

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-17-133303

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	6/14/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1117		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-63		FIELD PREP:	UF	
LOCATION TYPE:	Mon		FIELD QC TYPE:	REG	
TOP DEPTH:	OK		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	↓	↓	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: Breezy while sampling

LOCATION COMMENTS: None

FIELD PARAMETERS:

Sample Time	1117	HH:MM	Dissolved Oxygen	5.59	Flow (in gpm)	7.31
Oxidation-Reduction Potential	177.2		pH	6.96	Specific Conductance	106.1
Temperature	15.1		Turbidity	0.45		

COLLECTED BY (PRINT): M. Shendo, T. Bonham

RELINQUISHED BY (Printed Name) <u>M. Shendo</u> (Signature) <u>[Signature]</u>	Date/Time <u>6/14/17</u> <u>1215</u>	RECEIVED BY (Printed Name) <u>Shenwood</u> (Signature) <u>[Signature]</u>	Date/Time <u>6/14/17</u> <u>1215</u>
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-17-133331

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	6/14/17	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	1117		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-63		FIELD PREP:	F	
LOCATION TYPE:	Mon		FIELD QC TYPE:	REG	
TOP DEPTH:	OK		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	↓	✓	EXCAVATED:		YES / NO / NA

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT): M. Shendo, T. Bonham

RELINQUISHED BY (Printed Name) <i>M. Shendo</i> (Signature) <i>[Signature]</i>	Date/Time 6/14/17 1215	RECEIVED BY (Printed Name) <i>S. Sherwood</i> (Signature) <i>[Signature]</i>	Date/Time 6/14/17 1215
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. 2017-1759

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
425636	EPA:120.1	1				
425636	EPA:150.1	1				
425636	EPA:160.1	1				
425636	EPA:170.0	2				
425636	EPA:245.2	2				
425636	EPA:300.0	1				
425636	EPA:310.1	1				
425636	EPA:335.4	1				
425636	EPA:350.1	1				
425636	EPA:351.2	1				
425636	EPA:353.2	1				
425636	EPA:365.4	1				
425636	SM:A2340B	1				
425636	SW-846:6010C	1				
425636	SW-846:6020	1				
425636	SW-846:6850	1				
425636	SW-846:8330B	1				
425636	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
425636	EPA:120.1	1679218	1679218	1										1			2				
425636	EPA:150.1	1677686	1677686	1										1			1				
425636	EPA:160.1	1675256	1675256	1					1					1			1				
425636	EPA:170.0	NA	NA	2																	
425636	EPA:245.2	1675234	1675232	2					1	1				1			1				
425636	EPA:300.0	1675462	1675462	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
425636	EPA:310.1	1677682	1677682	1						1				1			1				
425636	EPA:335.4	1674062	1674061	1					1	1	1			1			1				
425636	EPA:350.1	1675174	1675173	1					1	1				1			1				
425636	EPA:351.2	1675176	1675175	1					1	1				1			1				
425636	EPA:353.2	1675664	1675664	1					1					1			1				
425636	EPA:365.4	1674640	1674639	1					1	1				1			1				
425636	SM:A2340B	1681462	1681462	1																	
425636	SW-846:6010C	1674924	1674923	1					1	1				1			1				
425636	SW-846:6020	1674884	1674883	1					1	1				1			1				
425636	SW-846:6850	1675694	1675692	1					1	1	1			1							
425636	SW-846:8330B	1675200	1675199	1					1	1	1			1							
425636	SW-846:9060	1675261	1675261	1					1					1			2				

2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	BDW01-17-139079	1203823671	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CALA-17-139173	1203823670	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAWA-17-133331	425636002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203823669	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAPU-17-139091	1203820095	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-133331	425636002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203820094	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-17-133328	1203816297	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-17-133331	425636002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203814325	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203814324	MB	1	0	0	0
EPA:170.0	VOC	CAWA-17-133303	425636001	REG	1	0	0	0
EPA:170.0	VOC	CAWA-17-133331	425636002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-133303	1203814251	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-133303	1203814253	MS	0	0	1	0
EPA:245.2	INORGANIC	CAWA-17-133303	425636001	REG	1	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:245.2	INORGANIC	CAWA-17-133331	425636002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203814250	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203814249	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-17-133328	1203814715	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-17-133331	425636002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203814714	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203814713	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPU-17-139091	1203820087	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAPU-17-139091	1203820090	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-133331	425636002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203820084	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-133279	1203811491	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-133279	1203811492	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-133279	1203814049	MSD	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-133303	425636001	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203811490	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203811489	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-133328	1203814058	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-133328	1203814061	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-133331	425636002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203814057	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203814056	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-133300	1203814067	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-133300	1203814069	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-133303	425636001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203814065	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203814064	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-17-133331	425636002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CTUA-17-131778	1203815247	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203815246	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203815245	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CALA-17-139173	1203812756	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CALA-17-139173	1203812757	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-133331	425636002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203812755	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203812754	MB	1	0	0	0
SM:A2340B	INORGANIC	CAWA-17-133331	425636002	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAWA-17-133331	1203813457	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAWA-17-133331	1203813458	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAWA-17-133331	425636002	REG	17	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6010C	INORGANIC	LCS	1203813456	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203813455	MB	17	0	0	0
SW-846:6020	INORGANIC	CAWA-17-133328	1203813680	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAWA-17-133328	1203813681	MS	0	0	11	0
SW-846:6020	INORGANIC	CAWA-17-133331	425636002	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203813355	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203813354	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-133327	1203815293	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-133327	1203815294	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-133331	425636002	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203815292	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203815291	MB	1	0	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-133303	1203814142	MS	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-133303	1203814143	MSD	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-133303	425636001	REG	20	1	0	0
SW-846:8330B	LCMS/MS HIGH	LCS	1203814141	LCS	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	MB	1203814140	MB	20	1	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-17-133299	1203814350	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-17-133300	1203814351	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-17-133303	425636001	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203814349	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203814348	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	1203813455	METHOD BLANK	SW-846:6010C	W	Calcium	65.4	J	ug/L	200
MB	1203813455	METHOD BLANK	SW-846:6010C	W	Sodium	178	J	ug/L	300
MB	1203814056	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0328	J	mg/L	0.050

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-17-133331	1203814056	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0328	mg/L	0.0705		0.050	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

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

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-17-133300	1203814069		EPA:351.2	Total Kjeldahl Nitrogen	1675175	06-27-2017	W	81.9		110	90	10		
CAWA-17-133331	1203813458		SW-846:6010C	Sodium	1674923	06-30-2017	W	5.74		125	75			
CAWA-17-133331	1203813458		SW-846:6010C	Sodium	1674923	06-30-2017	W	5.74		125	75			
CAWA-17-133303	1203814142	1203814143	SW-846:8330B	2,4-Diamino-6-nitrotoluene	1675199	07-01-2017	W	135	133	121	50		1	30

DATA VALIDATION REPORT

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
1203814141		SW-846:8330B	2,4-Diamino-6-nitrotoluene	1675199	07-01-2017	W	129		121	50				

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-63	2017-1759	CAWA-17-133331	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	14	N	0.0705	mg/L	0.0705	mg/L			W	06/14/2017		1675174	VAL	Y
R-63	2017-1759	CAWA-17-133331	REG	INIT	INORGANIC	SW-846:6010C	Sodium	N	J-	16a	Y	13100	ug/L	13.1	mg/L			W	06/14/2017		1674924	VAL	Y

Reason Code

Description

DATA VALIDATION REPORT

Reason Code

Description

I4

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

I6a

The associated matrix spike recovery was below the lower acceptance limit (LAL) but >10%. Follow the external laboratory limits located within the associated data package.

J_LAB

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

NQ

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

U_LAB

The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-17-133303	R-63	REG	EPA:170.0	0	1
CAWA-17-133303	R-63	REG	EPA:245.2	0	1
CAWA-17-133303	R-63	REG	EPA:335.4	0	1
CAWA-17-133303	R-63	REG	EPA:351.2	0	1
CAWA-17-133303	R-63	REG	SW-846:8330B	0	20
CAWA-17-133303	R-63	REG	SW-846:9060	0	1
CAWA-17-133331	R-63	REG	EPA:120.1	0	1
CAWA-17-133331	R-63	REG	EPA:150.1	0	1
CAWA-17-133331	R-63	REG	EPA:160.1	0	1
CAWA-17-133331	R-63	REG	EPA:170.0	0	1
CAWA-17-133331	R-63	REG	EPA:245.2	0	1
CAWA-17-133331	R-63	REG	EPA:300.0	0	4
CAWA-17-133331	R-63	REG	EPA:310.1	0	2
CAWA-17-133331	R-63	REG	EPA:350.1	0	1
CAWA-17-133331	R-63	REG	EPA:353.2	0	1
CAWA-17-133331	R-63	REG	EPA:365.4	0	1
CAWA-17-133331	R-63	REG	SM:A2340B	0	1
CAWA-17-133331	R-63	REG	SW-846:6010C	0	17
CAWA-17-133331	R-63	REG	SW-846:6020	0	11
CAWA-17-133331	R-63	REG	SW-846:6850	0	1

DATA VALIDATION REPORT

Chain Of Custody No. 2017-1759

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
425636	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
425636	SW-846:8330B	1675200	1675199	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
SW-846:8330B	LCMS/MS HIGH	CAWA-17-133303	425636001	REG	3	0	0	0
SW-846:8330B	LCMS/MS HIGH	MB	1203814140	MB	3	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

No.

6. Any surrogate recoveries outside the control limits?

DATA VALIDATION REPORT

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.

Reason Code

Description

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
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DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-17-133303	R-63	REG	SW-846:8330B	0	3

July 07, 2017

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

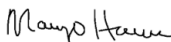
Re: LANL- WQH Water Samples
Work Order: 425636
SDG: 2017-1759

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on June 16, 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: 2017-1759
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 425636
SDG: 2017-1759

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 425636
SDG # : 2017-1759**

July 07, 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 16, 2017 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
425636001	CAWA-17-133303
425636002	CAWA-17-133331

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 07 July 2017

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	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



Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: <u>ESHL</u>		SDG/AR/COC/Work Order: <u>425636</u>	
Received By: <u>ZKW</u>		Date Received: <u>6/16/17</u>	
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>5908 1782 2201 - 32</u> <u>5908 1782 2197 2c</u> <u>5908 1782 2212 - 2c</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?	<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM/mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	<input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. <input checked="" type="checkbox"/> PCB's <input type="checkbox"/> Flammable <input type="checkbox"/> Foreign Soil <input type="checkbox"/> RCRA <input type="checkbox"/> Asbestos <input type="checkbox"/> Beryllium <input type="checkbox"/> Other:	

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

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials

MEA

Date

6/19/17

Page

1

of

1

GL-CHL-SR-001 Rev 5

ORIGIN ID:SAFA (505) 665-9966
KEITH GREENE
LOS ALAMOS NATL LAB.
TA00 BLDG 1297 DPU 03

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 15JUN17
ACTWGT: 31.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

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

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWEO



2 of 2

MPS# 5908 1782 2212
0263

Mistr# 5908 1782 2201

0201

FRI - 16 JUN 10:30A
PRIORITY OVERNIGHT

X7 RBWA

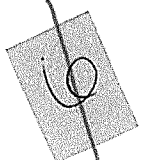
29407

SC-US CHS



Part # 156140V-434 RIT3 06/15

7/16/9



ORIGIN ID: SAFA (505) 665-9966

SHIP DATE: 15JUN17
ACTWGT: 49.0 LB MAN
CAD: 0014176/CAFE2916

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

BILL SENDER

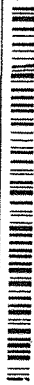
TO VALERIE DAVIS

GENERAL ENGINEERING LAB
2040 SAVAGE RD

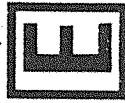
CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ARCH08BF4WA0



FedEx
Express



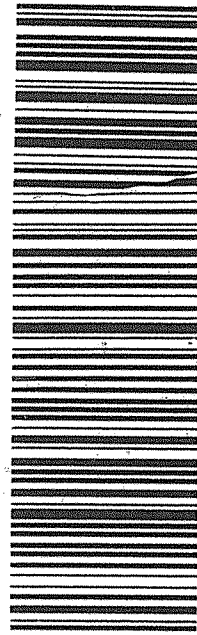
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PRIORITY OVERNIGHT

TRK# 5908 1782 2197

0201

X7 RBWA

29407
SC-US CHS



Part# 156148V-434 RIT2 06/15

ORIGIN ID: SAFA (505) 665-9966

SHIP DATE: 15JUN17
ACTWGT: 53.0 LB MAN
CAD: 0014176/CAFE2916

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

BILL SENDER

TO VALERIE DAVIS

GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BAGWE0



FedEx
Express



FRI - 16 JUN 10:30A
PRIORITY OVERNIGHT

1 of 2

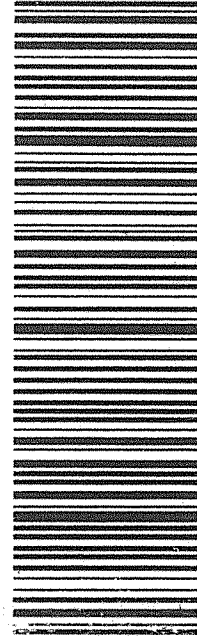
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0201

MASTER

X7 RBWA

29407
SC-US CHS



Part# 156148V-434 RIT2 06/15

538C1/4502/3298

15131505120149

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 #: 2017-1759
Work Order #: 425636**

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:	1675694
Prep Batch Number:	1675692

Sample Analysis

Sample ID	Client ID
425636002	425636002 (CAWA-17-133331)
1203815298	Interference Check Sample (ICS)
1203815291	Method Blank (MB)
1203815292	Laboratory Control Sample (LCS)
1203815293	425532003(CAWA-17-133327) Matrix Spike (MS)
1203815294	425532003(CAWA-17-133327) 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 425532003 (CAWA-17-133327) 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: 2017-1759 GEL Work Order: 425636

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: 24 JUN 2017

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1675692Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133331Date Received: 16-JUN-17GEL Job No (SDG): 2017-1759GEL Sample ID: 425636002Date Filtered: 20-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	0.243	ug/L		1	21-JUN-17 17:13	per0621028a
	Perchlorate Isotope Ratio			2.92			1	21-JUN-17 17:13	per0621028a
14797-73-0	Perchlorate-101	.05	.2	0.245	ug/L		1	21-JUN-17 17:13	per0621028a
	Perchlorate-O(18)			0.427	ug/L		1	21-JUN-17 17:13	per0621028a

^ 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): 2017-1759

Extract Batch Code: 1675692

Date Filtered: 20-JUN-17

Matrix: WATER

Sample ID: 1203815292

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.19	ug/L	95		85 - 115
Perchlorate Isotope Ratio		2.86				-
Perchlorate-101	0.200	.195	ug/L	98		85 - 115
Perchlorate-O(18)		.476	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): 2017-1759

Extract Batch Code: 1675692

Date Extracted: 20-JUN-17

GEL MS/PS ID: 1203815293

Client ID: CAWA-17-133327

GEL MSD/PSD ID: 1203815294

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	0.265	ug/L	0.434	85	.487	111	11	30	75 - 125
Perchlorate Isotope Ratio	0	2.84		2.91		3.04		4		-
Perchlorate-101	0.200	0.276	ug/L	0.442	83	.474	99	7	30	75 - 125
Perchlorate-O(18)	0	0.442	ug/L	0.455		.436		4		-

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

Quality Control Data

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample No.

MBLab Code: GELDate Received: 20-JUN-17Instrument: LCMSMSGEL Job No (SDG): 2017-1759Method: EPA 6850 ModifiedGEL Sample ID: 1203815291Matrix: WATERDate Filtered: 20-JUN-17Extraction Batch ID: 1675692Injection Volume (uL): 20Extraction Type: Filter/DAISample 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	0.200	ug/L	U	1	21-JUN-17 15:12	per0621017a
	Perchlorate Isotope Ratio						1	21-JUN-17 15:12	per0621017a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	21-JUN-17 15:12	per0621017a
	Perchlorate-O(18)			0.499	ug/L		1	21-JUN-17 15:12	per0621017a

^ 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: 1675692Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 20-JUN-17GEL Job No (SDG): 2017-1759GEL Sample ID: 1203815292Date Filtered: 20-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	21-JUN-17 15:23	per0621018a
	Perchlorate Isotope Ratio			2.86			1	21-JUN-17 15:23	per0621018a
14797-73-0	Perchlorate-101	.05	.2	0.195	ug/L	J	1	21-JUN-17 15:23	per0621018a
	Perchlorate-O(18)			0.476	ug/L		1	21-JUN-17 15:23	per0621018a

^ 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: 1675692Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-1759GEL Sample ID: 1203815298Date Filtered: 20-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	0.194	ug/L	J	1	21-JUN-17 15:34	per0621019a
	Perchlorate Isotope Ratio			2.8			1	21-JUN-17 15:34	per0621019a
14797-73-0	Perchlorate-101	.05	.2	0.205	ug/L		1	21-JUN-17 15:34	per0621019a
	Perchlorate-O(18)			0.463	ug/L		1	21-JUN-17 15:34	per0621019a

^ 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: 1675692Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133327MSDate Received: 15-JUN-17GEL Job No (SDG): 2017-1759GEL Sample ID: 1203815293Date Filtered: 20-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	0.434	ug/L		1	21-JUN-17 15:56	per0621021a
	Perchlorate Isotope Ratio			2.91			1	21-JUN-17 15:56	per0621021a
14797-73-0	Perchlorate-101	.05	.2	0.442	ug/L		1	21-JUN-17 15:56	per0621021a
	Perchlorate-O(18)			0.455	ug/L		1	21-JUN-17 15:56	per0621021a

^ 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: 1675692Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133327MSDDate Received: 15-JUN-17GEL Job No (SDG): 2017-1759GEL Sample ID: 1203815294Date Filtered: 20-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	0.487	ug/L		1	21-JUN-17 16:07	per0621022a
	Perchlorate Isotope Ratio			3.04			1	21-JUN-17 16:07	per0621022a
14797-73-0	Perchlorate-101	.05	.2	0.474	ug/L		1	21-JUN-17 16:07	per0621022a
	Perchlorate-O(18)			0.436	ug/L		1	21-JUN-17 16:07	per0621022a

^ 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 #: 2017-1759
Work Order #: 425636**

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: 1675200

Prep Batch Number: 1675199

Sample Analysis

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

Sample ID	Client ID
425636001	CAWA-17-133303
1203814140	Method Blank (MB)
1203814141	Laboratory Control Sample (LCS)
1203814142	425636001(CAWA-17-133303) Matrix Spike (MS)
1203814143	425636001(CAWA-17-133303) 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 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 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
1203814141 (LCS)	2,4-Diamino-6-nitrotoluene	129* (50%-121%)

QC Sample Designation

A matrix spike and matrix spike duplicate were not performed with this SDG in this batch.

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
1203814142 (CAWA-17-133303MS)	2,4-Diamino-6-nitrotoluene	135* (50%-121%)
1203814143 (CAWA-17-133303MSD)	2,4-Diamino-6-nitrotoluene	133* (50%-121%)

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) 1647797 was generated for samples 1203814141 (LCS), 1203814142 (CAWA-17-133303MS) and 1203814143 (CAWA-17-133303MSD) 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 LCMSMS.

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: 2017-1759 GEL Work Order: 425636

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 05 JUL 2017

Title: Group Leader

Sample Data Summary

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133303

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 425636001

Sample Amount 950 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0630038.wiff

Date Analyzed: 01-JUL-17 07:38

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.263	U	0.0842	0.263
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.263	U	0.0842	0.263
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.263	U	0.0842	0.263
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.263	U	0.0842	0.263
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.263	U	0.0842	0.263
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	.263	U	0.0842	0.263
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
88-72-2	o-Nitrotoluene	.263	U	0.0863	0.263
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
98-95-3	Nitrobenzene	.263	U	0.0842	0.263
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.263	U	0.0842	0.263
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.263	U	0.0842	0.263
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	.263	U	0.0842	0.263
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
479-45-8	Tetryl	.526	U	0.0842	0.526
<i>479-45-8</i>	<i>Tetryl</i>				
78-11-5	PETN	.526	U	0.105	0.526
<i>78-11-5</i>	<i>PETN</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133303

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 425636001

Sample Amount 950 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-99-0	p-Nitrotoluene	.526	U	0.158	0.526
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	1.05	U	0.316	1.05
<i>3058-38-6</i>	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	1.05	U	0.316	1.05
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	1.05	U	0.316	1.05
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
121-82-4	RDX	1.54		0.0842	0.263
<i>121-82-4</i>	<i>RDX</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	2.63	U	0.526	2.63
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	2.63	U	0.526	2.63
<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):** 2017-1759**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
425636001	CAWA-17-133303	100	55 - 115	
1203814140	MB for batch 1675199	100	55 - 115	
1203814141	LCS for batch 1675199	101	55 - 115	
1203814142	CAWA-17-133303MS	95	55 - 115	
1203814143	CAWA-17-133303MSD	98	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) 2017-1759

Extract Batch Code: 1675199

Date Extracted: 19-JUN-17

GEL LCS ID: 1203814141

GEL LCSDUP ID: .

Analysis Date/Time: 01-JUL-17 06:29

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
Tetryl	5	4.18	84					64 - 122
m-Dinitrobenzene	5	5.29	106					74 - 117
m-Nitrotoluene	5	4.64	93					66 - 114
o-Nitrotoluene	5	4.16	83					64 - 115
p-Nitrotoluene	5	5.08	102					66 - 127
tris(o-cresyl) phosphate	5	3.77	75					43 - 104
1,3,5-Trinitrobenzene	5	4.98	100					70 - 110
2,4,6-Trinitrotoluene	5	4.71	94					69 - 113
2,4-Diamino-6-nitrotoluene	5	6.45	129 *					50 - 121
2,4-Dinitrotoluene	5	4.62	92					71 - 110
2,6-Diamino-4-nitrotoluene	5	6.17	123					53 - 127
2,6-Dinitrotoluene	5	4.33	87					72 - 105
2-Amino-4,6-dinitrotoluene	5	4.95	99					70 - 112
3,5-Dinitroaniline	5	4.55	91					70 - 121
4-Amino-2,6-dinitrotoluene	5	4.94	99					74 - 116
HMX	5	4.29	86					58 - 113
Nitrobenzene	5	4.57	91					64 - 115
PETN	5	4.32	86					57 - 126
RDX	5	5.03	101					64 - 117
TATB	2.5	3.1	124					47 - 135

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-17-133303

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Extract Batch Code: 1675199

Date Extracted: 19-JUN-17

GEL Spike ID: 1203814142

GEL SpikeDup ID: 1203814143

Analysis Date/Time: 01-JUL-17 08:12

MSD Analysis Date/Time: 01-JUL-17 08:46

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
tris(o-cresyl) phosphate	5.26316	0	4.38	83	4.74	89	8	30	38 - 105
1,3,5-Trinitrobenzene	5.26316	0	5.06	96	5.17	97	2	30	67 - 111
2,4,6-Trinitrotoluene	5.26316	0	5.17	98	5.87	110	13	30	66 - 112
2,4-Diamino-6-nitrotoluene	5.26316	0	7.09	135 *	7.05	133 *	1	30	50 - 121
2,4-Dinitrotoluene	5.26316	0	4.98	95	4.93	93	1	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.26316	0	5.81	110	5.29	99	9	30	53 - 127
2,6-Dinitrotoluene	5.26316	0	4.87	92	5.19	98	6	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.26316	0	5.33	101	5.48	103	3	30	67 - 115
3,5-Dinitroaniline	5.26316	0	5.16	98	5.15	97	0	30	70 - 121
4-Amino-2,6-dinitrotoluene	5.26316	0	5.25	100	5.5	103	5	30	65 - 120
HMX	5.26316	0	5.09	97	5.08	96	0	30	44 - 128
Nitrobenzene	5.26316	0	4.94	94	5.36	101	8	30	62 - 116
PETN	5.26316	0	4.74	90	4.78	90	1	30	51 - 131
RDX	5.26316	1.54	7.67	116	7.12	105	7	30	57 - 125
TATB	2.63158	0	3.35	127	3.1	116	8	30	38 - 149
Tetryl	5.26316	0	3.84	73	3.71	70	3	30	50 - 126
m-Dinitrobenzene	5.26316	0	5.45	104	5.48	103	1	30	74 - 117
m-Nitrotoluene	5.26316	0	5.01	95	5.04	95	1	30	59 - 120
o-Nitrotoluene	5.26316	0	4.65	88	5.46	103	16	30	56 - 119
p-Nitrotoluene	5.26316	0	5.19	99	5.55	104	7	30	61 - 129

#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 1675199

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814140

Sample Amount 1000 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0630035.wiff

Date Analyzed: 01-JUL-17 05:55

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 1675199

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814140

Sample Amount 1000 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-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	U	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	U	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	U	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 1675199

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814141

Sample Amount 1000 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0630036.wiff

Date Analyzed: 01-JUL-17 06:29

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	3.1		0.300	1.00
<i>3058-38-6</i>	<i>TATB</i>				
78-30-8	tris(o-cresyl) phosphate	3.77		0.300	1.00
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
88-72-2	o-Nitrotoluene	4.16		0.082	0.250
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
479-45-8	Tetryl	4.18		0.080	0.500
<i>479-45-8</i>	<i>Tetryl</i>				
2691-41-0	HMX	4.29		0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
78-11-5	PETN	4.32		0.100	0.500
<i>78-11-5</i>	<i>PETN</i>				
606-20-2	2,6-Dinitrotoluene	4.33		0.080	0.250
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
618-87-1	3,5-Dinitroaniline	4.55		0.300	1.00
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
98-95-3	Nitrobenzene	4.57		0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				
121-14-2	2,4-Dinitrotoluene	4.62		0.080	0.250
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
99-08-1	m-Nitrotoluene	4.64		0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	4.71		0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.94		0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1675199

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814141

Sample Amount 1000 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
35572-78-2	2-Amino-4,6-dinitrotoluene	4.95		0.080	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene				
99-35-4	1,3,5-Trinitrobenzene	4.98		0.080	0.250
99-35-4	1,3,5-Trinitrobenzene				
121-82-4	RDX	5.03		0.080	0.250
121-82-4	RDX				
99-99-0	p-Nitrotoluene	5.08		0.150	0.500
99-99-0	p-Nitrotoluene				
99-65-0	m-Dinitrobenzene	5.29		0.080	0.250
99-65-0	m-Dinitrobenzene				
59229-75-3	2,6-Diamino-4-nitrotoluene	6.17		0.500	2.50
59229-75-3	2,6-Diamino-4-nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	6.45		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: CAWA-17-133303(425636001MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814142

Sample Amount 950 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0630039.wiff

Date Analyzed: 01-JUL-17 08:12

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	3.35		0.316	1.05
<i>3058-38-6</i>	<i>TATB</i>				
479-45-8	Tetryl	3.84		0.0842	0.526
<i>479-45-8</i>	<i>Tetryl</i>				
78-30-8	tris(o-cresyl) phosphate	4.38		0.316	1.05
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
88-72-2	o-Nitrotoluene	4.65		0.0863	0.263
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
78-11-5	PETN	4.74		0.105	0.526
<i>78-11-5</i>	<i>PETN</i>				
606-20-2	2,6-Dinitrotoluene	4.87		0.0842	0.263
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
98-95-3	Nitrobenzene	4.94		0.0842	0.263
<i>98-95-3</i>	<i>Nitrobenzene</i>				
121-14-2	2,4-Dinitrotoluene	4.98		0.0842	0.263
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
99-08-1	m-Nitrotoluene	5.01		0.0842	0.263
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	5.06		0.0842	0.263
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
2691-41-0	HMX	5.09		0.0842	0.263
<i>2691-41-0</i>	<i>HMX</i>				
618-87-1	3,5-Dinitroaniline	5.16		0.316	1.05
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
118-96-7	2,4,6-Trinitrotoluene	5.17		0.0842	0.263
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133303(425636001MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814142

Sample Amount 950 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-99-0	p-Nitrotoluene	5.19		0.158	0.526
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	5.25		0.0842	0.263
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	5.33		0.0842	0.263
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.45		0.0842	0.263
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	5.81		0.526	2.63
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	7.09		0.526	2.63
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
121-82-4	RDX	7.67		0.0842	0.263
<i>121-82-4</i>	<i>RDX</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133303(425636001MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814143

Sample Amount 940 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0630040.wiff

Date Analyzed: 01-JUL-17 08:46

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	3.1		0.319	1.06
<i>3058-38-6</i>	<i>TATB</i>				
479-45-8	Tetryl	3.71		0.0851	0.532
<i>479-45-8</i>	<i>Tetryl</i>				
78-30-8	tris(o-cresyl) phosphate	4.74		0.319	1.06
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
78-11-5	PETN	4.78		0.106	0.532
<i>78-11-5</i>	<i>PETN</i>				
121-14-2	2,4-Dinitrotoluene	4.93		0.0851	0.266
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
99-08-1	m-Nitrotoluene	5.04		0.0851	0.266
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
2691-41-0	HMX	5.08		0.0851	0.266
<i>2691-41-0</i>	<i>HMX</i>				
618-87-1	3,5-Dinitroaniline	5.15		0.319	1.06
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
99-35-4	1,3,5-Trinitrobenzene	5.17		0.0851	0.266
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
606-20-2	2,6-Dinitrotoluene	5.19		0.0851	0.266
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	5.29		0.532	2.66
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
98-95-3	Nitrobenzene	5.36		0.0851	0.266
<i>98-95-3</i>	<i>Nitrobenzene</i>				
88-72-2	o-Nitrotoluene	5.46		0.0872	0.266
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133303(425636001MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814143

Sample Amount 940 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
35572-78-2	2-Amino-4,6-dinitrotoluene	5.48		0.0851	0.266
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.48		0.0851	0.266
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	5.5		0.0851	0.266
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
99-99-0	p-Nitrotoluene	5.55		0.160	0.532
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	5.87		0.0851	0.266
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	7.05		0.532	2.66
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
121-82-4	RDX	7.12		0.0851	0.266
<i>121-82-4</i>	<i>RDX</i>				

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-1759Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 30-JUN-17 10:34GEL Data File: EXP0630001.wiffInstrument ID: LCMSMS7Column: Ultracarb Phenomenex 5u ODS (20)

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

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-1759Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 30-JUN-17 11:09GEL Data File: EXP0630002.wiffInstrument ID: LCMSMS7Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1759

Lab Code: GEL

Lab Sample ID: XIBLK02

Analysis Date: 30-JUN-17 15:42

GEL Data File: EXP0630010.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1759

Lab Code: GEL

Lab Sample ID: XIBLK03

Analysis Date: 30-JUN-17 17:58

GEL Data File: EXP0630014.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1759

Lab Code: GEL

Lab Sample ID: XIBLK04

Analysis Date: 30-JUN-17 21:23

GEL Data File: EXP0630020.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1759

Lab Code: GEL

Lab Sample ID: XIBLK05

Analysis Date: 30-JUN-17 22:31

GEL Data File: EXP0630022.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1759

Lab Code: GEL

Lab Sample ID: XIBLK06

Analysis Date: 01-JUL-17 05:21

GEL Data File: EXP0630034.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1759

Lab Code: GEL

Lab Sample ID: XIBLK07

Analysis Date: 01-JUL-17 09:54

GEL Data File: EXP0630042.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

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

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 02-JUL-17	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LC-MS/MS	Test / Method: SW846 3535A/8330B	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1675200	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 425632(2017-1760),425636(2017-1759) Application Issues: Failed Recovery for MS/MSD, or PS/PSD Failed Recovery for LCS/LCSD			
Specification and Requirements Exception Description:		DER Disposition:	
1. One or more of the required spiking analytes were not within the acceptance limits in the laboratory control sample (See Below). 1203814141 (LCS) recovered 2,4-Diamino-6-nitrotoluene at 129% (50%-121%). 2. The MS or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. 1203814142 (CAWA-17-133303MS) recovered 2,4-Diamino-6-nitrotoluene at 135% (50%-121%). 1203814143 (CAWA-17-133303MSD) recovered 2,4-Diamino-6-nitrotoluene at 133% (50%-121%).		1. While the LCS exhibited a high bias, 2,4-Diamino-6-nitrotoluene was not detected in the associated samples, the data are reported. 2. Because the recoveries were biased high and 2,4-Diamino-6-nitrotoluene was not detected in the associated samples above the reporting limit, the data were reported.	

Originator's Name:

Michael Penny 03-JUL-17

Data Validator/Group Leader:

Charles Wilson 05-JUL-17

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-1759
Work Order #: 425636

Sample ID	Client ID
425636001	CAWA-17-133303
425636002	CAWA-17-133331
1203813455	Method Blank (MB) ICP
1203813456	Laboratory Control Sample (LCS)
1203813459	425636002(CAWA-17-133331L) Serial Dilution (SD)
1203813457	425636002(CAWA-17-133331D) Sample Duplicate (DUP)
1203813458	425636002(CAWA-17-133331S) Matrix Spike (MS)
1203824584	425636002(CAWA-17-133331PS) Post Spike (PS)
1203813354	Method Blank (MB) ICP-MS
1203813355	Laboratory Control Sample (LCS)
1203813682	425632002(CAWA-17-133328L) Serial Dilution (SD)
1203813680	425632002(CAWA-17-133328D) Sample Duplicate (DUP)
1203813681	425632002(CAWA-17-133328S) Matrix Spike (MS)
1203814249	Method Blank (MB) CVAA
1203814250	Laboratory Control Sample (LCS)
1203814255	425636001(CAWA-17-133303L) Serial Dilution (SD)
1203814251	425636001(CAWA-17-133303D) Sample Duplicate (DUP)
1203814253	425636001(CAWA-17-133303S) Matrix Spike (MS)

Sample Analysis

Samples 425636001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1674924, 1674884, 1675234 and 1681462
Prep Batch :	1674923, 1674883 and 1675232
Standard Operating Procedures:	GL-MA-E-013 REV# 28, GL-MA-E-006 REV# 13, GL-MA-E-014 REV# 30, GL-MA-E-010 REV# 34 and GL-GC-E-107 REV# 10
Analytical Method:	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
Prep Method :	SW846 3005A and EPA 245.1/245.2 Prep

Preparation/Analytical Method Verification

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

System Configuration

The Hardness as CaCO₃ is calculated from Calcium and Magnesium results.

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

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

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

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 425636002 (CAWA-17-133331)-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: 425636002 (CAWA-17-133331)-ICP, 425632002 (CAWA-17-133328)-ICP-MS and 425636001 (CAWA-17-133303)-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 MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203813458 (CAWA-17-133331MS)	Sodium	5.74* (75%-125%)

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.

Post Spike (PS) Recovery Statement

The PS met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the absence of matrix interferences in the post-digested sample.

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Additional Comments

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

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2017-1759 GEL Work Order: 425636

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- J Value is estimated
- N Metals--The Matrix spike sample recovery is not within specified control limits
- 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: 12 JUL 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1759**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 425636001**BASIS:** As Received**DATE COLLECTED** 14-JUN-17**CLIENT ID:** CAWA-17-133303**LEVEL:** Low**DATE RECEIVED** 16-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	06/20/17 09:48	062017W1-4	1675234

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1675234	1675232	EPA 245.1/245.2 Prep	20	mL	20	mL	06/19/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1759**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 425636002**BASIS:** As Received**DATE COLLECTED** 14-JUN-17**CLIENT ID:** CAWA-17-133331**LEVEL:** Low**DATE RECEIVED** 16-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	06/20/17 09:59	062017W1-4	1675234

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1759

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 425636002

BASIS: As Received

DATE COLLECTED 14-JUN-17

CLIENT ID: CAWA-17-133331

LEVEL: Low

DATE RECEIVED 16-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	06/30/17 10:03	063017-1	1674924
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-38-2	Arsenic	5	ug/L	U	2	5	5	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-39-3	Barium	4.23	ug/L	J	1	5	5	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-70-2	Calcium	9950	ug/L		50	200	200	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-47-3	Chromium	10	ug/L	U	3	10	10	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	06/30/17 10:03	063017-1	1674924
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	06/30/17 10:03	063017-1	1674924
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7439-95-4	Magnesium	2400	ug/L		110	300	300	1	P	HSC	06/30/17 10:03	063017-1	1674924
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	06/30/17 10:03	063017-1	1674924
7439-98-7	Molybdenum	0.551	ug/L		0.2	0.5	0.5	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-02-0	Nickel	2	ug/L	U	0.6	2	2	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-09-7	Potassium	407	ug/L		50	150	150	1	P	HSC	06/30/17 10:03	063017-1	1674924
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7631-86-9	Silica	58800	ug/L		53	213	213	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-23-5	Sodium	13100	ug/L	N	100	300	300	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-24-6	Strontium	49	ug/L		1	5	5	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-61-1	Uranium	0.329	ug/L		0.067	0.2	0.2	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-62-2	Vanadium	1.52	ug/L	J	1	5	5	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	06/30/17 10:03	063017-1	1674924

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1759**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 425636002**BASIS:** As Received**DATE COLLECTED** 14-JUN-17**CLIENT ID:** CAWA-17-133331**LEVEL:** Low**DATE RECEIVED** 16-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	34.7	mg/L		0.453	1.24	1.24	1		TXT1	07/11/17 15:56		1681462

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1674884	1674883	SW846 3005A	50	mL	50	mL	06/19/17	SXW1
1674924	1674923	SW846 3005A	50	mL	50	mL	06/19/17	SXW1
1675234	1675232	EPA 245.1/245.2 Prep	20	mL	20	mL	06/19/17	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. 2017-1759

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>
1203813354	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
1203813455	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	65.4	ug/L	+/-200	J	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	178	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	3.3	ug/L	+/-10	U	P	3.3	10
1203814249	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. 2017-1759 Client ID: CAWA-17-13331S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 425636002 Spike ID: 1203813458

<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	5140		68	U	5000	102		P
Barium	ug/L	75-125	524		4.23	J	500	104		P
Beryllium	ug/L	75-125	515		1	U	500	103		P
Boron	ug/L	75-125	533		15	U	500	105		P
Calcium	ug/L	75-125	15100		9950		5000	102		P
Cobalt	ug/L	75-125	507		1	U	500	101		P
Copper	ug/L	75-125	525		3	U	500	105		P
Iron	ug/L	75-125	5250		30	U	5000	105		P
Magnesium	ug/L	75-125	8250		2400		5000	117		P
Manganese	ug/L	75-125	508		2	U	500	102		P
Potassium	ug/L	75-125	5930		407		5000	111		P
Silica	ug/L		69500		58800		10700	99.3	N/A	P
Sodium	ug/L	75-125	13400		13100		5000	5.74	N	P
Strontium	ug/L	75-125	544		49		500	98.9		P
Tin	ug/L	75-125	507		2.5	U	500	101		P
Vanadium	ug/L	75-125	516		1.52	J	500	103		P
Zinc	ug/L	75-125	491		3.3	U	500	97.7		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-1759 Client ID: CAWA-17-133328S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 425632002 Spike ID: 1203813681

<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	51.3		1	U	50	102		MS
Arsenic	ug/L	75-125	55.1		2	U	50	107		MS
Cadmium	ug/L	75-125	53		0.3	U	50	106		MS
Chromium	ug/L	75-125	52.8		3	U	50	104		MS
Lead	ug/L	75-125	50.7		0.5	U	50	101		MS
Molybdenum	ug/L	75-125	55		1.48		50	107		MS
Nickel	ug/L	75-125	54.8		0.6	U	50	109		MS
Selenium	ug/L	75-125	53.9		2	U	50	108		MS
Silver	ug/L	75-125	51.4		0.3	U	50	103		MS
Thallium	ug/L	75-125	48.7		0.6	U	50	97.2		MS
Uranium	ug/L	75-125	51.2		0.276		50	102		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-1759 Client ID CAWA-17-133303S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 425636001 Spike ID: 1203814253

<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	1.92		0.067	U	2	96		AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-5a-

Spike Summary

SDG NO. 2017-1759 **Client ID:** CAWA-17-133331PS**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 425636002 **Spike ID:** 1203824584

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Sodium	ug/L	80-120	18000		13100		5000	97.4		P

*Analytical Methods:

P SW846 3005A/6010C

Metals
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Duplicate Sample Summary

SDG No.: 2017-1759

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-133331D

Matrix: WATER

Level: Low

Sample ID: 425636002

Duplicate ID: 1203813457

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	4.23 J		4.29 J		1.34		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	9950		9800		1.49		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	2400		2370		1.48		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-150	407		374		8.5		P
Silica	ug/L	+/-20%	58800		58700		.23		P
Sodium	ug/L	+/-20%	13100		13200		.88		P
Strontium	ug/L	+/-20%	49		49.6		1.09		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	1.52 J		1.54 J		1.47		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
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Duplicate Sample Summary

SDG No.: 2017-1759

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-133328D

Matrix: WATER

Level: Low

Sample ID: 425632002

Duplicate ID: 1203813680

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L		2 U		2 U				MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L		3 U		3 U				MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.48		1.5		1.28		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	0.276		0.285		3.21		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
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Duplicate Sample Summary

SDG No.: 2017-1759**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAWA-17-133303D**Matrix:** WATER**Level:** Low**Sample ID:** 425636001**Duplicate ID:** 1203814251**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. 2017-1759

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>
1203813355								
	Arsenic	ug/L	50	54.5		109	80-120	MS
	Antimony	ug/L	50	48.1		96.1	80-120	MS
	Cadmium	ug/L	50	52.5		105	80-120	MS
	Chromium	ug/L	50	51.9		104	80-120	MS
	Lead	ug/L	50	49.7		99.3	80-120	MS
	Molybdenum	ug/L	50	50.5		101	80-120	MS
	Nickel	ug/L	50	53.9		108	80-120	MS
	Selenium	ug/L	50	54.4		109	80-120	MS
	Silver	ug/L	50	50.2		100	80-120	MS
	Thallium	ug/L	50	48.1		96.2	80-120	MS
	Uranium	ug/L	50	48.8		97.7	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-1759

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>
1203813456								
	Aluminum	ug/L	5000	5220		104	80-120	P
	Barium	ug/L	500	509		102	80-120	P
	Beryllium	ug/L	500	504		101	80-120	P
	Boron	ug/L	500	513		103	80-120	P
	Calcium	ug/L	5000	5220		104	80-120	P
	Cobalt	ug/L	500	507		101	80-120	P
	Copper	ug/L	500	512		102	80-120	P
	Iron	ug/L	5000	5300		106	80-120	P
	Magnesium	ug/L	5000	5310		106	80-120	P
	Manganese	ug/L	500	507		101	80-120	P
	Potassium	ug/L	5000	5190		104	80-120	P
	Silica	ug/L	10700	10600		99.2	80-120	P
	Sodium	ug/L	5000	5400		108	80-120	P
	Strontium	ug/L	500	507		101	80-120	P
	Tin	ug/L	500	499		99.8	80-120	P
	Vanadium	ug/L	500	509		102	80-120	P
	Zinc	ug/L	500	484		96.8	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-1759

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>
1203814250	Mercury	ug/L	2	1.94		97	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1759

Client ID: CAWA-17-133331L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 425636002

Serial Dilution ID: 1203813459

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	4.23	J	5	U	1.257			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	9950		10200		2.266		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	2400		2480		3.381			P
Manganese	2	U	10	U				P
Potassium	407		386	J	5.053			P
Silica	58800		59500		1.214		10	P
Sodium	13100		14000		6.641		10	P
Strontium	49		51.9		5.876			P
Tin	2.5	U	12.5	U				P
Vanadium	1.52	J	5	U	78.979			P
Zinc	3.3	U	18.1	J				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1759

Client ID: CAWA-17-133328L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 425632002

Serial Dilution ID: 1203813682

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	2	U	10	U				MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.48		1.31	J	11.307			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	.276		.335	U	3.986			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1759 **Client ID:** CAWA-17-133303L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 425636001 **Serial Dilution ID:** 1203814255

<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 #: 2017-1759
Work Order #: 425636**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1675261

Method: SW 9060 Total Organic Carbon

Sample Analysis

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

Sample ID	Client ID
425636001	CAWA-17-133303
1203814348	Method Blank (MB)
1203814349	Laboratory Control Sample (LCS)
1203814350	425532002(CAWA-17-133299) Sample Duplicate (DUP)
1203814351	425632001(CAWA-17-133300) Sample Duplicate (DUP)
1203814352	425632001(CAWA-17-133300) Post Spike (PS)
1203814353	425532002(CAWA-17-133299) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 425532002 (CAWA-17-133299) and 425632001 (CAWA-17-133300) were selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Cyanide and Total		
Analytical Batch:	1674062	Method:	WSP-CN(T)
Prep Batch :	1674061	Method:	EPA 335.4

Sample Analysis

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

Sample ID	Client ID
425636001	CAWA-17-133303
1203811489	Method Blank (MB)
1203811490	Laboratory Control Sample (LCS)
1203811491	425417001(CAWA-17-133279) Sample Duplicate (DUP)
1203811492	425417001(CAWA-17-133279) Matrix Spike (MS)
1203814049	425417001(CAWA-17-133279) Matrix Spike Duplicate (MSD)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 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 425417001 (CAWA-17-133279) 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.

MS/MSD Relative Percent Difference (RPD) Statement

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

Sample 425636001 (CAWA-17-133303) was re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported. Samples 1203811490 (LCS), 1203811491 (CAWA-17-133279DUP), 1203811492 (CAWA-17-133279MS) and 1203814049 (CAWA-17-133279MSD) were re-analyzed to verify the results.

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1675462

Method: WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203814713	Method Blank (MB)
1203814714	Laboratory Control Sample (LCS)
1203814715	425632002(CAWA-17-133328) Sample Duplicate (DUP)
1203814716	425632002(CAWA-17-133328) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 425632002 (CAWA-17-133328) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Manual Integrations

Samples 1203814715 (CAWA-17-133328DUP), 1203814716 (CAWA-17-133328PS) and 425636002 (CAWA-17-133331) were manually integrated to correctly position the baseline as set in the calibration standards.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

scanned and inserted into the electronic package.

Method/Analysis Information

Product:	Ammonia Nitrogen		
Analytical Batch:	1675174	Method:	NH3
Prep Batch :	1675173	Method:	EPA 350.1 Prep

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203814056	Method Blank (MB)
1203814057	Laboratory Control Sample (LCS)
1203814058	425632002(CAWA-17-133328) Sample Duplicate (DUP)
1203814061	425632002(CAWA-17-133328) 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 425632002 (CAWA-17-133328) 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

Sample1203814056 (MB) was re-analyzed due to (its) proximity to an overrange sample. The results from the reanalysis are reported.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an

effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

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

Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1675176	Method:	TKN
Prep Batch :	1675175	Method:	EPA 351.2 Prep

Sample Analysis

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

Sample ID	Client ID
425636001	CAWA-17-133303
1203814064	Method Blank (MB)
1203814065	Laboratory Control Sample (LCS)
1203814067	425632001(CAWA-17-133300) Sample Duplicate (DUP)
1203814069	425632001(CAWA-17-133300) 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 425632001 (CAWA-17-133300) was selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Total Kjeldahl	1203814069 (CAWA-17-133300MS)	81.9* (90%-110%)

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

Samples 1203814064 (MB) and 1203814065 (LCS) were re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1675664

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203815245	Method Blank (MB)
1203815246	Laboratory Control Sample (LCS)
1203815247	425642001(CTUA-17-131778) Sample Duplicate (DUP)
1203815250	425642001(CTUA-17-131778) 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

Sample 425642001 (CTUA-17-131778) 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 following samples 1203815247 (CTUA-17-131778DUP) and 1203815250 (CTUA-17-131778PS) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1674640	Method:	PO4
Prep Batch :	1674639	Method:	EPA 365.4 Prep

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203812754	Method Blank (MB)
1203812755	Laboratory Control Sample (LCS)
1203812756	425520005(CALA-17-139173) Sample Duplicate (DUP)
1203812757	425520005(CALA-17-139173) 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 425520005 (CALA-17-139173) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1675256

Method: TDS

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203814324	Method Blank (MB)
1203814325	Laboratory Control Sample (LCS)
1203816297	425632002(CAWA-17-133328) 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 425632002 (CAWA-17-133328) 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	1203816297 (CAWA-17-133328DUP)	8.87* (0%-5%)

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1679218

Method: EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203823669	Laboratory Control Sample (LCS)
1203823670	425520005(CALA-17-139173) Sample Duplicate (DUP)
1203823671	426779001(BDW01-17-139079) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 425520005 (CALA-17-139173) and 426779001 (BDW01-17-139079) were selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: pH

Analytical Batch: 1677686 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203820094	Laboratory Control Sample (LCS)
1203820095	425922003(CAPU-17-139091) 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 425922003 (CAPU-17-139091) 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
1203820095 (CAPU-17-139091DUP)	pH	Received 21-JUN-17, out of holding 19-JUN-17
425636002 (CAWA-17-133331)	pH	Received 16-JUN-17, out of holding 14-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**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: 1677682 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203820084	Laboratory Control Sample (LCS)
1203820087	425922003(CAPU-17-139091) Sample Duplicate (DUP)
1203820090	425922003(CAPU-17-139091) 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 425922003 (CAPU-17-139091) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2017-1759 GEL Work Order: 425636

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Kristen Mizzell

Date: 11 JUL 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: July 11, 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: 2017-1759

Client Sample ID: CAWA-17-133303
Sample ID: 425636001
Matrix: W
Collect Date: 14-JUN-17 11:17
Receive Date: 16-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	0.397	0.330	1.00	mg/L		1	TSM	06/23/17	1354	1675261	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	06/20/17	0948	1674062	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	J	0.0378	0.033	0.100	mg/L	1.00	1	KLP1	06/27/17	1531	1675176	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	06/19/17	1339	1674061
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	06/26/17	1700	1675175

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: July 11, 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: 2017-1759

Client Sample ID: CAWA-17-133331
Sample ID: 425636002
Matrix: W
Collect Date: 14-JUN-17 11:17
Receive Date: 16-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	06/19/17	2302	1675462	1
Chloride		1.09	0.067	0.200	mg/L		1					
Fluoride	J	0.048	0.033	0.100	mg/L		1					
Sulfate		2.25	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0705	0.017	0.050	mg/L	1.00	1	KLP1	06/21/17	1225	1675174	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.495	0.017	0.050	mg/L		1	AXH3	06/21/17	0713	1675664	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.031	0.020	0.050	mg/L	1.00	1	KLP1	06/27/17	1026	1674640	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		133	3.40	14.3	mg/L			KLP1	06/21/17	1042	1675256	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		51.8	1.45	4.00	mg/L			RXB5	06/28/17	1714	1677682	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		110	1.00	1.00	umhos/cm		1	SXM7	07/06/17	1029	1679218	7
PH "As Received"												
pH at Temp 16.4C	H	7.68	0.010	0.100	SU		1	RXB5	06/28/17	1713	1677686	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	06/20/17	1700	1675173
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	06/26/17	1700	1674639

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 11, 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: 2017-1759

Client Sample ID: CAWA-17-133331
Sample ID: 425636002

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: July 11, 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: 425636

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1675261										
QC1203814350	425532002	DUP									
Total Organic Carbon Average	J	0.512	J	0.532	mg/L	3.83	^	(+/-1.00)	TSM	06/23/17	05:21
QC1203814351	425632001	DUP									
Total Organic Carbon Average	J	0.596	J	0.616	mg/L	3.3	^	(+/-1.00)		06/23/17	12:26
QC1203814349	LCS										
Total Organic Carbon Average	10.0			9.82	mg/L			98.2 (80%-120%)		06/23/17	02:53
QC1203814348	MB										
Total Organic Carbon Average			U	ND	mg/L					06/23/17	02:41
QC1203814352	425632001	PS									
Total Organic Carbon Average	10.0	J	0.596	11.0	mg/L			104 (75%-125%)		06/23/17	13:10
QC1203814353	425532002	PS									
Total Organic Carbon Average	10.0	J	0.512	11.2	mg/L			107 (75%-125%)		06/23/17	06:06
Flow Injection Analysis											
Batch	1674062										
QC1203811491	425417001	DUP									
Cyanide, Total	U	ND	U	ND	ug/L	N/A			AXH3	06/20/17	10:26
QC1203811490	LCS										
Cyanide, Total	50.0			54.1	ug/L			108 (90%-110%)		06/20/17	08:44
QC1203811489	MB										
Cyanide, Total			U	ND	ug/L					06/20/17	08:32
QC1203811492	425417001	MS									
Cyanide, Total	100	U	ND	105	ug/L			105 (90%-110%)		06/20/17	10:27

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QC Summary

Workorder: 425636

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Flow Injection Analysis											
Batch	1674062										
QC1203814049	425417001	MSD									
Cyanide, Total	100	U	ND	105	ug/L	0	105	(0%-20%)	AXH3	06/20/17	10:28
Ion Chromatography											
Batch	1675462										
QC1203814715	425632002	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MXL2	06/19/17	22:04
Chloride			1.99		1.99	mg/L	0.136	(0%-20%)			
Fluoride		J	0.0822	J	0.0857	mg/L	4.17 ^	(+/-0.100)			
Sulfate			3.89		3.85	mg/L	0.944	(0%-20%)			
QC1203814714	LCS										
Bromide	1.25				1.22	mg/L	97.5	(80%-120%)		06/19/17	21:05
Chloride	5.00				4.69	mg/L	93.9	(80%-120%)			
Fluoride	2.50				2.41	mg/L	96.3	(80%-120%)			
Sulfate	10.0				9.70	mg/L	97	(80%-120%)			
QC1203814713	MB										
Bromide			U		ND	mg/L				06/19/17	20:35
Chloride			U		ND	mg/L					
Fluoride			U		ND	mg/L					
Sulfate			U		ND	mg/L					

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QC Summary

Workorder: 425636

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography												
Batch	1675462											
QC1203814716	425632002	PS										
Bromide	1.25	U	ND		1.27	mg/L		97.3	(75%-125%)	MXL2	06/19/17	22:33
Chloride	5.00		1.99		6.91	mg/L		98.3	(75%-125%)			
Fluoride	2.50	J	0.0822		2.40	mg/L		92.8	(75%-125%)			
Sulfate	10.0		3.89		13.9	mg/L		99.8	(75%-125%)			
Nutrient Analysis												
Batch	1674640											
QC1203812756	425520005	DUP										
Phosphorus, Total as P			0.191		0.150	mg/L	24	^	(+/-0.050)	KLP1	06/27/17	10:13
QC1203812755	LCS											
Phosphorus, Total as P	1.00				1.06	mg/L		106	(80%-124%)		06/27/17	10:11
QC1203812754	MB											
Phosphorus, Total as P			U		ND	mg/L					06/27/17	10:11
QC1203812757	425520005	MS										
Phosphorus, Total as P	1.00		0.191		1.17	mg/L		97.9	(63%-139%)		06/27/17	10:14
Batch	1675174											
QC1203814058	425632002	DUP										
Nitrogen, Ammonia		J	0.0445	J	0.0328	mg/L	30.3	^	(+/-0.050)	KLP1	06/21/17	12:19
QC1203814057	LCS											
Nitrogen, Ammonia	1.00				1.07	mg/L		107	(90%-110%)		06/21/17	12:12
QC1203814056	MB											
Nitrogen, Ammonia			J		0.0328	mg/L					06/21/17	12:25

GEL LABORATORIES LLC

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QC Summary

Workorder: 425636

Page 4 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1675174										
QC1203814061	425632002	MS									
Nitrogen, Ammonia	1.00	J	0.0445	1.01	mg/L		96.6	(90%-110%)	KLP1	06/21/17	12:20
Batch	1675176										
QC1203814067	425632001	DUP									
Nitrogen, Total Kjeldahl			0.141	0.129	mg/L	8.89 ^		(+/-0.100)	KLP1	06/27/17	15:29
QC1203814065	LCS										
Nitrogen, Total Kjeldahl	1.00			1.05	mg/L		105	(90%-110%)		06/27/17	16:06
QC1203814064	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					06/27/17	15:23
QC1203814069	425632001	MS									
Nitrogen, Total Kjeldahl	1.00		0.141	0.960	mg/L		81.9*	(90%-110%)		06/27/17	15:30
Batch	1675664										
QC1203815247	425642001	DUP									
Nitrogen, Nitrate/Nitrite			2.47	2.40	mg/L	2.88		(0%-20%)	AXH3	06/21/17	07:31
QC1203815246	LCS										
Nitrogen, Nitrate/Nitrite	1.00			0.982	mg/L		98.2	(90%-110%)		06/21/17	07:07
QC1203815245	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					06/21/17	07:06
QC1203815250	425642001	PS									
Nitrogen, Nitrate/Nitrite	1.00		0.493	1.46	mg/L		96.7	(90%-110%)		06/21/17	07:32
Solids Analysis											
Batch	1675256										
QC1203816297	425632002	DUP									
Total Dissolved Solids			146	139	mg/L	8.87*		(0%-5%)	KLP1	06/21/17	10:42

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QC Summary

Workorder: 425636

Page 5 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Solids Analysis											
Batch	1675256										
QC1203814325	LCS										
Total Dissolved Solids	300			304	mg/L		101	(95%-105%)	KLP1	06/21/17	10:42
QC1203814324	MB										
Total Dissolved Solids			U	ND	mg/L					06/21/17	10:42
Titration and Ion Analysis											
Batch	1677682										
QC1203820087	425922003	DUP									
Alkalinity, Total as CaCO3		172		171	mg/L	0.584		(0%-20%)	RXB5	06/28/17	17:26
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203820084	LCS										
Alkalinity, Total as CaCO3	100			109	mg/L		109	(90%-110%)		06/28/17	16:47
QC1203820090	425922003	MS									
Alkalinity, Total as CaCO3	100	172		278	mg/L		106	(80%-120%)		06/28/17	17:27
Batch	1677686										
QC1203820095	425922003	DUP									
pH	H	7.72	H	7.71	SU	0.13		(0%-5%)	RXB5	06/28/17	17:23
QC1203820094	LCS										
pH	7.00			7.01	SU		100	(99%-101%)		06/28/17	16:46
Batch	1679218										
QC1203823670	425520005	DUP									
Conductivity		311		310	umhos/cm	0.322		(0%-10%)	SXM7	07/06/17	10:23
QC1203823671	426779001	DUP									
Conductivity		455		455	umhos/cm	0		(0%-10%)		07/06/17	10:47

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QC Summary

Workorder: 425636

Page 6 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1679218										
QC1203823669	LCS										
Conductivity	1410			1360	umhos/cm		96.2	(95%-105%)	SXM7	07/06/17	10:12

Notes:

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

July 19, 2017

gel.com

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

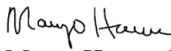
Re: LANL- WQH Water Samples
Work Order: 425636
SDG: 2017-1759

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on June 16, 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 DNX, MNX, and TNX on the 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: 2017-1759
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 425636
SDG: 2017-1759

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 425636
SDG # : 2017-1759**

July 11, 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 16, 2017 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
425636001	CAWA-17-133303
425636002	CAWA-17-133331

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 11 July 2017

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	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



Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: <u>ESHL</u>		SDG/AR/COC/Work Order: <u>425636</u>	
Received By: <u>ZKW</u>		Date Received: <u>6/16/17</u>	
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>5908 1782 2201 - 32</u> <u>5908 1782 2197 2c</u> <u>5908 1782 2212 - 2c</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?	<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM/mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	<input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. <input checked="" type="checkbox"/> PCB's <input type="checkbox"/> Flammable <input type="checkbox"/> Foreign Soil <input type="checkbox"/> RCRA <input type="checkbox"/> Asbestos <input type="checkbox"/> Beryllium <input type="checkbox"/> Other:	

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

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials

MEH

Date

6/19/17

Page

1

of

1

GL-CHL-SR-001 Rev 5

ORIGIN ID: SAFA (505) 665-9966
KEITH GREENE
LOS ALAMOS NATL LAB.
TA00 BLDG 1297 DPU 03

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 15 JUN 17
ACTWGT: 31.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

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

CHARLESTON SC 29407

(843) 666-8171

REF: 21PD0ASRGW04BAGWEO



2 of 2

MPS# 5908 1782 2212
0263

Mistr# 5908 1782 2201

0201

FRI - 16 JUN 10:30A
PRIORITY OVERNIGHT

X7 RBWA

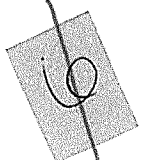
29407

SC-US CHS



Part # 156140V-434 RIT3 06/15

7/16/9



ORIGIN ID: SAFA (505) 665-9966

SHIP DATE: 15JUN17
ACTWGT: 49.0 LB MAN
CAD: 0014176/CAFE2916

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

BILL SENDER

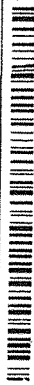
TO VALERIE DAVIS

GENERAL ENGINEERING LAB
2040 SAVAGE RD

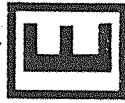
CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ARCH08BF4WA0



FedEx
Express



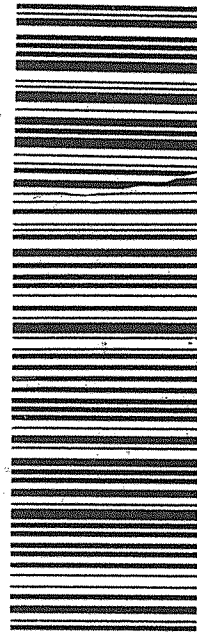
FRI - 16 JUN 10:30A
PRIORITY OVERNIGHT

TRK# 5908 1782 2197

0201

X7 RBWA

29407
SC-US CHS



Part# 156148V-434 RIT2 06/15

ORIGIN ID: SAFA (505) 665-9966

SHIP DATE: 15JUN17
ACTWGT: 53.0 LB MAN
CAD: 0014176/CAFE2916

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

BILL SENDER

TO VALERIE DAVIS

GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BAGWE0



FedEx
Express



FRI - 16 JUN 10:30A
PRIORITY OVERNIGHT

1 of 2

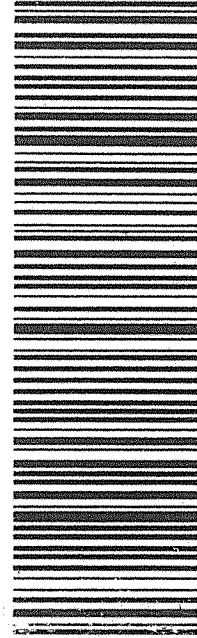
TRK# 5908 1782 2201

0201

MASTER

X7 RBWA

29407
SC-US CHS



Part# 156148V-434 RIT2 06/15

538C1/4502/3298

15131505120149

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 #: 2017-1759
Work Order #: 425636**

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:	1675694
Prep Batch Number:	1675692

Sample Analysis

Sample ID	Client ID
425636002	425636002 (CAWA-17-133331)
1203815298	Interference Check Sample (ICS)
1203815291	Method Blank (MB)
1203815292	Laboratory Control Sample (LCS)
1203815293	425532003(CAWA-17-133327) Matrix Spike (MS)
1203815294	425532003(CAWA-17-133327) 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 425532003 (CAWA-17-133327) 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: 2017-1759 GEL Work Order: 425636

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: 24 JUN 2017

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1675692Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133331Date Received: 16-JUN-17GEL Job No (SDG): 2017-1759GEL Sample ID: 425636002Date Filtered: 20-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	0.243	ug/L		1	21-JUN-17 17:13	per0621028a
	Perchlorate Isotope Ratio			2.92			1	21-JUN-17 17:13	per0621028a
14797-73-0	Perchlorate-101	.05	.2	0.245	ug/L		1	21-JUN-17 17:13	per0621028a
	Perchlorate-O(18)			0.427	ug/L		1	21-JUN-17 17:13	per0621028a

^ 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): 2017-1759

Extract Batch Code: 1675692

Date Filtered: 20-JUN-17

Matrix: WATER

Sample ID: 1203815292

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.19	ug/L	95		85 - 115
Perchlorate Isotope Ratio		2.86				-
Perchlorate-101	0.200	.195	ug/L	98		85 - 115
Perchlorate-O(18)		.476	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): 2017-1759

Extract Batch Code: 1675692

Date Extracted: 20-JUN-17

GEL MS/PS ID: 1203815293

Client ID: CAWA-17-133327

GEL MSD/PSD ID: 1203815294

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	0.265	ug/L	0.434	85	.487	111	11	30	75 - 125
Perchlorate Isotope Ratio	0	2.84		2.91		3.04		4		-
Perchlorate-101	0.200	0.276	ug/L	0.442	83	.474	99	7	30	75 - 125
Perchlorate-O(18)	0	0.442	ug/L	0.455		.436		4		-

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

Quality Control Data

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1675692Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 20-JUN-17GEL Job No (SDG): 2017-1759GEL Sample ID: 1203815291Date Filtered: 20-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	21-JUN-17 15:12	per0621017a
	Perchlorate Isotope Ratio						1	21-JUN-17 15:12	per0621017a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	21-JUN-17 15:12	per0621017a
	Perchlorate-O(18)			0.499	ug/L		1	21-JUN-17 15:12	per0621017a

^ 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: 1675692Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 20-JUN-17GEL Job No (SDG): 2017-1759GEL Sample ID: 1203815292Date Filtered: 20-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	21-JUN-17 15:23	per0621018a
	Perchlorate Isotope Ratio			2.86			1	21-JUN-17 15:23	per0621018a
14797-73-0	Perchlorate-101	.05	.2	0.195	ug/L	J	1	21-JUN-17 15:23	per0621018a
	Perchlorate-O(18)			0.476	ug/L		1	21-JUN-17 15:23	per0621018a

^ 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: 1675692Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-1759GEL Sample ID: 1203815298Date Filtered: 20-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	0.194	ug/L	J	1	21-JUN-17 15:34	per0621019a
	Perchlorate Isotope Ratio			2.8			1	21-JUN-17 15:34	per0621019a
14797-73-0	Perchlorate-101	.05	.2	0.205	ug/L		1	21-JUN-17 15:34	per0621019a
	Perchlorate-O(18)			0.463	ug/L		1	21-JUN-17 15:34	per0621019a

^ 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: 1675692Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133327MSDate Received: 15-JUN-17GEL Job No (SDG): 2017-1759GEL Sample ID: 1203815293Date Filtered: 20-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	0.434	ug/L		1	21-JUN-17 15:56	per0621021a
	Perchlorate Isotope Ratio			2.91			1	21-JUN-17 15:56	per0621021a
14797-73-0	Perchlorate-101	.05	.2	0.442	ug/L		1	21-JUN-17 15:56	per0621021a
	Perchlorate-O(18)			0.455	ug/L		1	21-JUN-17 15:56	per0621021a

^ 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: 1675692Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133327MSDDate Received: 15-JUN-17GEL Job No (SDG): 2017-1759GEL Sample ID: 1203815294Date Filtered: 20-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	0.487	ug/L		1	21-JUN-17 16:07	per0621022a
	Perchlorate Isotope Ratio			3.04			1	21-JUN-17 16:07	per0621022a
14797-73-0	Perchlorate-101	.05	.2	0.474	ug/L		1	21-JUN-17 16:07	per0621022a
	Perchlorate-O(18)			0.436	ug/L		1	21-JUN-17 16:07	per0621022a

^ 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 #: 2017-1759
Work Order #: 425636**

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: 1675200

Prep Batch Number: 1675199

Sample Analysis

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

Sample ID	Client ID
425636001	CAWA-17-133303
1203814140	Method Blank (MB)
1203814141	Laboratory Control Sample (LCS)
1203814142	425636001(CAWA-17-133303) Matrix Spike (MS)
1203814143	425636001(CAWA-17-133303) 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 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 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
1203814141 (LCS)	2,4-Diamino-6-nitrotoluene	129* (50%-121%)

QC Sample Designation

A matrix spike and matrix spike duplicate were not performed with this SDG in this batch.

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
1203814142 (CAWA-17-133303MS)	2,4-Diamino-6-nitrotoluene	135* (50%-121%)
1203814143 (CAWA-17-133303MSD)	2,4-Diamino-6-nitrotoluene	133* (50%-121%)

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) 1647797 was generated for samples 1203814141 (LCS), 1203814142 (CAWA-17-133303MS) and 1203814143 (CAWA-17-133303MSD) 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 LCMSMS.

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: 2017-1759 GEL Work Order: 425636

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 05 JUL 2017

Title: Group Leader

Sample Data Summary

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133303

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 425636001

Sample Amount 950 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0630038.wiff

Date Analyzed: 01-JUL-17 07:38

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.263	U	0.0842	0.263
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.263	U	0.0842	0.263
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
13980-04-6	TNX	.263	U	0.0842	0.263
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.263	U	0.0842	0.263
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.263	U	0.0842	0.263
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.263	U	0.0842	0.263
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
5755-27-1	MNX	.263	U	0.0842	0.263
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.263	U	0.0842	0.263
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.263	U	0.0842	0.263
<i>80251-29-2</i>	<i>DNX</i>				
88-72-2	o-Nitrotoluene	.263	U	0.0863	0.263
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
98-95-3	Nitrobenzene	.263	U	0.0842	0.263
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.263	U	0.0842	0.263
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.263	U	0.0842	0.263
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133303

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 425636001

Sample Amount 950 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-65-0	m-Dinitrobenzene	.263	U	0.0842	0.263
99-65-0	<i>m-Dinitrobenzene</i>				
479-45-8	Tetryl	.526	U	0.0842	0.526
479-45-8	<i>Tetryl</i>				
78-11-5	PETN	.526	U	0.105	0.526
78-11-5	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.526	U	0.158	0.526
99-99-0	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	1.05	U	0.316	1.05
3058-38-6	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	1.05	U	0.316	1.05
618-87-1	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	1.05	U	0.316	1.05
78-30-8	<i>tris(o-cresyl) phosphate</i>				
121-82-4	RDX	1.54		0.0842	0.263
121-82-4	<i>RDX</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	2.63	U	0.526	2.63
59229-75-3	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	2.63	U	0.526	2.63
6629-29-4	<i>2,4-Diamino-6-nitrotoluene</i>				

Quality Control Summary

High Explosives Surrogate Recovery Summary**Lab Name:** GEL Laboratories LLC**GEL Job No (SDG):** 2017-1759**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20)

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
425636001	CAWA-17-133303	100	55 - 115	
1203814140	MB for batch 1675199	100	55 - 115	
1203814141	LCS for batch 1675199	101	55 - 115	
1203814142	CAWA-17-133303MS	95	55 - 115	
1203814143	CAWA-17-133303MSD	98	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) 2017-1759

Extract Batch Code: 1675199

Date Extracted: 19-JUN-17

GEL LCS ID: 1203814141

GEL LCSDUP ID: .

Analysis Date/Time: 01-JUL-17 06:29

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
Tetryl	5	4.18	84					64 - 122
m-Dinitrobenzene	5	5.29	106					74 - 117
m-Nitrotoluene	5	4.64	93					66 - 114
o-Nitrotoluene	5	4.16	83					64 - 115
p-Nitrotoluene	5	5.08	102					66 - 127
tris(o-cresyl) phosphate	5	3.77	75					43 - 104
1,3,5-Trinitrobenzene	5	4.98	100					70 - 110
2,4,6-Trinitrotoluene	5	4.71	94					69 - 113
2,4-Diamino-6-nitrotoluene	5	6.45	129 *					50 - 121
2,4-Dinitrotoluene	5	4.62	92					71 - 110
2,6-Diamino-4-nitrotoluene	5	6.17	123					53 - 127
2,6-Dinitrotoluene	5	4.33	87					72 - 105
2-Amino-4,6-dinitrotoluene	5	4.95	99					70 - 112
3,5-Dinitroaniline	5	4.55	91					70 - 121
4-Amino-2,6-dinitrotoluene	5	4.94	99					74 - 116
HMX	5	4.29	86					58 - 113
Nitrobenzene	5	4.57	91					64 - 115
PETN	5	4.32	86					57 - 126
RDX	5	5.03	101					64 - 117
TATB	2.5	3.1	124					47 - 135

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-17-133303

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Extract Batch Code: 1675199

Date Extracted: 19-JUN-17

GEL Spike ID: 1203814142

GEL SpikeDup ID: 1203814143

Analysis Date/Time: 01-JUL-17 08:12

MSD Analysis Date/Time: 01-JUL-17 08:46

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
tris(o-cresyl) phosphate	5.26316	0	4.38	83	4.74	89	8	30	38 - 105
1,3,5-Trinitrobenzene	5.26316	0	5.06	96	5.17	97	2	30	67 - 111
2,4,6-Trinitrotoluene	5.26316	0	5.17	98	5.87	110	13	30	66 - 112
2,4-Diamino-6-nitrotoluene	5.26316	0	7.09	135 *	7.05	133 *	1	30	50 - 121
2,4-Dinitrotoluene	5.26316	0	4.98	95	4.93	93	1	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.26316	0	5.81	110	5.29	99	9	30	53 - 127
2,6-Dinitrotoluene	5.26316	0	4.87	92	5.19	98	6	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.26316	0	5.33	101	5.48	103	3	30	67 - 115
3,5-Dinitroaniline	5.26316	0	5.16	98	5.15	97	0	30	70 - 121
4-Amino-2,6-dinitrotoluene	5.26316	0	5.25	100	5.5	103	5	30	65 - 120
HMX	5.26316	0	5.09	97	5.08	96	0	30	44 - 128
Nitrobenzene	5.26316	0	4.94	94	5.36	101	8	30	62 - 116
PETN	5.26316	0	4.74	90	4.78	90	1	30	51 - 131
RDX	5.26316	1.54	7.67	116	7.12	105	7	30	57 - 125
TATB	2.63158	0	3.35	127	3.1	116	8	30	38 - 149
Tetryl	5.26316	0	3.84	73	3.71	70	3	30	50 - 126
m-Dinitrobenzene	5.26316	0	5.45	104	5.48	103	1	30	74 - 117
m-Nitrotoluene	5.26316	0	5.01	95	5.04	95	1	30	59 - 120
o-Nitrotoluene	5.26316	0	4.65	88	5.46	103	16	30	56 - 119
p-Nitrotoluene	5.26316	0	5.19	99	5.55	104	7	30	61 - 129

#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 1675199

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814140

Sample Amount 1000 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0630035.wiff

Date Analyzed: 01-JUL-17 05:55

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 1675199

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814140

Sample Amount 1000 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-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	U	0.300	1.00
78-30-8	tris(o-cresyl) phosphate				
59229-75-3	2,6-Diamino-4-nitrotoluene	2.5	U	0.500	2.50
59229-75-3	2,6-Diamino-4-nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	2.5	U	0.500	2.50
6629-29-4	2,4-Diamino-6-nitrotoluene				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1675199

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814141

Sample Amount 1000 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0630036.wiff

Date Analyzed: 01-JUL-17 06:29

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>	3.1		0.300	1.00
78-30-8 <i>78-30-8</i>	tris(o-cresyl) phosphate <i>tris(o-cresyl) phosphate</i>	3.77		0.300	1.00
88-72-2 <i>88-72-2</i>	o-Nitrotoluene <i>o-Nitrotoluene</i>	4.16		0.082	0.250
479-45-8 <i>479-45-8</i>	Tetryl <i>Tetryl</i>	4.18		0.080	0.500
2691-41-0 <i>2691-41-0</i>	HMX <i>HMX</i>	4.29		0.080	0.250
78-11-5 <i>78-11-5</i>	PETN <i>PETN</i>	4.32		0.100	0.500
606-20-2 <i>606-20-2</i>	2,6-Dinitrotoluene <i>2,6-Dinitrotoluene</i>	4.33		0.080	0.250
618-87-1 <i>618-87-1</i>	3,5-Dinitroaniline <i>3,5-Dinitroaniline</i>	4.55		0.300	1.00
98-95-3 <i>98-95-3</i>	Nitrobenzene <i>Nitrobenzene</i>	4.57		0.080	0.250
121-14-2 <i>121-14-2</i>	2,4-Dinitrotoluene <i>2,4-Dinitrotoluene</i>	4.62		0.080	0.250

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1675199

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814141

Sample Amount 1000 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
99-08-1	m-Nitrotoluene	4.64		0.080	0.250
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	4.71		0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.94		0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.95		0.080	0.250
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	4.98		0.080	0.250
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
121-82-4	RDX	5.03		0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
99-99-0	p-Nitrotoluene	5.08		0.150	0.500
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.29		0.080	0.250
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	6.17		0.500	2.50
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	6.45		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: CAWA-17-133303(425636001MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814142

Sample Amount 950 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0630039.wiff

Date Analyzed: 01-JUL-17 08:12

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
13980-04-6	TNX	.263	U	0.0842	0.263
<i>13980-04-6</i>	<i>TNX</i>				
5755-27-1	MNX	.263	U	0.0842	0.263
<i>5755-27-1</i>	<i>MNX</i>				
80251-29-2	DNX	.263	U	0.0842	0.263
<i>80251-29-2</i>	<i>DNX</i>				
3058-38-6	TATB	3.35		0.316	1.05
<i>3058-38-6</i>	<i>TATB</i>				
479-45-8	Tetryl	3.84		0.0842	0.526
<i>479-45-8</i>	<i>Tetryl</i>				
78-30-8	tris(o-cresyl) phosphate	4.38		0.316	1.05
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
88-72-2	o-Nitrotoluene	4.65		0.0863	0.263
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
78-11-5	PETN	4.74		0.105	0.526
<i>78-11-5</i>	<i>PETN</i>				
606-20-2	2,6-Dinitrotoluene	4.87		0.0842	0.263
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
98-95-3	Nitrobenzene	4.94		0.0842	0.263
<i>98-95-3</i>	<i>Nitrobenzene</i>				
121-14-2	2,4-Dinitrotoluene	4.98		0.0842	0.263
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
99-08-1	m-Nitrotoluene	5.01		0.0842	0.263
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	5.06		0.0842	0.263
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133303(425636001MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814142

Sample Amount 950 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
2691-41-0	HMX	5.09		0.0842	0.263
<i>2691-41-0</i>	<i>HMX</i>				
618-87-1	3,5-Dinitroaniline	5.16		0.316	1.05
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
118-96-7	2,4,6-Trinitrotoluene	5.17		0.0842	0.263
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
99-99-0	p-Nitrotoluene	5.19		0.158	0.526
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	5.25		0.0842	0.263
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	5.33		0.0842	0.263
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.45		0.0842	0.263
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	5.81		0.526	2.63
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	7.09		0.526	2.63
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
121-82-4	RDX	7.67		0.0842	0.263
<i>121-82-4</i>	<i>RDX</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133303(425636001MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814143

Sample Amount 940 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0630040.wiff

Date Analyzed: 01-JUL-17 08:46

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>				
3058-38-6	TATB	3.1		0.319	1.06
<i>3058-38-6</i>	<i>TATB</i>				
479-45-8	Tetryl	3.71		0.0851	0.532
<i>479-45-8</i>	<i>Tetryl</i>				
78-30-8	tris(o-cresyl) phosphate	4.74		0.319	1.06
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
78-11-5	PETN	4.78		0.106	0.532
<i>78-11-5</i>	<i>PETN</i>				
121-14-2	2,4-Dinitrotoluene	4.93		0.0851	0.266
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
99-08-1	m-Nitrotoluene	5.04		0.0851	0.266
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
2691-41-0	HMX	5.08		0.0851	0.266
<i>2691-41-0</i>	<i>HMX</i>				
618-87-1	3,5-Dinitroaniline	5.15		0.319	1.06
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
99-35-4	1,3,5-Trinitrobenzene	5.17		0.0851	0.266
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
606-20-2	2,6-Dinitrotoluene	5.19		0.0851	0.266
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133303(425636001MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-1759

Matrix: WATER

GEL Sample ID: 1203814143

Sample Amount 940 mL

Date Received: 16-JUN-17

Moisture: .

Extraction Batch ID: 1675199

Extraction Type Sol Exchange

Date Extracted: 19-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
59229-75-3	2,6-Diamino-4-nitrotoluene	5.29		0.532	2.66
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
98-95-3	Nitrobenzene	5.36		0.0851	0.266
<i>98-95-3</i>	<i>Nitrobenzene</i>				
88-72-2	o-Nitrotoluene	5.46		0.0872	0.266
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	5.48		0.0851	0.266
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.48		0.0851	0.266
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	5.5		0.0851	0.266
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
99-99-0	p-Nitrotoluene	5.55		0.160	0.532
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	5.87		0.0851	0.266
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	7.05		0.532	2.66
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
121-82-4	RDX	7.12		0.0851	0.266
<i>121-82-4</i>	<i>RDX</i>				

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-1759Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 30-JUN-17 10:34GEL Data File: EXP0630001.wiffInstrument ID: LCMSMS7Column: Ultracarb Phenomenex 5u ODS (20)

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

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-1759Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 30-JUN-17 11:09GEL Data File: EXP0630002.wiffInstrument ID: LCMSMS7Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1759

Lab Code: GEL

Lab Sample ID: XIBLK02

Analysis Date: 30-JUN-17 15:42

GEL Data File: EXP0630010.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1759

Lab Code: GEL

Lab Sample ID: XIBLK03

Analysis Date: 30-JUN-17 17:58

GEL Data File: EXP0630014.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1759

Lab Code: GEL

Lab Sample ID: XIBLK04

Analysis Date: 30-JUN-17 21:23

GEL Data File: EXP0630020.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1759

Lab Code: GEL

Lab Sample ID: XIBLK05

Analysis Date: 30-JUN-17 22:31

GEL Data File: EXP0630022.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1759

Lab Code: GEL

Lab Sample ID: XIBLK06

Analysis Date: 01-JUL-17 05:21

GEL Data File: EXP0630034.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

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

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1759

Lab Code: GEL

Lab Sample ID: XIBLK07

Analysis Date: 01-JUL-17 09:54

GEL Data File: EXP0630042.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

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

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 02-JUL-17	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LC-MS/MS	Test / Method: SW846 3535A/8330B	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1675200	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 425632(2017-1760),425636(2017-1759) Application Issues: Failed Recovery for MS/MSD, or PS/PSD Failed Recovery for LCS/LCSD			
Specification and Requirements Exception Description:		DER Disposition:	
1. One or more of the required spiking analytes were not within the acceptance limits in the laboratory control sample (See Below). 1203814141 (LCS) recovered 2,4-Diamino-6-nitrotoluene at 129% (50%-121%). 2. The MS or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. 1203814142 (CAWA-17-133303MS) recovered 2,4-Diamino-6-nitrotoluene at 135% (50%-121%). 1203814143 (CAWA-17-133303MSD) recovered 2,4-Diamino-6-nitrotoluene at 133% (50%-121%).		1. While the LCS exhibited a high bias, 2,4-Diamino-6-nitrotoluene was not detected in the associated samples, the data are reported. 2. Because the recoveries were biased high and 2,4-Diamino-6-nitrotoluene was not detected in the associated samples above the reporting limit, the data were reported.	

Originator's Name:

Michael Penny 03-JUL-17

Data Validator/Group Leader:

Charles Wilson 05-JUL-17

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-1759
Work Order #: 425636

Sample ID	Client ID
425636001	CAWA-17-133303
425636002	CAWA-17-133331
1203813455	Method Blank (MB) ICP
1203813456	Laboratory Control Sample (LCS)
1203813459	425636002(CAWA-17-133331L) Serial Dilution (SD)
1203813457	425636002(CAWA-17-133331D) Sample Duplicate (DUP)
1203813458	425636002(CAWA-17-133331S) Matrix Spike (MS)
1203824584	425636002(CAWA-17-133331PS) Post Spike (PS)
1203813354	Method Blank (MB) ICP-MS
1203813355	Laboratory Control Sample (LCS)
1203813682	425632002(CAWA-17-133328L) Serial Dilution (SD)
1203813680	425632002(CAWA-17-133328D) Sample Duplicate (DUP)
1203813681	425632002(CAWA-17-133328S) Matrix Spike (MS)
1203814249	Method Blank (MB) CVAA
1203814250	Laboratory Control Sample (LCS)
1203814255	425636001(CAWA-17-133303L) Serial Dilution (SD)
1203814251	425636001(CAWA-17-133303D) Sample Duplicate (DUP)
1203814253	425636001(CAWA-17-133303S) Matrix Spike (MS)

Sample Analysis

Samples 425636001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1674924, 1674884, 1675234 and 1681462
Prep Batch :	1674923, 1674883 and 1675232
Standard Operating Procedures:	GL-MA-E-013 REV# 28, GL-MA-E-006 REV# 13, GL-MA-E-014 REV# 30, GL-MA-E-010 REV# 34 and GL-GC-E-107 REV# 10
Analytical Method:	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
Prep Method :	SW846 3005A and EPA 245.1/245.2 Prep

Preparation/Analytical Method Verification

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

System Configuration

The Hardness as CaCO₃ is calculated from Calcium and Magnesium results.

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

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

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

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 425636002 (CAWA-17-133331)-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: 425636002 (CAWA-17-133331)-ICP, 425632002 (CAWA-17-133328)-ICP-MS and 425636001 (CAWA-17-133303)-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 MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203813458 (CAWA-17-133331MS)	Sodium	5.74* (75%-125%)

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.

Post Spike (PS) Recovery Statement

The PS met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the absence of matrix interferences in the post-digested sample.

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Additional Comments

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

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2017-1759 GEL Work Order: 425636

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- J Value is estimated
- N Metals--The Matrix spike sample recovery is not within specified control limits
- 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: 12 JUL 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1759**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 425636001**BASIS:** As Received**DATE COLLECTED** 14-JUN-17**CLIENT ID:** CAWA-17-133303**LEVEL:** Low**DATE RECEIVED** 16-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	06/20/17 09:48	062017W1-4	1675234

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1675234	1675232	EPA 245.1/245.2 Prep	20	mL	20	mL	06/19/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1759**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 425636002**BASIS:** As Received**DATE COLLECTED** 14-JUN-17**CLIENT ID:** CAWA-17-133331**LEVEL:** Low**DATE RECEIVED** 16-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	06/20/17 09:59	062017W1-4	1675234

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1759

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 425636002

BASIS: As Received

DATE COLLECTED 14-JUN-17

CLIENT ID: CAWA-17-133331

LEVEL: Low

DATE RECEIVED 16-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	06/30/17 10:03	063017-1	1674924
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-38-2	Arsenic	5	ug/L	U	2	5	5	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-39-3	Barium	4.23	ug/L	J	1	5	5	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-70-2	Calcium	9950	ug/L		50	200	200	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-47-3	Chromium	10	ug/L	U	3	10	10	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	HSC	06/30/17 10:03	063017-1	1674924
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	06/30/17 10:03	063017-1	1674924
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7439-95-4	Magnesium	2400	ug/L		110	300	300	1	P	HSC	06/30/17 10:03	063017-1	1674924
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	HSC	06/30/17 10:03	063017-1	1674924
7439-98-7	Molybdenum	0.551	ug/L		0.2	0.5	0.5	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-02-0	Nickel	2	ug/L	U	0.6	2	2	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-09-7	Potassium	407	ug/L		50	150	150	1	P	HSC	06/30/17 10:03	063017-1	1674924
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7631-86-9	Silica	58800	ug/L		53	213	213	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-23-5	Sodium	13100	ug/L	N	100	300	300	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-24-6	Strontium	49	ug/L		1	5	5	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-61-1	Uranium	0.329	ug/L		0.067	0.2	0.2	1	MS	BAJ	06/27/17 18:18	170627-3	1674884
7440-62-2	Vanadium	1.52	ug/L	J	1	5	5	1	P	HSC	06/30/17 10:03	063017-1	1674924
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	HSC	06/30/17 10:03	063017-1	1674924

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1759**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 425636002**BASIS:** As Received**DATE COLLECTED** 14-JUN-17**CLIENT ID:** CAWA-17-133331**LEVEL:** Low**DATE RECEIVED** 16-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	34.7	mg/L		0.453	1.24	1.24	1		TXT1	07/11/17 15:56		1681462

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1674884	1674883	SW846 3005A	50	mL	50	mL	06/19/17	SXW1
1674924	1674923	SW846 3005A	50	mL	50	mL	06/19/17	SXW1
1675234	1675232	EPA 245.1/245.2 Prep	20	mL	20	mL	06/19/17	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. 2017-1759

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>
1203813354	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
1203813455	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	65.4	ug/L	+/-200	J	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	178	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	3.3	ug/L	+/-10	U	P	3.3	10
1203814249	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. 2017-1759 Client ID: CAWA-17-13331S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 425636002 Spike ID: 1203813458

<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	5140		68	U	5000	102		P
Barium	ug/L	75-125	524		4.23	J	500	104		P
Beryllium	ug/L	75-125	515		1	U	500	103		P
Boron	ug/L	75-125	533		15	U	500	105		P
Calcium	ug/L	75-125	15100		9950		5000	102		P
Cobalt	ug/L	75-125	507		1	U	500	101		P
Copper	ug/L	75-125	525		3	U	500	105		P
Iron	ug/L	75-125	5250		30	U	5000	105		P
Magnesium	ug/L	75-125	8250		2400		5000	117		P
Manganese	ug/L	75-125	508		2	U	500	102		P
Potassium	ug/L	75-125	5930		407		5000	111		P
Silica	ug/L		69500		58800		10700	99.3	N/A	P
Sodium	ug/L	75-125	13400		13100		5000	5.74	N	P
Strontium	ug/L	75-125	544		49		500	98.9		P
Tin	ug/L	75-125	507		2.5	U	500	101		P
Vanadium	ug/L	75-125	516		1.52	J	500	103		P
Zinc	ug/L	75-125	491		3.3	U	500	97.7		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-1759 Client ID: CAWA-17-133328S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 425632002 Spike ID: 1203813681

<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	51.3		1	U	50	102		MS
Arsenic	ug/L	75-125	55.1		2	U	50	107		MS
Cadmium	ug/L	75-125	53		0.3	U	50	106		MS
Chromium	ug/L	75-125	52.8		3	U	50	104		MS
Lead	ug/L	75-125	50.7		0.5	U	50	101		MS
Molybdenum	ug/L	75-125	55		1.48		50	107		MS
Nickel	ug/L	75-125	54.8		0.6	U	50	109		MS
Selenium	ug/L	75-125	53.9		2	U	50	108		MS
Silver	ug/L	75-125	51.4		0.3	U	50	103		MS
Thallium	ug/L	75-125	48.7		0.6	U	50	97.2		MS
Uranium	ug/L	75-125	51.2		0.276		50	102		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-1759 Client ID CAWA-17-133303S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 425636001 Spike ID: 1203814253

<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	1.92		0.067	U	2	96		AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-5a-

Spike Summary

SDG NO. 2017-1759 **Client ID:** CAWA-17-133331PS**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 425636002 **Spike ID:** 1203824584

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Sodium	ug/L	80-120	18000		13100		5000	97.4		P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1759

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-133331D

Matrix: WATER

Level: Low

Sample ID: 425636002

Duplicate ID: 1203813457

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	4.23 J		4.29 J		1.34		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	9950		9800		1.49		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	2400		2370		1.48		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-150	407		374		8.5		P
Silica	ug/L	+/-20%	58800		58700		.23		P
Sodium	ug/L	+/-20%	13100		13200		.88		P
Strontium	ug/L	+/-20%	49		49.6		1.09		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	1.52 J		1.54 J		1.47		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1759

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-133328D

Matrix: WATER

Level: Low

Sample ID: 425632002

Duplicate ID: 1203813680

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L		2 U		2 U				MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L		3 U		3 U				MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.48		1.5		1.28		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	0.276		0.285		3.21		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
–6–
Duplicate Sample Summary

SDG No.: 2017–1759**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAWA–17–133303D**Matrix:** WATER**Level:** Low**Sample ID:** 425636001**Duplicate ID:** 1203814251**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. 2017-1759

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>
1203813355								
	Arsenic	ug/L	50	54.5		109	80-120	MS
	Antimony	ug/L	50	48.1		96.1	80-120	MS
	Cadmium	ug/L	50	52.5		105	80-120	MS
	Chromium	ug/L	50	51.9		104	80-120	MS
	Lead	ug/L	50	49.7		99.3	80-120	MS
	Molybdenum	ug/L	50	50.5		101	80-120	MS
	Nickel	ug/L	50	53.9		108	80-120	MS
	Selenium	ug/L	50	54.4		109	80-120	MS
	Silver	ug/L	50	50.2		100	80-120	MS
	Thallium	ug/L	50	48.1		96.2	80-120	MS
	Uranium	ug/L	50	48.8		97.7	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2017-1759

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>
1203813456								
	Aluminum	ug/L	5000	5220		104	80-120	P
	Barium	ug/L	500	509		102	80-120	P
	Beryllium	ug/L	500	504		101	80-120	P
	Boron	ug/L	500	513		103	80-120	P
	Calcium	ug/L	5000	5220		104	80-120	P
	Cobalt	ug/L	500	507		101	80-120	P
	Copper	ug/L	500	512		102	80-120	P
	Iron	ug/L	5000	5300		106	80-120	P
	Magnesium	ug/L	5000	5310		106	80-120	P
	Manganese	ug/L	500	507		101	80-120	P
	Potassium	ug/L	5000	5190		104	80-120	P
	Silica	ug/L	10700	10600		99.2	80-120	P
	Sodium	ug/L	5000	5400		108	80-120	P
	Strontium	ug/L	500	507		101	80-120	P
	Tin	ug/L	500	499		99.8	80-120	P
	Vanadium	ug/L	500	509		102	80-120	P
	Zinc	ug/L	500	484		96.8	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2017-1759

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>
1203814250	Mercury	ug/L	2	1.94		97	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1759

Client ID: CAWA-17-133331L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 425636002

Serial Dilution ID: 1203813459

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	4.23	J	5	U	1.257			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	9950		10200		2.266		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	2400		2480		3.381			P
Manganese	2	U	10	U				P
Potassium	407		386	J	5.053			P
Silica	58800		59500		1.214		10	P
Sodium	13100		14000		6.641		10	P
Strontium	49		51.9		5.876			P
Tin	2.5	U	12.5	U				P
Vanadium	1.52	J	5	U	78.979			P
Zinc	3.3	U	18.1	J				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1759

Client ID: CAWA-17-133328L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 425632002

Serial Dilution ID: 1203813682

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	2	U	10	U				MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.48		1.31	J	11.307			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	.276		.335	U	3.986			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1759 **Client ID:** CAWA-17-133303L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 425636001 **Serial Dilution ID:** 1203814255

<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 #: 2017-1759
Work Order #: 425636**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1675261

Method: SW 9060 Total Organic Carbon

Sample Analysis

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

Sample ID	Client ID
425636001	CAWA-17-133303
1203814348	Method Blank (MB)
1203814349	Laboratory Control Sample (LCS)
1203814350	425532002(CAWA-17-133299) Sample Duplicate (DUP)
1203814351	425632001(CAWA-17-133300) Sample Duplicate (DUP)
1203814352	425632001(CAWA-17-133300) Post Spike (PS)
1203814353	425532002(CAWA-17-133299) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 425532002 (CAWA-17-133299) and 425632001 (CAWA-17-133300) were selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Cyanide and Total		
Analytical Batch:	1674062	Method:	WSP-CN(T)
Prep Batch :	1674061	Method:	EPA 335.4

Sample Analysis

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

Sample ID	Client ID
425636001	CAWA-17-133303
1203811489	Method Blank (MB)
1203811490	Laboratory Control Sample (LCS)
1203811491	425417001(CAWA-17-133279) Sample Duplicate (DUP)
1203811492	425417001(CAWA-17-133279) Matrix Spike (MS)
1203814049	425417001(CAWA-17-133279) Matrix Spike Duplicate (MSD)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 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 425417001 (CAWA-17-133279) 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.

MS/MSD Relative Percent Difference (RPD) Statement

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

Sample 425636001 (CAWA-17-133303) was re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported. Samples 1203811490 (LCS), 1203811491 (CAWA-17-133279DUP), 1203811492 (CAWA-17-133279MS) and 1203814049 (CAWA-17-133279MSD) were re-analyzed to verify the results.

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1675462

Method: WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203814713	Method Blank (MB)
1203814714	Laboratory Control Sample (LCS)
1203814715	425632002(CAWA-17-133328) Sample Duplicate (DUP)
1203814716	425632002(CAWA-17-133328) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 425632002 (CAWA-17-133328) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Manual Integrations

Samples 1203814715 (CAWA-17-133328DUP), 1203814716 (CAWA-17-133328PS) and 425636002 (CAWA-17-133331) were manually integrated to correctly position the baseline as set in the calibration standards.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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scanned and inserted into the electronic package.

Method/Analysis Information

Product:	Ammonia Nitrogen		
Analytical Batch:	1675174	Method:	NH3
Prep Batch :	1675173	Method:	EPA 350.1 Prep

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203814056	Method Blank (MB)
1203814057	Laboratory Control Sample (LCS)
1203814058	425632002(CAWA-17-133328) Sample Duplicate (DUP)
1203814061	425632002(CAWA-17-133328) 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 425632002 (CAWA-17-133328) 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

Sample1203814056 (MB) was re-analyzed due to (its) proximity to an overrange sample. The results from the reanalysis are reported.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an

effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

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Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1675176	Method:	TKN
Prep Batch :	1675175	Method:	EPA 351.2 Prep

Sample Analysis

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

Sample ID	Client ID
425636001	CAWA-17-133303
1203814064	Method Blank (MB)
1203814065	Laboratory Control Sample (LCS)
1203814067	425632001(CAWA-17-133300) Sample Duplicate (DUP)
1203814069	425632001(CAWA-17-133300) 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 425632001 (CAWA-17-133300) was selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Total Kjeldahl	1203814069 (CAWA-17-133300MS)	81.9* (90%-110%)

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

Samples 1203814064 (MB) and 1203814065 (LCS) were re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1675664

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203815245	Method Blank (MB)
1203815246	Laboratory Control Sample (LCS)
1203815247	425642001(CTUA-17-131778) Sample Duplicate (DUP)
1203815250	425642001(CTUA-17-131778) 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

Sample 425642001 (CTUA-17-131778) 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 following samples 1203815247 (CTUA-17-131778DUP) and 1203815250 (CTUA-17-131778PS) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Sample Re-analysis

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

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1674640	Method:	PO4
Prep Batch :	1674639	Method:	EPA 365.4 Prep

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203812754	Method Blank (MB)
1203812755	Laboratory Control Sample (LCS)
1203812756	425520005(CALA-17-139173) Sample Duplicate (DUP)
1203812757	425520005(CALA-17-139173) 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 425520005 (CALA-17-139173) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1675256

Method: TDS

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203814324	Method Blank (MB)
1203814325	Laboratory Control Sample (LCS)
1203816297	425632002(CAWA-17-133328) 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 425632002 (CAWA-17-133328) 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	1203816297 (CAWA-17-133328DUP)	8.87* (0%-5%)

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1679218

Method: EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203823669	Laboratory Control Sample (LCS)
1203823670	425520005(CALA-17-139173) Sample Duplicate (DUP)
1203823671	426779001(BDW01-17-139079) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 425520005 (CALA-17-139173) and 426779001 (BDW01-17-139079) were selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: pH

Analytical Batch: 1677686 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203820094	Laboratory Control Sample (LCS)
1203820095	425922003(CAPU-17-139091) 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 425922003 (CAPU-17-139091) 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
1203820095 (CAPU-17-139091DUP)	pH	Received 21-JUN-17, out of holding 19-JUN-17
425636002 (CAWA-17-133331)	pH	Received 16-JUN-17, out of holding 14-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**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: 1677682 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

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

Sample ID	Client ID
425636002	CAWA-17-133331
1203820084	Laboratory Control Sample (LCS)
1203820087	425922003(CAPU-17-139091) Sample Duplicate (DUP)
1203820090	425922003(CAPU-17-139091) 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 425922003 (CAPU-17-139091) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

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Qualifier Definition Report for

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

Client SDG: 2017-1759 GEL Work Order: 425636

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Kristen Mizzell

Date: 11 JUL 2017

Title: Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: July 11, 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: 2017-1759

Client Sample ID: CAWA-17-133303
Sample ID: 425636001
Matrix: W
Collect Date: 14-JUN-17 11:17
Receive Date: 16-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	0.397	0.330	1.00	mg/L		1	TSM	06/23/17	1354	1675261	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	06/20/17	0948	1674062	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	J	0.0378	0.033	0.100	mg/L	1.00	1	KLP1	06/27/17	1531	1675176	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	06/19/17	1339	1674061
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	06/26/17	1700	1675175

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

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Certificate of Analysis

Report Date: July 11, 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: 2017-1759

Client Sample ID: CAWA-17-133331
Sample ID: 425636002
Matrix: W
Collect Date: 14-JUN-17 11:17
Receive Date: 16-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	06/19/17	2302	1675462	1
Chloride		1.09	0.067	0.200	mg/L		1					
Fluoride	J	0.048	0.033	0.100	mg/L		1					
Sulfate		2.25	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0705	0.017	0.050	mg/L	1.00	1	KLP1	06/21/17	1225	1675174	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.495	0.017	0.050	mg/L		1	AXH3	06/21/17	0713	1675664	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.031	0.020	0.050	mg/L	1.00	1	KLP1	06/27/17	1026	1674640	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		133	3.40	14.3	mg/L			KLP1	06/21/17	1042	1675256	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		51.8	1.45	4.00	mg/L			RXB5	06/28/17	1714	1677682	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		110	1.00	1.00	umhos/cm		1	SXM7	07/06/17	1029	1679218	7
PH "As Received"												
pH at Temp 16.4C	H	7.68	0.010	0.100	SU		1	RXB5	06/28/17	1713	1677686	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	06/20/17	1700	1675173
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	06/26/17	1700	1674639

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Certificate of Analysis

Report Date: July 11, 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: 2017-1759

Client Sample ID: CAWA-17-133331
Sample ID: 425636002

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

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QC Summary

Report Date: July 11, 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: 425636

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1675261										
QC1203814350	425532002	DUP									
Total Organic Carbon Average	J	0.512	J	0.532	mg/L	3.83	^	(+/-1.00)	TSM	06/23/17	05:21
QC1203814351	425632001	DUP									
Total Organic Carbon Average	J	0.596	J	0.616	mg/L	3.3	^	(+/-1.00)		06/23/17	12:26
QC1203814349	LCS										
Total Organic Carbon Average	10.0			9.82	mg/L			98.2 (80%-120%)		06/23/17	02:53
QC1203814348	MB										
Total Organic Carbon Average			U	ND	mg/L					06/23/17	02:41
QC1203814352	425632001	PS									
Total Organic Carbon Average	10.0	J	0.596	11.0	mg/L			104 (75%-125%)		06/23/17	13:10
QC1203814353	425532002	PS									
Total Organic Carbon Average	10.0	J	0.512	11.2	mg/L			107 (75%-125%)		06/23/17	06:06
Flow Injection Analysis											
Batch	1674062										
QC1203811491	425417001	DUP									
Cyanide, Total	U	ND	U	ND	ug/L	N/A			AXH3	06/20/17	10:26
QC1203811490	LCS										
Cyanide, Total	50.0			54.1	ug/L			108 (90%-110%)		06/20/17	08:44
QC1203811489	MB										
Cyanide, Total			U	ND	ug/L					06/20/17	08:32
QC1203811492	425417001	MS									
Cyanide, Total	100	U	ND	105	ug/L			105 (90%-110%)		06/20/17	10:27

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QC Summary

Workorder: 425636

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Flow Injection Analysis											
Batch	1674062										
QC1203814049	425417001	MSD									
Cyanide, Total	100	U	ND	105	ug/L	0	105	(0%-20%)	AXH3	06/20/17	10:28
Ion Chromatography											
Batch	1675462										
QC1203814715	425632002	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MXL2	06/19/17	22:04
Chloride			1.99		1.99	mg/L	0.136	(0%-20%)			
Fluoride		J	0.0822	J	0.0857	mg/L	4.17 ^	(+/-0.100)			
Sulfate			3.89		3.85	mg/L	0.944	(0%-20%)			
QC1203814714	LCS										
Bromide	1.25				1.22	mg/L	97.5	(80%-120%)		06/19/17	21:05
Chloride	5.00				4.69	mg/L	93.9	(80%-120%)			
Fluoride	2.50				2.41	mg/L	96.3	(80%-120%)			
Sulfate	10.0				9.70	mg/L	97	(80%-120%)			
QC1203814713	MB										
Bromide			U		ND	mg/L				06/19/17	20:35
Chloride			U		ND	mg/L					
Fluoride			U		ND	mg/L					
Sulfate			U		ND	mg/L					

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QC Summary

Workorder: 425636

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography												
Batch	1675462											
QC1203814716	425632002	PS										
Bromide	1.25	U	ND		1.27	mg/L		97.3	(75%-125%)	MXL2	06/19/17	22:33
Chloride	5.00		1.99		6.91	mg/L		98.3	(75%-125%)			
Fluoride	2.50	J	0.0822		2.40	mg/L		92.8	(75%-125%)			
Sulfate	10.0		3.89		13.9	mg/L		99.8	(75%-125%)			
Nutrient Analysis												
Batch	1674640											
QC1203812756	425520005	DUP										
Phosphorus, Total as P			0.191		0.150	mg/L	24	^	(+/-0.050)	KLP1	06/27/17	10:13
QC1203812755	LCS											
Phosphorus, Total as P	1.00				1.06	mg/L		106	(80%-124%)		06/27/17	10:11
QC1203812754	MB											
Phosphorus, Total as P			U		ND	mg/L					06/27/17	10:11
QC1203812757	425520005	MS										
Phosphorus, Total as P	1.00		0.191		1.17	mg/L		97.9	(63%-139%)		06/27/17	10:14
Batch	1675174											
QC1203814058	425632002	DUP										
Nitrogen, Ammonia		J	0.0445	J	0.0328	mg/L	30.3	^	(+/-0.050)	KLP1	06/21/17	12:19
QC1203814057	LCS											
Nitrogen, Ammonia	1.00				1.07	mg/L		107	(90%-110%)		06/21/17	12:12
QC1203814056	MB											
Nitrogen, Ammonia			J		0.0328	mg/L					06/21/17	12:25

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QC Summary

Workorder: 425636

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1675174										
QC1203814061	425632002	MS									
Nitrogen, Ammonia	1.00	J	0.0445	1.01	mg/L		96.6	(90%-110%)	KLP1	06/21/17	12:20
Batch	1675176										
QC1203814067	425632001	DUP									
Nitrogen, Total Kjeldahl			0.141	0.129	mg/L	8.89 ^		(+/-0.100)	KLP1	06/27/17	15:29
QC1203814065	LCS										
Nitrogen, Total Kjeldahl	1.00			1.05	mg/L		105	(90%-110%)		06/27/17	16:06
QC1203814064	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					06/27/17	15:23
QC1203814069	425632001	MS									
Nitrogen, Total Kjeldahl	1.00		0.141	0.960	mg/L		81.9*	(90%-110%)		06/27/17	15:30
Batch	1675664										
QC1203815247	425642001	DUP									
Nitrogen, Nitrate/Nitrite			2.47	2.40	mg/L	2.88		(0%-20%)	AXH3	06/21/17	07:31
QC1203815246	LCS										
Nitrogen, Nitrate/Nitrite	1.00			0.982	mg/L		98.2	(90%-110%)		06/21/17	07:07
QC1203815245	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					06/21/17	07:06
QC1203815250	425642001	PS									
Nitrogen, Nitrate/Nitrite	1.00		0.493	1.46	mg/L		96.7	(90%-110%)		06/21/17	07:32
Solids Analysis											
Batch	1675256										
QC1203816297	425632002	DUP									
Total Dissolved Solids			146	139	mg/L	8.87*		(0%-5%)	KLP1	06/21/17	10:42

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QC Summary

Workorder: 425636

Page 5 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Solids Analysis											
Batch	1675256										
QC1203814325	LCS										
Total Dissolved Solids	300			304	mg/L		101	(95%-105%)	KLP1	06/21/17	10:42
QC1203814324	MB										
Total Dissolved Solids			U	ND	mg/L					06/21/17	10:42
Titration and Ion Analysis											
Batch	1677682										
QC1203820087	425922003	DUP									
Alkalinity, Total as CaCO3		172		171	mg/L	0.584		(0%-20%)	RXB5	06/28/17	17:26
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203820084	LCS										
Alkalinity, Total as CaCO3	100			109	mg/L		109	(90%-110%)		06/28/17	16:47
QC1203820090	425922003	MS									
Alkalinity, Total as CaCO3	100	172		278	mg/L		106	(80%-120%)		06/28/17	17:27
Batch	1677686										
QC1203820095	425922003	DUP									
pH	H	7.72	H	7.71	SU	0.13		(0%-5%)	RXB5	06/28/17	17:23
QC1203820094	LCS										
pH	7.00			7.01	SU		100	(99%-101%)		06/28/17	16:46
Batch	1679218										
QC1203823670	425520005	DUP									
Conductivity		311		310	umhos/cm	0.322		(0%-10%)	SXM7	07/06/17	10:23
QC1203823671	426779001	DUP									
Conductivity		455		455	umhos/cm	0		(0%-10%)		07/06/17	10:47

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QC Summary

Workorder: 425636

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1679218										
QC1203823669	LCS										
Conductivity	1410			1360	umhos/cm		96.2	(95%-105%)	SXM7	07/06/17	10:12

Notes:

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