17	AXS5

**\*Analytical Methods:**

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

# **Quality Control Summary**



**METALS**  
**-3b-**  
**PREPARATION BLANK SUMMARY**

SDG NO. 2017-1657

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>
1203806009	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	107	ug/L	+/-300	J	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	-3.38	ug/L	+/-10	J	P	3.3	10
1203806018	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
1203810085	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. 2017-1657 Client ID: SWWS46-17-136913S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 424904001 Spike ID: 1203806012

<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	4700		68	U	5000	92.8		P
Barium	ug/L	75-125	500		17		500	96.5		P
Beryllium	ug/L	75-125	496		1	U	500	99.3		P
Boron	ug/L	75-125	580		61		500	104		P
Calcium	ug/L	75-125	21300		16300		5000	98.7		P
Cobalt	ug/L	75-125	493		1	U	500	98.5		P
Copper	ug/L	75-125	526		3.75	J	500	104		P
Iron	ug/L	75-125	5160		69.2	J	5000	102		P
Magnesium	ug/L	75-125	9510		4620		5000	97.9		P
Manganese	ug/L	75-125	492		11.6		500	96.1		P
Potassium	ug/L	75-125	15300		10300		5000	101		P
Silica	ug/L		92300		82700		10700	89	N/A	P
Sodium	ug/L		61100		58500		5000	52	N/A	P
Strontium	ug/L	75-125	562		32.3		500	106		P
Tin	ug/L	75-125	490		2.5	U	500	97.6		P
Vanadium	ug/L	75-125	513		5.53		500	102		P
Zinc	ug/L	75-125	545		41		500	101		P

\*Analytical Methods:

P SW846 3005A/6010C

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2017-1657

Client ID: SWWS46-17-136913S

Contract: ESHL00114

Level: Low

Matrix: WATER

% Solids:

Sample ID: 424904001

Spike ID: 1203806021

<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	50.4		1	U	50	99.9		MS
Arsenic	ug/L	75-125	52.5		2.29	J	50	100		MS
Cadmium	ug/L	75-125	48.4		0.3	U	50	96.8		MS
Chromium	ug/L	75-125	52.6		3	U	50	99.2		MS
Lead	ug/L	75-125	47.4		0.5	U	50	94.6		MS
Molybdenum	ug/L	75-125	53.2		1.76		50	103		MS
Nickel	ug/L	75-125	48.4		0.6	U	50	95.7		MS
Selenium	ug/L	75-125	47.6		2	U	50	93.1		MS
Silver	ug/L	75-125	49.9		0.3	U	50	99.7		MS
Thallium	ug/L	75-125	43.8		0.6	U	50	87.4		MS
Uranium	ug/L	75-125	48		0.147	J	50	95.7		MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-5a-

## Matrix Spike Summary

**SDG NO.** 2017-1657 **Client ID:** CAPA-17133354S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 424739001 **Spike ID:** 1203810090

<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	2.09		0.067	U	2	104		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

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

SDG No.: 2017-1657

Lab Code: GEL

Contract: ESHL00114

Client ID: SWWS46-17-136913D

Matrix: WATER

Level: Low

Sample ID: 424904001

Duplicate ID: 1203806011

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	17		16.9		.378		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	61		60.7		.561		P
Calcium	ug/L	+/-20%	16300		16400		.288		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L	+/-10	3.75 J		3.87 J		3.23		P
Iron	ug/L	+/-100	69.2 J		80.9 J		15.6		P
Magnesium	ug/L	+/-20%	4620		4660		.912		P
Manganese	ug/L	+/-10	11.6		11.6		.233		P
Potassium	ug/L	+/-20%	10300		10300		.194		P
Silica	ug/L	+/-20%	82700		82200		.627		P
Sodium	ug/L	+/-20%	58500		58200		.453		P
Strontium	ug/L	+/-20%	32.3		32.6		.804		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	5.53		5.61		1.47		P
Zinc	ug/L	+/-10	41		36.3		12.1		P

\*Analytical Methods:

P SW846 3005A/6010C

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

SDG No.: 2017-1657

Lab Code: GEL

Contract: ESHL00114

Client ID: SWWS46-17-136913D

Matrix: WATER

Level: Low

Sample ID: 424904001

Duplicate ID: 1203806020

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	2.29 J		2.67 J		15.2		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L		3 U		3.1 J		200		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.76		1.7		3.42		MS
Nickel	ug/L		0.6 U		0.6 U				MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.3 U		0.3 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L	+/- .2	0.147 J		0.146 J		.683		MS

\*Analytical Methods:

MS SW846 3005A/6020A

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

**SDG No.:** 2017-1657**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAPA-17133354D**Matrix:** WATER**Level:** Low**Sample ID:** 424739001**Duplicate ID:** 1203810088**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. 2017-1657

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>
1203806010								
	Vanadium	ug/L	500	517		103	80-120	P
	Zinc	ug/L	500	496		99.2	80-120	P
	Aluminum	ug/L	5000	5170		103	80-120	P
	Barium	ug/L	500	505		101	80-120	P
	Beryllium	ug/L	500	505		101	80-120	P
	Boron	ug/L	500	520		104	80-120	P
	Calcium	ug/L	5000	5120		102	80-120	P
	Cobalt	ug/L	500	516		103	80-120	P
	Copper	ug/L	500	526		105	80-120	P
	Iron	ug/L	5000	5060		101	80-120	P
	Magnesium	ug/L	5000	5400		108	80-120	P
	Manganese	ug/L	500	511		102	80-120	P
	Potassium	ug/L	5000	5010		100	80-120	P
	Silica	ug/L	10700	10700		99.9	80-120	P
	Sodium	ug/L	5000	4810		96.1	80-120	P
	Strontium	ug/L	500	572		114	80-120	P
	Tin	ug/L	500	510		102	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C



## METALS

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## Laboratory Control Sample Summary

SDG NO. 2017-1657

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>
1203806019								
	Antimony	ug/L	50	49.4		98.7	80-120	MS
	Arsenic	ug/L	50	52.1		104	80-120	MS
	Cadmium	ug/L	50	50.5		101	80-120	MS
	Chromium	ug/L	50	50.1		100	80-120	MS
	Lead	ug/L	50	49.4		98.8	80-120	MS
	Molybdenum	ug/L	50	49.3		98.7	80-120	MS
	Nickel	ug/L	50	50.4		101	80-120	MS
	Selenium	ug/L	50	51.6		103	80-120	MS
	Silver	ug/L	50	51.5		103	80-120	MS
	Thallium	ug/L	50	45		90	80-120	MS
	Uranium	ug/L	50	48.7		97.4	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2017-1657

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>
1203810086	Mercury	ug/L	2	2.04		102	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

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## Serial Dilution Sample Summary

SDG NO. 2017-1657 Client ID: SWWS46-17-136913L

Contract: ESHL00114

Matrix: LIQUID Level: Low

Sample ID: 424904001 Serial Dilution ID: 1203806013

<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	17		17	J	.386			P
Beryllium	1	U	5	U				P
Boron	61		75	U	3.411			P
Calcium	16300		16800		3.16		10	P
Cobalt	1	U	5	U				P
Copper	3.75	J	15	U	3.812			P
Iron	69.2	J	212	J	207.006			P
Magnesium	4620		5030		8.852			P
Manganese	11.6		12.2	J	4.659			P
Potassium	10300		10400		1.615		10	P
Silica	82700		82300		.568		10	P
Sodium	58500		63600		8.822		10	P
Strontium	32.3		36.6		13.289			P
Tin	2.5	U	12.5	U				P
Vanadium	5.53		5	U	37.07			P
Zinc	41		47.8	J	16.505			P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

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## Serial Dilution Sample Summary

SDG NO. 2017-1657

Client ID: SWWS46-17-136913L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 424904001

Serial Dilution ID: 1203806022

<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	2.29	J	10	U	2.749			MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.76		2.09	J	19.088			MS
Nickel	.6	U	3	U				MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.147	J	.335	U	12.245			MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-9-

## Serial Dilution Sample Summary

**SDG NO.** 2017-1657 **Client ID:** CAPA-17133354L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 424739001 **Serial Dilution ID:** 1203810092

<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 #: 2017-1657  
Work Order #: 424916**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1671529

**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>
424916001	CAWA-17-133301
1203805981	Method Blank (MB)
1203805982	Laboratory Control Sample (LCS)
1203805984	424739002(CAPA-17133356) Sample Duplicate (DUP)
1203805986	424739002(CAPA-17133356) 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 424739002 (CAPA-17133356) 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**

#### **Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

#### **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>	1671991	<b>Method:</b>	WSP-CN(T)
<b>Prep Batch :</b>	1671990	<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>
424916001	CAWA-17-133301
1203806299	Method Blank (MB)
1203806300	Laboratory Control Sample (LCS)
1203806301	424904001(NonSDG) Sample Duplicate (DUP)
1203806302	424904001(NonSDG) Matrix Spike (MS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 19.

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

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

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

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

### **Y Intercept Rule**

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

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

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

The MB analyzed with this SDG met the acceptance criteria.

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

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.

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

Sample 424904001 (NonSDG) 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**

##### **Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

##### **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:** 1672927

**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>
424916002	CAWA-17-133329
1203808700	Method Blank (MB)
1203808701	Laboratory Control Sample (LCS)
1203808702	425075004(CAWA-17-133313) Sample Duplicate (DUP)
1203808703	425075004(CAWA-17-133313) 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-1600 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 425075004 (CAWA-17-133313) 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**

#### **Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

#### **Manual Integrations**

Samples 1203808702 (CAWA-17-133313DUP), 1203808703 (CAWA-17-133313PS) and 424916002 (CAWA-17-133329) 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>	1671935	<b>Method:</b>	NH3
<b>Prep Batch :</b>	1671933	<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>
424916002	CAWA-17-133329
1203806101	Method Blank (MB)
1203806102	Laboratory Control Sample (LCS)
1203806103	424741001(CAPA-17-133353) Sample Duplicate (DUP)
1203806104	424741001(CAPA-17-133353) Matrix Spike (MS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

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

### **Continuing Calibration Blanks**

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

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

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

acceptance limits.

**Y Intercept Rule**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 424741001 (CAPA-17-133353) 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**

**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**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>	1671942	<b>Method:</b>	TKN
<b>Prep Batch :</b>	1671941	<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>
424916001	CAWA-17-133301
1203806126	Method Blank (MB)
1203806127	Laboratory Control Sample (LCS)
1203806128	424741002(CAPA-17-133355) Sample Duplicate (DUP)
1203806129	424741002(CAPA-17-133355) 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 424741002 (CAPA-17-133355) 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**

Samples 1203806126 (MB) and 1203806127 (LCS) were re-analyzed due to instrument failure. The results from the reanalysis are reported. Sample 424916001 (CAWA-17-133301) was re-analyzed due to CCB failure. The reanalysis data with passing instrument QC was reported.

**Miscellaneous Information**

**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**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:** 1671832

**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>
424916002	CAWA-17-133329
1203805863	Method Blank (MB)
1203805864	Laboratory Control Sample (LCS)
1203805866	424735002(CAWA-17-134176) Sample Duplicate (DUP)
1203805867	424853003(NonSDG) Sample Duplicate (DUP)
1203805871	424735002(CAWA-17-134176) Post Spike (PS)
1203805872	424853003(NonSDG) Post Spike (PS)

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

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-128 REV# 8.

### **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**

Samples 424735002 (CAWA-17-134176) and 424853003 (NonSDG) were selected for QC analysis.

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**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>	1672160	<b>Method:</b>	PO4
<b>Prep Batch :</b>	1672159	<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>
424916002	CAWA-17-133329
1203806693	Method Blank (MB)
1203806694	Laboratory Control Sample (LCS)
1203806695	424916002(CAWA-17-133329) Sample Duplicate (DUP)
1203806696	424916002(CAWA-17-133329) Matrix Spike (MS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

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

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

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

### **Y Intercept Rule**

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

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

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

The MB analyzed with this SDG met the acceptance criteria.

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

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.

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

Sample 424916002 (CAWA-17-133329) 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**

##### **Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

##### **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:** 1673398

**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>
424916002	CAWA-17-133329
1203809792	Method Blank (MB)
1203809793	Laboratory Control Sample (LCS)
1203806142	424916002(CAWA-17-133329) 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 424916002 (CAWA-17-133329) was selected for QC analysis.

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

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

Analyte	Sample	Value
Total Dissolved Solids	1203806142 (CAWA-17-133329DUP)	12.2* (0%-5%)

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Data Exception (DER) Documentation**

A data exception report (DER) 1641693 was generated for sample 1203806142 (CAWA-17-133329DUP) in this SDG/batch.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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### **Method/Analysis Information**

**Product:** Specific Conductivity

**Analytical Batch:** 1678861

**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>
424916002	CAWA-17-133329
1203822826	Laboratory Control Sample (LCS)
1203822828	425121001(CAWA-17-133347) Sample Duplicate (DUP)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Initial Standardization**

The titrant was properly standardized

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

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

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.

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

Sample 425121001 (CAWA-17-133347) 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****Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**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:** 1673523 **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>
424916002	CAWA-17-133329
1203811672	Laboratory Control Sample (LCS)
1203810238	425121001(CAWA-17-133347) 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 425121001 (CAWA-17-133347) 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
1203810238 (CAWA-17-133347DUP)	pH	Received 09-JUN-17, out of holding 07-JUN-17
424916002 (CAWA-17-133329)	pH	Received 07-JUN-17, out of holding 05-JUN-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****Data Exception (DER) Documentation**

A data exception report (DER) 1642299 was generated for samples 424916002 (CAWA-17-133329) and 1203810238 (CAWA-17-133347DUP) in this SDG/batch.

**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:** 1673522      **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>
424916002	CAWA-17-133329
1203810229	Laboratory Control Sample (LCS)
1203810232	425121001(CAWA-17-133347) Sample Duplicate (DUP)
1203810235	425121001(CAWA-17-133347) 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 425121001 (CAWA-17-133347) 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**

**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

**Certification Statement**

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

## **GEL LABORATORIES LLC**

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

### **Qualifier Definition Report for**

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

Client SDG: 2017-1657 GEL Work Order: 424916


#### **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:** 30 JUN 2017

**Title:** Analyst I

# **Sample Data Summary**

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: June 30, 2017

Company : Los Alamos National Laboratory  
Address : TA-03, SM271, Drop Pt. 02U, Rm111

Los Alamos, New Mexico 87545

Contact: Mr. Keith Greene

Client SDG: 2017-1657

Project: LANL- WQH Water Samples

Client Sample ID: CAWA-17-133301

Project: ESHL00114

Sample ID: 424916001

Client ID: ARSL004

Matrix: W

Collect Date: 05-JUN-17 13:23

Receive Date: 07-JUN-17

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.359	0.330	1.00	mg/L		1	TSM	06/09/17	1405	1671529	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	06/12/17	1112	1671991	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl		0.150	0.033	0.100	mg/L	1.00	1	KLP1	06/09/17	1549	1671942	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	06/12/17	0925	1671990
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	06/08/17	1700	1671941

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

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: June 30, 2017

Company : Los Alamos National Laboratory  
Address : TA-03, SM271, Drop Pt. 02U, Rm111

Los Alamos, New Mexico 87545  
Contact: Mr. Keith Greene  
Project: LANL- WQH Water Samples

Client SDG: 2017-1657

Client Sample ID: CAWA-17-133329  
Sample ID: 424916002  
Matrix: W  
Collect Date: 05-JUN-17 13:23  
Receive Date: 07-JUN-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	06/10/17	0023	1672927	1
Chloride		2.47	0.067	0.200	mg/L		1					
Fluoride		0.144	0.033	0.100	mg/L		1					
Sulfate		2.30	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0482	0.017	0.050	mg/L	1.00	1	KLP1	06/09/17	1029	1671935	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.346	0.017	0.050	mg/L		1	AXH3	06/09/17	1041	1671832	3
PO4 "As Received"												
Phosphorus, Total as P		0.053	0.020	0.050	mg/L	1.00	1	KLP1	06/09/17	1346	1672160	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		121	3.40	14.3	mg/L			KLP1	06/12/17	1617	1673398	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		63.0	1.45	4.00	mg/L			RXB5	06/14/17	1450	1673522	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		135	1.00	1.00	umhos/cm		1	RXB5	06/30/17	1330	1678861	7
PH "As Received"												
pH at Temp 19.4C	H	8.18	0.010	0.100	SU		1	RXB5	06/14/17	1450	1673523	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	06/08/17	1545	1671933
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	06/08/17	1700	1672159



# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: June 30, 2017

Company : Los Alamos National Laboratory  
Address : TA-03, SM271, Drop Pt. 02U, Rm111

Los Alamos, New Mexico 87545  
Contact: Mr. Keith Greene  
Project: LANL- WQH Water Samples

Client SDG: 2017-1657

Client Sample ID: CAWA-17-133329  
Sample ID: 424916002

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

# **Quality Control Summary**

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: June 30, 2017

Page 1 of 6

Los Alamos National Laboratory  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico

Contact: Mr. Keith Greene

Workorder: 424916

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1671529										
QC1203805984	424739002	DUP									
Total Organic Carbon Average		J	0.455	J	0.416	mg/L	8.96	^	(+/-1.00)	TSM	06/09/17 03:57
QC1203805982	LCS										
Total Organic Carbon Average	10.0				10.6	mg/L			106	(80%-120%)	06/09/17 00:26
QC1203805981	MB										
Total Organic Carbon Average				U	ND	mg/L					06/09/17 00:15
QC1203805986	424739002	PS									
Total Organic Carbon Average	10.0	J	0.455		11.6	mg/L			111	(75%-125%)	06/09/17 04:44
<b>Flow Injection Analysis</b>											
Batch	1671991										
QC1203806301	424904001	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A			AXH3	06/12/17 11:10
QC1203806300	LCS										
Cyanide, Total	50.0				50.2	ug/L			100	(90%-110%)	06/12/17 11:08
QC1203806299	MB										
Cyanide, Total				U	ND	ug/L					06/12/17 11:07
QC1203806302	424904001	MS									
Cyanide, Total	100	U	ND		102	ug/L			101	(90%-110%)	06/12/17 11:11
<b>Ion Chromatography</b>											
Batch	1672927										
QC1203808702	425075004	DUP									
Bromide		J	0.0828	J	0.0829	mg/L	0.121	^	(+/-0.200)	MXL2	06/10/17 01:49

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## QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1672927										
Chloride		3.64		3.64	mg/L	0.0962		(0%-20%)	MXL2	06/10/17	01:49
Fluoride	J	0.0877	J	0.090	mg/L	2.59	^	(+/-0.100)			
Sulfate		3.88		3.85	mg/L	0.787		(0%-20%)			
QC1203808701 LCS											
Bromide	1.25			1.31	mg/L		105	(80%-120%)		06/09/17	23:25
Chloride	5.00			4.93	mg/L		98.5	(80%-120%)			
Fluoride	2.50			2.57	mg/L		103	(80%-120%)			
Sulfate	10.0			10.2	mg/L		102	(80%-120%)			
QC1203808700 MB											
Bromide			U	ND	mg/L					06/09/17	22:56
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203808703 425075004 PS											
Bromide	1.25	J	0.0828	1.31	mg/L		98.5	(75%-125%)		06/10/17	02:18
Chloride	5.00		3.64	8.91	mg/L		105	(75%-125%)			
Fluoride	2.50	J	0.0877	2.54	mg/L		98.2	(75%-125%)			
Sulfate	10.0		3.88	14.0	mg/L		101	(75%-125%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1671832										
QC1203805866	424735002	DUP									
Nitrogen, Nitrate/Nitrite	J	0.0222	J	0.0219	mg/L	1.36	^	(+/-0.050)	AXH3	06/09/17	10:00
QC1203805867	424853003	DUP									
Nitrogen, Nitrate/Nitrite		1.12		1.11	mg/L	0.897		(0%-20%)		06/09/17	10:28
QC1203805864	LCS										
Nitrogen, Nitrate/Nitrite	1.00			0.997	mg/L			99.7	(90%-110%)	06/09/17	09:52
QC1203805863	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					06/09/17	09:51
QC1203805871	424735002	PS									
Nitrogen, Nitrate/Nitrite	1.00	J	0.0222	1.02	mg/L			99.8	(90%-110%)	06/09/17	10:01
QC1203805872	424853003	PS									
Nitrogen, Nitrate/Nitrite	1.00		1.12	2.04	mg/L			92	(90%-110%)	06/09/17	10:29
Batch	1671935										
QC1203806103	424741001	DUP									
Nitrogen, Ammonia		0.0858		0.0733	mg/L	15.7	^	(+/-0.050)	KLP1	06/09/17	10:13
QC1203806102	LCS										
Nitrogen, Ammonia	1.00			1.01	mg/L			101	(90%-110%)	06/09/17	10:02
QC1203806101	MB										
Nitrogen, Ammonia			J	0.0385	mg/L					06/09/17	10:01
QC1203806104	424741001	MS									
Nitrogen, Ammonia	1.00		0.0858	1.03	mg/L			94.4	(90%-110%)	06/09/17	10:14
Batch	1671942										
QC1203806128	424741002	DUP									
Nitrogen, Total Kjeldahl		0.336		0.308	mg/L	8.7	^	(+/-0.100)	KLP1	06/09/17	15:06

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1671942										
QC1203806127	LCS										
Nitrogen, Total Kjeldahl	1.00			0.953	mg/L		95.3	(90%-110%)	KLP1	06/09/17	15:14
QC1203806126	MB										
Nitrogen, Total Kjeldahl			J	0.0715	mg/L					06/09/17	15:13
QC1203806129	424741002	MS									
Nitrogen, Total Kjeldahl	1.00	0.336		1.35	mg/L		101	(90%-110%)		06/09/17	15:07
Batch	1672160										
QC1203806695	424916002	DUP									
Phosphorus, Total as P		0.053	J	0.0499	mg/L	6.03	^	(+/-0.050)	KLP1	06/09/17	13:47
QC1203806694	LCS										
Phosphorus, Total as P	1.00			1.00	mg/L		100	(80%-124%)		06/09/17	13:45
QC1203806693	MB										
Phosphorus, Total as P			U	ND	mg/L					06/09/17	13:44
QC1203806696	424916002	MS									
Phosphorus, Total as P	1.00	0.053		0.944	mg/L		89.1	(63%-139%)		06/09/17	13:48
<b>Solids Analysis</b>											
Batch	1673398										
QC1203806142	424916002	DUP									
Total Dissolved Solids		121		137	mg/L	12.2*		(0%-5%)	KLP1	06/12/17	16:17
QC1203809793	LCS										
Total Dissolved Solids	300			306	mg/L		102	(95%-105%)		06/12/17	16:17
QC1203809792	MB										
Total Dissolved Solids			J	4.29	mg/L					06/12/17	16:17

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1673522										
QC1203810232	425121001	DUP									
Alkalinity, Total as CaCO3		62.0		61.8	mg/L	0.323		(0%-20%)	RXB5	06/14/17	15:10
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203810229	LCS										
Alkalinity, Total as CaCO3	100			105	mg/L		105	(90%-110%)		06/14/17	13:54
QC1203810235	425121001	MS									
Alkalinity, Total as CaCO3	100	62.0		166	mg/L		104	(80%-120%)		06/14/17	15:12
Batch	1673523										
QC1203810238	425121001	DUP									
pH	H	8.04	H	8.05	SU	0.124		(0%-5%)	RXB5	06/14/17	15:10
QC1203811672	LCS										
pH	7.00			7.00	SU		100	(99%-101%)		06/14/17	14:49
Batch	1678861										
QC1203822828	425121001	DUP									
Conductivity		190		197	umhos/cm	3.31		(0%-10%)	RXB5	06/30/17	13:39
QC1203822826	LCS										
Conductivity	1410			1410	umhos/cm		99.4	(95%-105%)		06/30/17	13:23

- 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

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## QC Summary

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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.



# Miscellaneous

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 14-JUN-17	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> BALANCE ANALYTICAL	<b>Test / Method:</b> EPA 160.1, SM 2540C	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> BRKL, ESHL
<b>Batch ID:</b> 1673398	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 424746(38791),424916(2017-1657)</b> <b>Application Issues:</b> Failed RPD for DUP			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. Failed RPD for DUP:  QC 1203806142DUP,1203807493DUP		1. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: Total Dissolved Solids 1203806142 (CAWA-17-133329DUP) [12.2* (0%-5%)] and 1203807493 (38791-001DUP) [7.84* (0%-5%)].	

**Originator's Name:**

Kristen Mizzell 14-JUN-17

**Data Validator/Group Leader:**

Aubrey Kingsbury 14-JUN-17

### DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 15-JUN-17	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ELECTRODE	<b>Test / Method:</b> EPA 150.1, SM 4500-H B, SW846 9040C	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> BELI, ESHL, UCOR
<b>Batch ID:</b> 1673523	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 423944(2017-1573),423945(2017-1572),424030(2017-1589),424080,424916(2017-1657),424952,425075(2017-1667),425079(2017-1664),425115(2017-1690),425121(2017-1689) <b>Application Issues:</b> Sample received out of holding			
<b>Specification and Requirements</b> <b>Exception Description:</b>		<b>DER Disposition:</b>	
1. Sample received out of holding:  423944 001  423945 001  424030 001  424080 004  424916 002  424952 001,002,003  425075 002,004  425079 002,004  425115 002  425121 001  QC 1203810237DUP,1203810238DUP		1. Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified. 1203810237 (EMWGW7913DUP) [Received 25-MAY-17, out of holding 24-MAY-17]. 1203810238 (CAWA-17-133347DUP) [Received 09-JUN-17, out of holding 07-JUN-17]. 423944001 (WST35-17-135774) [Received 24-MAY-17, out of holding 22-MAY-17]. 423945001 (WST35-17-135775) [Received 24-MAY-17, out of holding 22-MAY-17]. 424030001 (WST03-17-135771) [Received 25-MAY-17, out of holding 23-MAY-17]. 424080004 (EMWGW7913) [Received 25-MAY-17, out of holding 24-MAY-17]. 424916002 (CAWA-17-133329) [Received 07-JUN-17, out of holding 05-JUN-17]. 424952001 (1. Kaiser Capitol Hill - Cold Water) [Received 07-JUN-17, out of holding 06-JUN-17]. 424952002 (2. Kaiser Capitol Hill - Hot Water) [Received 07-JUN-17, out of holding 06-JUN-17]. 424952003 (3. Kaiser Capitol Hill - RO/DI) [Received 07-JUN-17, out of holding 06-JUN-17]. 425075002 (CAWA-17-133312) [Received 08-JUN-17, out of holding 06-JUN-17]. 425075004 (CAWA-17-133313) [Received 08-JUN-17, out of holding 06-JUN-17]. 425079002 (CAWA-17-133314) [Received 08-JUN-17, out of holding 06-JUN-17]. 425079004 (CAWA-17-133315) [Received 08-JUN-17, out of holding 06-JUN-17]. 425115002 (CAWA-17-133326) [Received 09-JUN-17, out of holding 07-JUN-17]. 425121001 (CAWA-17-133347) [Received 09-JUN-17, out of holding 07-JUN-17].	

**Originator's Name:**

Rachael Bell 15-JUN-17

**Data Validator/Group Leader:**

Elzbieta Szulc 15-JUN-17