

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:

[illegible]

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11258

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

SAMPLE ID: CAWA-17-133347

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	6/7/17	OK	FIELD MATRIX:	WS	OK
TIME COLLECTED (HH:MM):	1045		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	PP	
LOCATION ID:	Between E252 and Water at Beta		FIELD PREP:	F	
LOCATION TYPE:	Mon		FIELD QC TYPE:	REG	
TOP DEPTH:	OK		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / <u>NO</u> / NA

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

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time _____ HH:MM

COLLECTED BY (PRINT): K. Tow, M. Shendo

RELINQUISHED BY (Printed Name) Katrina Tow (Signature) <i>Katrina Tow</i>	Date/Time 6/7/17 1405	RECEIVED BY (Printed Name) M. Shendo (Signature) <i>M. Shendo</i>	Date/Time 6/7/17 1405
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 05/30/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11258

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

SAMPLE ID: CAWA-17-133348

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	6/7/17	OK	FIELD MATRIX:	WS	NA
TIME COLLECTED (HH:MM):	1045		MEDIA:	UA	
PRS ID:	OK		SAMPLE TECH CODE:	DC	
LOCATION ID:	Between E252 and Water at Beta		FIELD PREP:	UF	
LOCATION TYPE:	Mon		FIELD QC TYPE:	REG	
TOP DEPTH:	OK		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES / <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8330B-NMED HEXMOD	1 LITER AMBER GLASS	3	ICE	Y	NA
↓	WSP-All Metals	1 LITER POLY	1	HNO3	↓	↓
↓	WSP-CN(T)	250 ML POLY	1	NAOH	↓	↓
↓	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	↓	↓

SAMPLE COMMENTS: None

LOCATION COMMENTS: None

FIELD PARAMETERS:

Sample Time

1045

HH:MM

Temp 16.0°C

pH 8.06 (sw)

DO 7.91 (mg/L)

Sp. Cond 181.2 (us/cm)

Turbidity 7.4 (NTU)

COLLECTED BY (PRINT): K. Tow, M. Shendo

RELINQUISHED BY (Printed Name) Katrina Tow (Signature) <i>K. Tow</i>	Date/Time 6/7/17 1405	RECEIVED BY (Printed Name) S. Sherwood (Signature) <i>S. Sherwood</i>	Date/Time 6/7/17 1405
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. 2017-1689

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
425121	EPA:120.1	1				
425121	EPA:150.1	1				
425121	EPA:160.1	1				
425121	EPA:170.0	2				
425121	EPA:245.2	2				
425121	EPA:300.0	1				
425121	EPA:310.1	1				
425121	EPA:335.4	1				
425121	EPA:350.1	1				
425121	EPA:351.2	1				
425121	EPA:353.2	1				
425121	EPA:365.4	1				
425121	SM:A2340B	2				
425121	SW-846:6010C	2				
425121	SW-846:6020	2				
425121	SW-846:6850	1				
425121	SW-846:8330B	1				
425121	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
425121	EPA:120.1	1678861	1678861	1										1				1			
425121	EPA:150.1	1673523	1673523	1										1				1			
425121	EPA:160.1	1673668	1673668	1					1					1				1			
425121	EPA:170.0	NA	NA	2																	
425121	EPA:245.2	1673857	1673856	2					1	2				1				2			
425121	EPA:300.0	1672927	1672927	1					1					1				1			

DATA VALIDATION REPORT

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
425121	EPA:310.1	1673522	1673522	1						1				1				1			
425121	EPA:335.4	1672526	1672525	1					1	1				1				1			
425121	EPA:350.1	1672879	1672878	1					1	1				1				1			
425121	EPA:351.2	1672891	1672890	1					1	1				1				1			
425121	EPA:353.2	1673506	1673506	1					1					1	1			1			
425121	EPA:365.4	1672893	1672892	1					1	1				1				1			
425121	SM:A2340B	1678964	1678964	2																	
425121	SW-846:6010C	1672788	1672787	2					1	1				1				1			
425121	SW-846:6020	1672758	1672757	2					1	1				1				1			
425121	SW-846:6850	1675216	1675214	1					1	1	1			1							
425121	SW-846:8330B	1673460	1673459	1					1	1	1			1							
425121	SW-846:9060	1673634	1673634	1					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	CAWA-17-133347	1203822828	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAWA-17-133347	425121001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203822826	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-133347	1203810238	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAWA-17-133347	425121001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203811672	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-17-133347	1203810564	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAWA-17-133347	425121001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203810562	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203810561	MB	1	0	0	0
EPA:170.0	VOC	CAWA-17-133347	425121001	REG	1	0	0	0
EPA:170.0	VOC	CAWA-17-133348	425121002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAPA-17-133353	1203811031	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAPA-17-133353	1203811033	MS	0	0	1	0
EPA:245.2	INORGANIC	CAWA-17-133286	1203811032	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-133286	1203811034	MS	0	0	1	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:245.2	INORGANIC	CAWA-17-133347	425121001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAWA-17-133348	425121002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203811030	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203811029	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-17-133313	1203808702	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAWA-17-133347	425121001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203808701	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203808700	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-133347	1203810232	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-133347	1203810235	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAWA-17-133347	425121001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203810229	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-133298	1203808580	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-133298	1203808581	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAWA-17-133348	425121002	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203807672	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203807671	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-133315	1203808634	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-133315	1203808636	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	CAWA-17-133347	425121001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203808633	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203808632	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-133348	1203808654	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-133348	1203808656	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAWA-17-133348	425121002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203808653	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203808652	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-17-133312	1203810167	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAWA-17-133347	425121001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203810165	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	LCSD	1203810166	LCSD	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203810164	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-133315	1203808660	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-133315	1203808661	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAWA-17-133347	425121001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203808659	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203808658	MB	1	0	0	0
SM:A2340B	INORGANIC	CAWA-17-133347	425121001	REG	1	0	0	0
SM:A2340B	INORGANIC	CAWA-17-133348	425121002	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAWA-17-133314	1203808403	DUP	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	CAWA-17-133314	1203808404	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAWA-17-133347	425121001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAWA-17-133348	425121002	REG	16	0	0	0
SW-846:6010C	INORGANIC	LCS	1203808402	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203808401	MB	17	0	0	0
SW-846:6020	INORGANIC	CAWA-17-133314	1203808337	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAWA-17-133314	1203808338	MS	0	0	11	0
SW-846:6020	INORGANIC	CAWA-17-133347	425121001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAWA-17-133348	425121002	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203808336	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203808335	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-133326	1203814196	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-133326	1203814197	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAWA-17-133347	425121001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203814195	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203814194	MB	1	0	0	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-133348	1203810016	MS	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-133348	1203810017	MSD	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	CAWA-17-133348	425121002	REG	20	1	0	0
SW-846:8330B	LCMS/MS HIGH	LCS	1203810015	LCS	0	1	20	0
SW-846:8330B	LCMS/MS HIGH	MB	1203810014	MB	20	1	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-17-133284	1203812104	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-17-133305	1203812105	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAWA-17-133348	425121002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203812103	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	LCSD	1203812277	LCSD	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203812102	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	1203808335	METHOD BLANK	SW-846:6020	W	Molybdenum	0.231	J	ug/L	0.500
MB	1203808632	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0252	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-17-133347	1203808632	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0252	mg/L	0.096		0.050	Y	5	100	Y
CAWA-17-133347	1203808335	METHOD BLANK	SW-846:6020	Molybdenum	0.231	ug/L	0.679		0.500	Y	5	100	Y
CAWA-17-133348	1203808335	METHOD BLANK	SW-846:6020	Molybdenum	0.231	ug/L	0.655		0.500	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-17-133314	1203808404		SW-846:6010C	Barium	1672787	06-26-2017	W	141		125	75			
CAWA-17-133348	1203810016	1203810017	SW-846:8330B	2,4-Diamino-6-nitrotoluene	1673459	06-27-2017	W	95	66	121	50		36	30
CAWA-17-133348	1203810016	1203810017	SW-846:8330B	2,6-Diamino-4-nitrotoluene	1673459	06-27-2017	W	91	66	127	53		32	30
CAWA-17-133348	1203810016	1203810017	SW-846:8330B	Nitrotoluene[2-]	1673459	06-27-2017	W	84	49	119	56		52	30

DATA VALIDATION REPORT

Field Sample ID	MS Lab Sample ID	MSD Lab Sample ID	Analytical Method	Parameter Name	Analysis Lot ID	Analysis Date	Sample Matrix	MS Spike Recovery	MSD Spike Recovery	MS Upper Limit	MS Lower Limit	MS Reject Limit	RPD	RPD Limit
CAWA-17-133348	1203810016	1203810017	SW-846:8330B	Tris (o-cresyl) phosphate	1673459	06-27-2017	W	84	58	105	38		36	30

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

LCS Lab Sample	LCSD Lab	Analytical Method	Parameter Name	Lab Lot ID	Analysis	Sample Matrix	LCS Spike Recovery	LCSD Spike Recovery	Upper Limit	Lower Limit	Upper Rejection Limit	Lower Rejection Limit	RPD	RPD Limit
1203810015		SW-846:8330B	TATB	1673459	06-27-2017	W	151		135	47				

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

Field Sample ID	Lab Sample ID	LD Lab Sample ID	Analytical Method	Parameter Name	Sample Matrix	Lab Result	LD Lab Result	Lab Units	Detect Flag	LD Detect Flag	RPD	RPD Limit
CAWA-17-133348	425121002	1203808654	EPA:351.2	Total Kjeldahl	W	0.385	0.243	mg/L	Y	Y	45.2	20

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

DATA VALIDATION REPORT

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
Between E252 and Water at	2017-1689	CAWA-17-133347	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	I4	N	0.096	mg/L	0.096	mg/L			W	06/07/2017		1672879	VAL	Y
Between E252 and Water at	2017-1689	CAWA-17-133347	REG	INIT	INORGANIC	SW-846:6020	Molybdenum		U	I4	N	0.679	ug/L	0.679	ug/L			W	06/07/2017		1672758	VAL	Y
Between E252 and Water at	2017-1689	CAWA-17-133348	REG	INIT	INORGANIC	SW-846:6020	Molybdenum		U	I4	N	0.655	ug/L	0.655	ug/L			W	06/07/2017		1672758	VAL	Y
Between E252 and Water at	2017-1689	CAWA-17-133348	REG	INIT	GENERAL CHEMISTRY	EPA:351.2	Total Kjeldahl Nitrogen		U	I10b	Y	0.385	mg/L	0.385	mg/L			W	06/07/2017		1672891	VAL	Y

Reason Code

Description

I10b

The sample and/or the duplicate sample results RPD is not within the acceptance limits. Follow the external laboratory limits located within the associated data package

I4

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

J_LAB

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

NQ

The analytical laboratory did not qualify the analyte as not detected and/or any other standard 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-17-133347	Between E252 and Water	REG	EPA:120.1	0	1
CAWA-17-133347	Between E252 and Water	REG	EPA:150.1	0	1
CAWA-17-133347	Between E252 and Water	REG	EPA:160.1	0	1
CAWA-17-133347	Between E252 and Water	REG	EPA:170.0	0	1
CAWA-17-133347	Between E252 and Water	REG	EPA:245.2	0	1
CAWA-17-133347	Between E252 and Water	REG	EPA:300.0	0	4
CAWA-17-133347	Between E252 and Water	REG	EPA:310.1	0	2
CAWA-17-133347	Between E252 and Water	REG	EPA:350.1	0	1
CAWA-17-133347	Between E252 and Water	REG	EPA:353.2	0	1
CAWA-17-133347	Between E252 and Water	REG	EPA:365.4	0	1
CAWA-17-133347	Between E252 and Water	REG	SM:A2340B	0	1
CAWA-17-133347	Between E252 and Water	REG	SW-846:6010C	0	17
CAWA-17-133347	Between E252 and Water	REG	SW-846:6020	0	11

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-17-133347	Between E252 and Water	REG	SW-846:6850	0	1
CAWA-17-133348	Between E252 and Water	REG	EPA:170.0	0	1
CAWA-17-133348	Between E252 and Water	REG	EPA:245.2	0	1
CAWA-17-133348	Between E252 and Water	REG	EPA:335.4	0	1
CAWA-17-133348	Between E252 and Water	REG	EPA:351.2	0	1
CAWA-17-133348	Between E252 and Water	REG	SM:A2340B	0	1
CAWA-17-133348	Between E252 and Water	REG	SW-846:6010C	0	16
CAWA-17-133348	Between E252 and Water	REG	SW-846:6020	0	11
CAWA-17-133348	Between E252 and Water	REG	SW-846:8330B	0	20
CAWA-17-133348	Between E252 and Water	REG	SW-846:9060	0	1

DATA VALIDATION REPORT

Chain Of Custody No. 2017-1689 - Rev

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
425121	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
425121	SW-846:8330B	1673460	1673459	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-17-133348	425121002	REG	3	0	0	0
SW-846:8330B	LCMS/MS HIGH	MB	1203810014	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
-----------------	-------------	----------------	-------------------	-----------------------	---------------

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAWA-17-133348	Between E252 and Water	REG	SW-846:8330B	0	3

June 30, 2017

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

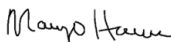
Re: LANL- WQH Water Samples
Work Order: 425121
SDG: 2017-1689

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on June 09, 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: 2017-1689
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 425121
SDG: 2017-1689

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 425121
SDG # : 2017-1689**

June 30, 2017

Laboratory Identification:

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

Summary

Sample receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on June 09, 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>
425121001	CAWA-17-133347
425121002	CAWA-17-133348

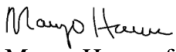
Case Narrative

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 for
Valerie Davis
Project Manager

List of current GEL Certifications as of 30 June 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

SAMPLE RECEIPT & REVIEW FORM

Client: <u>Esth</u>		SDG/AR/COC/Work Order: <u>425121</u>	
Received By: <u>ZKW</u>		Date Received: <u>6/9/17</u>	
Carrier and Tracking Number		Circle Applicable: FedEx <input checked="" type="radio"/> Express FedEx Ground UPS Field Services Courier Other	
		<u>5908 1782 1867</u> <u>5908 1782 1856</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <u>CPM</u> mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:	

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

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials ME/T Date 6/12/17 Page 1 of 1

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

SHIP DATE: 08JUN17
ACTWGT: 45.0 LB MAN
CAD: 0014176/CAFE2516

BILL SENDER

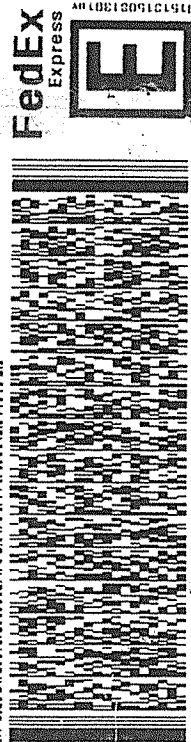
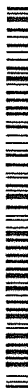
TO VALERIE DAVIS

GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BAGWE0



2 of 2

MPS# 5908 1782 1867

Mstr# 5908 1782 1856

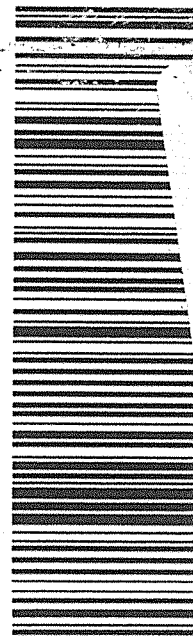
X7 RBWA

FRI - 09 JUN 10:30A
PRIORITY OVERNIGHT

0201

29407

SC-US CHS



RT 257 5 10:30 E

Part # 156148V-434 RIT2 06/15

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

SHIP DATE: 08JUN17
ACTWGT: 55.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

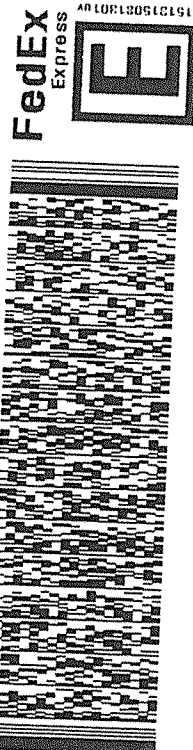
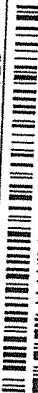
TO VALERIE DAVIS

GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BAGWE0



1 of 2

TRK# 5908 1782 1856

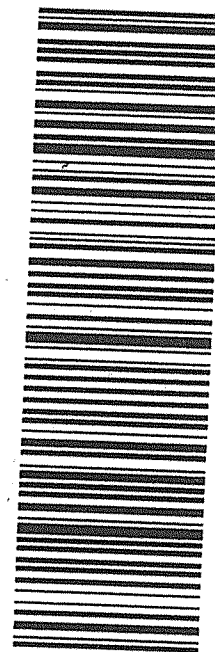
MASTER

X7 RBWA

FRI - 09 JUN 10:30A
PRIORITY OVERNIGHT

29407

SC-US CHS



Part # 156148V-434 RIT2 06/15

538C1/4502/329H

J151315081307 W

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 #: 2017-1689
Work Order #: 425121**

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:	1675216
Prep Batch Number:	1675214

Sample Analysis

Sample ID	Client ID
425121001	425121001 (CAWA-17-133347)
1203814204	Interference Check Sample (ICS)
1203814194	Method Blank (MB)
1203814195	Laboratory Control Sample (LCS)
1203814196	425115002(CAWA-17-133326) Matrix Spike (MS)
1203814197	425115002(CAWA-17-133326) 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 425115002 (CAWA-17-133326) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The recoveries of Perchlorate and Perchlorate-101 were not within the acceptance limits in 1203814196 (CAWA-17-133326MS) and 1203814197 (CAWA-17-133326MSD). This was due to the background concentration in the parent sample, 425115002 (CAWA-17-133326).

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: 2017-1689 GEL Work Order: 425121

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: 1675214Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133347Date Received: 09-JUN-17GEL Job No (SDG): 2017-1689GEL Sample ID: 425121001Date Filtered: 19-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	0.132	ug/L	J	1	19-JUN-17 19:21	per0619019a
	Perchlorate Isotope Ratio			2.88			1	19-JUN-17 19:21	per0619019a
14797-73-0	Perchlorate-101	.05	.2	0.134	ug/L	J	1	19-JUN-17 19:21	per0619019a
	Perchlorate-O(18)			0.422	ug/L		1	19-JUN-17 19:21	per0619019a

^ 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): 2017-1689

Extract Batch Code: 1675214

Date Filtered: 19-JUN-17

Matrix: WATER

Sample ID: 1203814195

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.197	ug/L	99		85 - 115
Perchlorate Isotope Ratio		3.04				-
Perchlorate-101	0.200	.189	ug/L	95		85 - 115
Perchlorate-O(18)		.439	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): 2017-1689

Extract Batch Code: 1675214

Date Extracted: 19-JUN-17

GEL MS/PS ID: 1203814196

Client ID: CAWA-17-133326

GEL MSD/PSD ID: 1203814197

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	1.05	ug/L	1.12	34 *	1.16	53 *	3	30	75 - 125
Perchlorate Isotope Ratio	0	2.92		2.78		2.83		2		-
Perchlorate-101	0.200	1.05	ug/L	1.17	61 *	1.19	71 *	2	30	75 - 125
Perchlorate-O(18)	0	0.410	ug/L	0.415		.423		2		-

^ 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: 1675214Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 19-JUN-17GEL Job No (SDG): 2017-1689GEL Sample ID: 1203814194Date Filtered: 19-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	19-JUN-17 18:15	per0619013a
	Perchlorate Isotope Ratio						1	19-JUN-17 18:15	per0619013a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	19-JUN-17 18:15	per0619013a
	Perchlorate-O(18)			0.475	ug/L		1	19-JUN-17 18:15	per0619013a

^ 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: 1675214Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 19-JUN-17GEL Job No (SDG): 2017-1689GEL Sample ID: 1203814195Date Filtered: 19-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	0.197	ug/L	J	1	19-JUN-17 18:26	per0619014a
	Perchlorate Isotope Ratio			3.04			1	19-JUN-17 18:26	per0619014a
14797-73-0	Perchlorate-101	.05	.2	0.189	ug/L	J	1	19-JUN-17 18:26	per0619014a
	Perchlorate-O(18)			0.439	ug/L		1	19-JUN-17 18:26	per0619014a

^ 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: 1675214Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-1689GEL Sample ID: 1203814204Date Filtered: 19-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	0.186	ug/L	J	1	19-JUN-17 18:37	per0619015a
	Perchlorate Isotope Ratio			2.58			1	19-JUN-17 18:37	per0619015a
14797-73-0	Perchlorate-101	.05	.2	0.210	ug/L		1	19-JUN-17 18:37	per0619015a
	Perchlorate-O(18)			0.432	ug/L		1	19-JUN-17 18:37	per0619015a

^ 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: 1675214Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133326MSDate Received: 09-JUN-17GEL Job No (SDG): 2017-1689GEL Sample ID: 1203814196Date Filtered: 19-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	1.12	ug/L		1	19-JUN-17 18:59	per0619017a
	Perchlorate Isotope Ratio			2.78			1	19-JUN-17 18:59	per0619017a
14797-73-0	Perchlorate-101	.05	.2	1.17	ug/L		1	19-JUN-17 18:59	per0619017a
	Perchlorate-O(18)			0.415	ug/L		1	19-JUN-17 18:59	per0619017a

^ 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: 1675214Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133326MSDDate Received: 09-JUN-17GEL Job No (SDG): 2017-1689GEL Sample ID: 1203814197Date Filtered: 19-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	1.16	ug/L		1	19-JUN-17 19:10	per0619018a
	Perchlorate Isotope Ratio			2.83			1	19-JUN-17 19:10	per0619018a
14797-73-0	Perchlorate-101	.05	.2	1.19	ug/L		1	19-JUN-17 19:10	per0619018a
	Perchlorate-O(18)			0.423	ug/L		1	19-JUN-17 19:10	per0619018a

^ 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 #: 2017-1689
Work Order #: 425121**

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: 1673460

Prep Batch Number: 1673459

Sample Analysis

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

Sample ID	Client ID
425121002	CAWA-17-133348
1203810014	Method Blank (MB)
1203810015	Laboratory Control Sample (LCS)
1203810016	425121002(CAWA-17-133348) Matrix Spike (MS)
1203810017	425121002(CAWA-17-133348) Matrix Spike Duplicate (MSD)

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-068 REV# 7.

Calibration Information

Initial Calibration

All initial calibration requirements for this analysis have been met for this SDG.

Calibration Verification Standard Requirements

All continuing calibration verification standards (CCV) have not met requirements of 80-120% for 425121002 (CAWA-17-133348) in this SDG. Please refer to Form 7 of the data package for a list of recoveries. A LLOQ level standard was analyzed following the biased low CCV with all target analytes meeting acceptance limits. Since the target analyte was not detected in the associated samples, the data are reported. All continuing calibration verification standards (CCV) have not met requirements of 80-120% for 425121002 (CAWA-17-133348) 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, both the MS and MSD met acceptance limits. Since the analyte was/were not detected in the associated samples, the data are reported.

Sample	Analyte	Value
1203810015 (LCS)	TATB	151* (47%-135%)

QC Sample Designation

Client sample 425121002 (CAWA-17-133348) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

One or more of the required spiking analytes were not within the acceptance limits in the matrix spike duplicate (MSD). While the MSD exhibited a high bias, both the LCS and MS met acceptance limits for (insert compound name). Since (insert compound name) was not detected in the associated samples, the data are reported.

Sample	Analyte	Value
1203810017 (CAWA-17-133348MSD)	o-Nitrotoluene	49* (56%-119%)

MS/MSD Relative Percent Difference (RPD) Statement

The RPD values between the MS and MSD (See Below) were not within the acceptance limits. Since all other RPD values met acceptance criteria, the noted exceptions are attributed to vagaries in the extraction process. The data are reported.

Sample	Analyte	Value
1203810016MS and 1203810017MSD (CAWA-17-133348)	2,4-Diamino-6-nitrotoluene	36* (0%-30%)
	2,6-Diamino-4-nitrotoluene	32* (0%-30%)

	o-Nitrotoluene	52* (0%-30%)
	tris(o-cresyl) phosphate	36* (0%-30%)

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) 1647079 was generated for samples 1203810015 (LCS) and 1203810017 (CAWA-17-133348MSD) 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: 2017-1689 GEL Work Order: 425121

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: 01 JUL 2017

Title: Group Leader

Sample Data Summary

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133348

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 425121002

Sample Amount 870 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0625037.wiff

Date Analyzed: 27-JUN-17 12:57

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.287	U	0.092	0.287
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.287	U	0.092	0.287
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.287	U	0.092	0.287
<i>121-82-4</i>	<i>RDX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.287	U	0.092	0.287
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.287	U	0.092	0.287
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.287	U	0.092	0.287
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	.287	U	0.092	0.287
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
88-72-2	o-Nitrotoluene	.287	U	0.0943	0.287
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
98-95-3	Nitrobenzene	.287	U	0.092	0.287
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.287	U	0.092	0.287
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	.287	U	0.092	0.287
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-65-0	m-Dinitrobenzene	.287	U	0.092	0.287
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
479-45-8	Tetryl	.575	U	0.092	0.575
<i>479-45-8</i>	<i>Tetryl</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133348

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 425121002

Sample Amount 870 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-11-5	PETN	.575	U	0.115	0.575
<i>78-11-5</i>	<i>PETN</i>				
99-99-0	p-Nitrotoluene	.575	U	0.172	0.575
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
3058-38-6	TATB	1.15	U	0.345	1.15
<i>3058-38-6</i>	<i>TATB</i>				
618-87-1	3,5-Dinitroaniline	1.15	U	0.345	1.15
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
78-30-8	tris(o-cresyl) phosphate	1.15	U	0.345	1.15
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	2.87	U	0.575	2.87
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	2.87	U	0.575	2.87
<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):** 2017-1689**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20), 250 x
4.60 mm ID

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
425121002	CAWA-17-133348	89	55 - 115	
1203810014	MB for batch 1673459	92	55 - 115	
1203810015	LCS for batch 1673459	90	55 - 115	
1203810016	CAWA-17-133348MS	93	55 - 115	
1203810017	CAWA-17-133348MSD	99	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) 2017-1689

Extract Batch Code: 1673459

Date Extracted: 13-JUN-17

GEL LCS ID: 1203810015

GEL LCSDUP ID: .

Analysis Date/Time: 27-JUN-17 11:49

DUP Analysis Date/Time:

Reporting Units: ug/L

QC Type: LCS/LCSD

Compound	Spike Added	LCS Conc	LCS Rec #	LCSD Conc	LCSD Rec #	RPD #	RPD	Recovery Limits
2,4,6-Trinitrotoluene	5	4.29	86					69 - 113
2,4-Diamino-6-nitrotoluene	5	4.23	85					50 - 121
2,4-Dinitrotoluene	5	4.19	84					71 - 110
2,6-Diamino-4-nitrotoluene	5	4.87	97					53 - 127
2,6-Dinitrotoluene	5	3.9	78					72 - 105
2-Amino-4,6-dinitrotoluene	5	4	80					70 - 112
3,5-Dinitroaniline	5	4.88	98					70 - 121
4-Amino-2,6-dinitrotoluene	5	4.24	85					74 - 116
HMX	5	4.7	94					58 - 113
Nitrobenzene	5	5.33	107					64 - 115
PETN	5	4.65	93					57 - 126
RDX	5	4.68	94					64 - 117
1,3,5-Trinitrobenzene	5	4.67	93					70 - 110
TATB	2.5	3.79	151 *					47 - 135
Tetryl	5	3.62	72					64 - 122
m-Dinitrobenzene	5	4.76	95					74 - 117
m-Nitrotoluene	5	3.91	78					66 - 114
o-Nitrotoluene	5	3.34	67					64 - 115
p-Nitrotoluene	5	3.47	69					66 - 127
tris(o-cresyl) phosphate	5	3.47	69					43 - 104

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

* Values outside of QC limits

3
High Explosives MS/MSD Summary

Lab Name: GEL Laboratories LLC

Client ID: CAWA-17-133348

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Extract Batch Code: 1673459

Date Extracted: 13-JUN-17

GEL Spike ID: 1203810016

GEL SpikeDup ID: 1203810017

Analysis Date/Time: 27-JUN-17 15:48

MSD Analysis Date/Time: 27-JUN-17 14:05

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	5.2356	0	4.41	84	3.05	58	36 *	30	38 - 105
1,3,5-Trinitrobenzene	5.2356	0	4.23	81	4.32	83	2	30	67 - 111
2,4,6-Trinitrotoluene	5.2356	0	4.65	89	4.79	92	3	30	66 - 112
2,4-Diamino-6-nitrotoluene	5.2356	0	4.95	95	3.44	66	36 *	30	50 - 121
2,4-Dinitrotoluene	5.2356	0	4.97	95	5.02	96	1	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.2356	0	4.77	91	3.45	66	32 *	30	53 - 127
2,6-Dinitrotoluene	5.2356	0	4.66	89	4.79	91	3	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.2356	.0423	4.56	86	4.66	88	2	30	67 - 115
3,5-Dinitroaniline	5.2356	0	5.57	106	5.83	111	5	30	70 - 121
4-Amino-2,6-dinitrotoluene	5.2356	.043	5.08	96	4.29	81	17	30	65 - 120
HMX	5.2356	.0897	5.31	100	6.14	116	14	30	44 - 128
Nitrobenzene	5.2356	0	4.27	82	3.53	67	19	30	62 - 116
PETN	5.2356	0	5.01	96	4.54	87	10	30	51 - 131
RDX	5.2356	.0206	5.58	106	5.39	102	3	30	57 - 125
TATB	2.6178	0	3.46	132	3.22	123	7	30	38 - 149
Tetryl	5.2356	0	3.6	69	3.05	58	17	30	50 - 126
m-Dinitrobenzene	5.2356	0	5.19	99	5.38	103	3	30	74 - 117
m-Nitrotoluene	5.2356	0	4.88	93	4.97	95	2	30	59 - 120
o-Nitrotoluene	5.2356	.00667	4.41	84	2.58	49 *	52 *	30	56 - 119
p-Nitrotoluene	5.2356	0	4.42	84	4.53	87	3	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 1673459

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810014

Sample Amount 1000 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0625034.wiff

Date Analyzed: 27-JUN-17 11:15

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 1673459

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810014

Sample Amount 1000 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-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 1673459

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810015

Sample Amount 1000 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0625035.wiff

Date Analyzed: 27-JUN-17 11:49

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
88-72-2	o-Nitrotoluene	3.34		0.082	0.250
88-72-2	<i>o-Nitrotoluene</i>				
78-30-8	tris(o-cresyl) phosphate	3.47		0.300	1.00
78-30-8	<i>tris(o-cresyl) phosphate</i>				
99-99-0	p-Nitrotoluene	3.47		0.150	0.500
99-99-0	<i>p-Nitrotoluene</i>				
479-45-8	Tetryl	3.62		0.080	0.500
479-45-8	<i>Tetryl</i>				
3058-38-6	TATB	3.79		0.300	1.00
3058-38-6	<i>TATB</i>				
606-20-2	2,6-Dinitrotoluene	3.9		0.080	0.250
606-20-2	<i>2,6-Dinitrotoluene</i>				
99-08-1	m-Nitrotoluene	3.91		0.080	0.250
99-08-1	<i>m-Nitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4		0.080	0.250
35572-78-2	<i>2-Amino-4,6-dinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	4.19		0.080	0.250
121-14-2	<i>2,4-Dinitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	4.23		0.500	2.50
6629-29-4	<i>2,4-Diamino-6-nitrotoluene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.24		0.080	0.250
19406-51-0	<i>4-Amino-2,6-dinitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	4.29		0.080	0.250
118-96-7	<i>2,4,6-Trinitrotoluene</i>				
78-11-5	PETN	4.65		0.100	0.500
78-11-5	<i>PETN</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1673459

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810015

Sample Amount 1000 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-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	4.67		0.080	0.250
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
121-82-4	RDX	4.68		0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
2691-41-0	HMX	4.7		0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
99-65-0	m-Dinitrobenzene	4.76		0.080	0.250
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.87		0.500	2.50
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
618-87-1	3,5-Dinitroaniline	4.88		0.300	1.00
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
98-95-3	Nitrobenzene	5.33		0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133348(425121002MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810016

Sample Amount 955 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0625042.wiff

Date Analyzed: 27-JUN-17 15:48

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
3058-38-6	TATB	3.46		0.314	1.05
<i>3058-38-6</i>	<i>TATB</i>				
479-45-8	Tetryl	3.6		0.0838	0.524
<i>479-45-8</i>	<i>Tetryl</i>				
99-35-4	1,3,5-Trinitrobenzene	4.23		0.0838	0.262
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
98-95-3	Nitrobenzene	4.27		0.0838	0.262
<i>98-95-3</i>	<i>Nitrobenzene</i>				
78-30-8	tris(o-cresyl) phosphate	4.41		0.314	1.05
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
88-72-2	o-Nitrotoluene	4.41		0.0859	0.262
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
99-99-0	p-Nitrotoluene	4.42		0.157	0.524
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.56		0.0838	0.262
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	4.65		0.0838	0.262
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	4.66		0.0838	0.262
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.77		0.524	2.62
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
99-08-1	m-Nitrotoluene	4.88		0.0838	0.262
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	4.95		0.524	2.62
<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-17-133348(425121002MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810016

Sample Amount 955 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
121-14-2	2,4-Dinitrotoluene	4.97		0.0838	0.262
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
78-11-5	PETN	5.01		0.105	0.524
<i>78-11-5</i>	<i>PETN</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	5.08		0.0838	0.262
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.19		0.0838	0.262
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
2691-41-0	HMX	5.31		0.0838	0.262
<i>2691-41-0</i>	<i>HMX</i>				
618-87-1	3,5-Dinitroaniline	5.57		0.314	1.05
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
121-82-4	RDX	5.58		0.0838	0.262
<i>121-82-4</i>	<i>RDX</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133348(425121002MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810017

Sample Amount 955 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0625039.wiff

Date Analyzed: 27-JUN-17 14:05

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
88-72-2	o-Nitrotoluene	2.58		0.0859	0.262
88-72-2	<i>o-Nitrotoluene</i>				
479-45-8	Tetryl	3.05		0.0838	0.524
479-45-8	<i>Tetryl</i>				
78-30-8	tris(o-cresyl) phosphate	3.05		0.314	1.05
78-30-8	<i>tris(o-cresyl) phosphate</i>				
3058-38-6	TATB	3.22		0.314	1.05
3058-38-6	<i>TATB</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	3.44		0.524	2.62
6629-29-4	<i>2,4-Diamino-6-nitrotoluene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	3.45		0.524	2.62
59229-75-3	<i>2,6-Diamino-4-nitrotoluene</i>				
98-95-3	Nitrobenzene	3.53		0.0838	0.262
98-95-3	<i>Nitrobenzene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.29		0.0838	0.262
19406-51-0	<i>4-Amino-2,6-dinitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	4.32		0.0838	0.262
99-35-4	<i>1,3,5-Trinitrobenzene</i>				
99-99-0	p-Nitrotoluene	4.53		0.157	0.524
99-99-0	<i>p-Nitrotoluene</i>				
78-11-5	PETN	4.54		0.105	0.524
78-11-5	<i>PETN</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.66		0.0838	0.262
35572-78-2	<i>2-Amino-4,6-dinitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	4.79		0.0838	0.262
118-96-7	<i>2,4,6-Trinitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133348(425121002MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810017

Sample Amount 955 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
606-20-2	2,6-Dinitrotoluene	4.79		0.0838	0.262
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
99-08-1	m-Nitrotoluene	4.97		0.0838	0.262
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	5.02		0.0838	0.262
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.38		0.0838	0.262
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
121-82-4	RDX	5.39		0.0838	0.262
<i>121-82-4</i>	<i>RDX</i>				
618-87-1	3,5-Dinitroaniline	5.83		0.314	1.05
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
2691-41-0	HMX	6.14		0.0838	0.262
<i>2691-41-0</i>	<i>HMX</i>				

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-1689Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 26-JUN-17 16:29GEL Data File: EXP0625001.wiffInstrument ID: LCMSMS7Column: Ultracarb Phenomenex 5u ODS (20), 250 x 4.60 mm ID

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	.69
p-Nitrotoluene	0	0

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-1689Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 26-JUN-17 17:03GEL Data File: EXP0625002.wiffInstrument ID: LCMSMS7Column: Ultracarb Phenomenex 5u ODS (20), 250 x
4.60 mm ID

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
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	1.41
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK02

Analysis Date: 26-JUN-17 21:36

GEL Data File: EXP0625010.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20), 250 x 4.60 mm ID

Compound	True	Found (ug/L)
m-Dinitrobenzene	0	1.4
m-Nitrotoluene	0	0
o-Nitrotoluene	0	1.58
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	1.48
tris(o-cresyl) phosphate	0	6.15
TATB	0	1.57
3,5-Dinitroaniline	0	1.82
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	1.65
DNX	0	2.65
MXN	0	2.03
TNX	0	2.15
1,3,5-Trinitrobenzene	0	1.85
2,4,6-Trinitrotoluene	0	1.65
2,4-Dinitrotoluene	0	1.35
2,6-Dinitrotoluene	0	1.18
2-Amino-4,6-dinitrotoluene	0	1.51
4-Amino-2,6-dinitrotoluene	0	1.49
HMX	0	2.19
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	2.17
RDX	0	2.09
Tetryl	0	1.99

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK03

Analysis Date: 26-JUN-17 23:52

GEL Data File: EXP0625014.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20), 250 x
4.60 mm ID

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	6.41
TATB	0	0
3,5-Dinitroaniline	0	1.36
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	1.77
MNX	0	1.47
TNX	0	1.56
1,3,5-Trinitrobenzene	0	1.24
2,4,6-Trinitrotoluene	0	1.29
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	1.27
4-Amino-2,6-dinitrotoluene	0	1.32
HMX	0	1.93
Nitrobenzene	0	0
Nitroglycerin	0	2.25
PETN	0	1.68
RDX	0	1.77
Tetryl	0	1.43
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	.62
p-Nitrotoluene	0	5

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK04

Analysis Date: 27-JUN-17 02:09

GEL Data File: EXP0625018.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20), 250 x 4.60 mm ID

Compound	True	Found (ug/L)
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	1.36
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK05

Analysis Date: 27-JUN-17 03:17

GEL Data File: EXP0625020.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20), 250 x
4.60 mm ID

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	5.22
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	3.68

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK06

Analysis Date: 27-JUN-17 03:51

GEL Data File: EXP0625021.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20), 250 x 4.60 mm ID

Compound	True	Found (ug/L)
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	1.71
p-Nitrotoluene	0	0
2,4-Dinitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK07

Analysis Date: 27-JUN-17 08:58

GEL Data File: EXP0625030.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20), 250 x
4.60 mm ID

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	1.31
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
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): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK08

Analysis Date: 27-JUN-17 09:33

GEL Data File: EXP0625031.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20), 250 x
4.60 mm ID

Compound	True	Found (ug/L)
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	1.14
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK09

Analysis Date: 27-JUN-17 10:41

GEL Data File: EXP0625033.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20), 250 x
4.60 mm ID

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	5.75
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	.92
p-Nitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK10

Analysis Date: 27-JUN-17 16:56

GEL Data File: EXP0625044.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20), 250 x
4.60 mm ID

Compound	True	Found (ug/L)
tris(o-cresyl) phosphate	0	5.28
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	.39
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 29-JUN-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: 1673460	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 425079(2017-1664),425121(2017-1689) Application Issues: Failed Recovery for MS/MSD, or PS/PSD Failed RPD for MS/MSD, or PS/PSD Failed Recovery for LCS/LCSD			
Specification and Requirements		DER Disposition:	
Exception Description:			
<p>1. The RPD values between the MS and MSD (See Below) were not within the acceptance limits. 1203810016MS and 1203810017MSD (CAWA-17-133348) recovered 2,4-Diamino-6-nitrotoluene at 36% (0%-30%), 2,6-Diamino-4-nitrotoluene at 32% (0%-30%), o-Nitrotoluene at 52% (0%-30%) and tris(o-cresyl) phosphate at 36% (0%-30%).</p> <p>2. One or more of the required spiking analytes were not within the acceptance limits in the laboratory control sample (See Below). 1203810015 (LCS) recovered TATB at 151% (47%-135%).</p> <p>3. One or more of the required spiking analytes were not within the acceptance limits in the matrix spike duplicate (MSD). 1203810017 (CAWA-17-133348MSD) recovered o-Nitrotoluene at 49% (56%-119%).</p>		<p>1. Since all other RPD values met acceptance criteria, the noted exceptions are attributed to vagaries in the extraction process. The data are reported.</p> <p>2. While the LCS exhibited a high bias, both the MS and MSD met acceptance limits. Since TATB was not detected in the associated samples, the data are reported.</p> <p>3. While the MSD exhibited a low bias, both the LCS and MS met acceptance limits for o-Nitrotoluene. Since o-Nitrotoluene was not detected in the associated samples, the data are reported.</p>	

Originator's Name:

Jannie Shaw-Busby 29-JUN-17

Data Validator/Group Leader:

Michael Penny 30-JUN-17

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-1689
Work Order #: 425121

Sample ID	Client ID
425121001	CAWA-17-133347
425121002	CAWA-17-133348
1203808401	Method Blank (MB) ICP
1203808402	Laboratory Control Sample (LCS)
1203808405	425079002(CAWA-17-133314L) Serial Dilution (SD)
1203808403	425079002(CAWA-17-133314D) Sample Duplicate (DUP)
1203808404	425079002(CAWA-17-133314S) Matrix Spike (MS)
1203808335	Method Blank (MB) ICP-MS
1203808336	Laboratory Control Sample (LCS)
1203808339	425079002(CAWA-17-133314L) Serial Dilution (SD)
1203808337	425079002(CAWA-17-133314D) Sample Duplicate (DUP)
1203808338	425079002(CAWA-17-133314S) Matrix Spike (MS)
1203811029	Method Blank (MB) CVAA
1203811030	Laboratory Control Sample (LCS)
1203811036	425079001(CAWA-17-133286L) Serial Dilution (SD)
1203811032	425079001(CAWA-17-133286D) Sample Duplicate (DUP)
1203811034	425079001(CAWA-17-133286S) Matrix Spike (MS)

Sample Analysis

Samples 425121001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1672788, 1672758, 1673857 and 1678964
Prep Batch :	1672787, 1672757 and 1673856
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 PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

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

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

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

The CRDL/PQL standard recoveries met the referenced advisory control limits.

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: 425079002 (CAWA-17-133314)-ICP and ICP-MS, 424741001 (CAPA-17-133353) and 425079001 (CAWA-17-133286)-CVAA.

Matrix Spike (MS/MSD) Recovery Statement

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

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20%

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

Serial Dilution % Difference Statement

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

Sample	Analyte	Value
1203808405 (CAWA-17-133314SDILT)	Potassium	11.9 *(0%-10%)

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Data Exception (DER) Documentation

A Data exception report (DER) was generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) 1646571 was generated for sample 1203808405 (CAWA-17-133314SDILT) in this SDG/batch.

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: 2017-1689 GEL Work Order: 425121

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- E %difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Review/Validation

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

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

Signature:



Name: Nik-Cole Elmore

Date: 03 JUL 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1689**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 425121001**BASIS:** As Received**DATE COLLECTED** 07-JUN-17**CLIENT ID:** CAWA-17-133347**LEVEL:** Low**DATE RECEIVED** 09-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	06/15/17 12:18	061517W1-3	1673857

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1689

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 425121001

BASIS: As Received

DATE COLLECTED 07-JUN-17

CLIENT ID: CAWA-17-133347

LEVEL: Low

DATE RECEIVED 09-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	341	ug/L		68	200	200	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-38-2	Arsenic	5	ug/L	U	2	5	5	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-39-3	Barium	79.4	ug/L		1	5	5	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-70-2	Calcium	15900	ug/L		50	200	200	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-47-3	Chromium	10	ug/L	U	3	10	10	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7439-89-6	Iron	179	ug/L		30	100	100	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7439-95-4	Magnesium	4380	ug/L		110	300	300	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7439-96-5	Manganese	6.3	ug/L	J	2	10	10	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7439-98-7	Molybdenum	0.679	ug/L		0.2	0.5	0.5	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-02-0	Nickel	2	ug/L	U	0.6	2	2	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-09-7	Potassium	4020	ug/L		50	150	150	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7631-86-9	Silica	40900	ug/L		53	213	213	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-23-5	Sodium	12600	ug/L		100	300	300	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-24-6	Strontium	106	ug/L		1	5	5	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-61-1	Uranium	0.20	ug/L	U	0.067	0.2	0.2	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-62-2	Vanadium	2.42	ug/L	J	1	5	5	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	JWJ	06/26/17 16:34	062617-1	1672788

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1689**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 425121001**BASIS:** As Received**DATE COLLECTED** 07-JUN-17**CLIENT ID:** CAWA-17-133347**LEVEL:** Low**DATE RECEIVED** 09-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	57.8	mg/L		0.453	1.24	1.24	1		TXT1	06/30/17 14:46		1678964

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1672758	1672757	SW846 3005A	50	mL	50	mL	06/19/17	CXW4
1672788	1672787	SW846 3005A	50	mL	50	mL	06/19/17	CXW4
1673857	1673856	EPA 245.1/245.2 Prep	20	mL	20	mL	06/14/17	AXS5

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1689**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 425121002**BASIS:** As Received**DATE COLLECTED** 07-JUN-17**CLIENT ID:** CAWA-17-133348**LEVEL:** Low**DATE RECEIVED** 09-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	06/15/17 12:20	061517W1-3	1673857

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1689

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 425121002

BASIS: As Received

DATE COLLECTED 07-JUN-17

CLIENT ID: CAWA-17-133348

LEVEL: Low

DATE RECEIVED 09-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	614	ug/L		68	200	200	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-38-2	Arsenic	2.13	ug/L	J	2	5	5	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-39-3	Barium	85.2	ug/L		1	5	5	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-70-2	Calcium	16500	ug/L		50	200	200	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-47-3	Chromium	10	ug/L	U	3	10	10	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7439-89-6	Iron	347	ug/L		30	100	100	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7439-95-4	Magnesium	4530	ug/L		110	300	300	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7439-96-5	Manganese	11.7	ug/L		2	10	10	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7439-98-7	Molybdenum	0.655	ug/L		0.2	0.5	0.5	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-02-0	Nickel	2	ug/L	U	0.6	2	2	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-09-7	Potassium	4140	ug/L		50	150	150	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-23-5	Sodium	12900	ug/L		100	300	300	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-24-6	Strontium	110	ug/L		1	5	5	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-61-1	Uranium	0.20	ug/L	U	0.067	0.2	0.2	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-62-2	Vanadium	3.84	ug/L	J	1	5	5	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	JWJ	06/26/17 16:37	062617-1	1672788

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1689**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 425121002**BASIS:** As Received**DATE COLLECTED** 07-JUN-17**CLIENT ID:** CAWA-17-133348**LEVEL:** Low**DATE RECEIVED** 09-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	59.9	mg/L		0.453	1.24	1.24	1		TXT1	06/30/17 14:46		1678964

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1672758	1672757	SW846 3005A	50	mL	50	mL	06/19/17	CXW4
1672788	1672787	SW846 3005A	50	mL	50	mL	06/19/17	CXW4
1673857	1673856	EPA 245.1/245.2 Prep	20	mL	20	mL	06/14/17	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. 2017-1689

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>
1203808335	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
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Molybdenum	0.231	ug/L	+/-0.5	J	MS	0.2	0.5
	Chromium	3	ug/L	+/-10	U	MS	3	10
1203808401	Aluminum	68	ug/L	+/-200	U	P	68	200
	Boron	15	ug/L	+/-50	U	P	15	50
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Iron	30	ug/L	+/-100	U	P	30	100
	Manganese	2	ug/L	+/-10	U	P	2	10
	Silica	53	ug/L	+/-213	U	P	53	213
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Strontium	1	ug/L	+/-5	U	P	1	5
	Sodium	100	ug/L	+/-300	U	P	100	300
	Potassium	50	ug/L	+/-150	U	P	50	150
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Copper	3	ug/L	+/-10	U	P	3	10
	Calcium	50	ug/L	+/-200	U	P	50	200
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Barium	1	ug/L	+/-5	U	P	1	5
1203811029	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. 2017-1689 Client ID CAWA-17-133314S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 425079002 Spike ID: 1203808338

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Uranium	ug/L	75-125	48.9		0.067	U	50	97.8		MS
Antimony	ug/L	75-125	48.9		1	U	50	97.1		MS
Arsenic	ug/L	75-125	51.7		2.18	J	50	99.1		MS
Cadmium	ug/L	75-125	49.1		0.3	U	50	98.2		MS
Chromium	ug/L	75-125	50.1		3	U	50	99.4		MS
Lead	ug/L	75-125	48.7		0.5	U	50	97.4		MS
Molybdenum	ug/L	75-125	51.7		0.67		50	102		MS
Nickel	ug/L	75-125	52.9		1.37	J	50	103		MS
Selenium	ug/L	75-125	47.4		2	U	50	94.5		MS
Silver	ug/L	75-125	51.1		0.3	U	50	102		MS
Thallium	ug/L	75-125	47.2		0.6	U	50	94.3		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-1689 Client ID: CAWA-17-133314S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 425079002 Spike ID: 1203808404

<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	5110		73.3	J	5000	101		P
Barium	ug/L		7510		6810		500	141	N/A	P
Beryllium	ug/L	75-125	508		1	U	500	102		P
Boron	ug/L	75-125	538		30.2	J	500	102		P
Calcium	ug/L		26700		21600		5000	102	N/A	P
Cobalt	ug/L	75-125	511		5.85		500	101		P
Copper	ug/L	75-125	514		3	U	500	103		P
Iron	ug/L	75-125	6010		939		5000	101		P
Magnesium	ug/L	75-125	10600		5460		5000	102		P
Manganese	ug/L	75-125	741		238		500	101		P
Potassium	ug/L	75-125	8210		3150		5000	101		P
Silica	ug/L		58900		46600		10700	115	N/A	P
Sodium	ug/L	75-125	23100		17600		5000	110		P
Strontium	ug/L	75-125	685		193		500	98.4		P
Tin	ug/L	75-125	505		2.5	U	500	101		P
Vanadium	ug/L	75-125	515		1.94	J	500	103		P
Zinc	ug/L	75-125	482		3.3	U	500	96.4		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-1689 **Client ID:** CAWA-17-133286S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 425079001 **Spike ID:** 1203811034

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	2.06		0.067	U	2	103		AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-5a-

Spike Summary

SDG NO. 2017-1689 **Client ID:** CAPA-17-133353PS**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 424741001 **Spike ID:** 1203811037

<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>
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*Analytical Methods:

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1689

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-133314D

Matrix: WATER

Level: Low

Sample ID: 425079002

Duplicate ID: 1203808337

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		2.18 J		2 U		200		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L		3 U		3 U				MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	0.67		0.643		4.11		MS
Nickel	ug/L	+/- 2	1.37 J		1.23 J		10.5		MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.3 U		0.3 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L		0.067 U		0.067 U				MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1689

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-133314D

Matrix: WATER

Level: Low

Sample ID: 425079002

Duplicate ID: 1203808403

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L	+/-200	73.3 J		82.8 J		12.1		P
Barium	ug/L	+/-20%	6810		6960		2.24		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	30.2 J		32.2 J		6.45		P
Calcium	ug/L	+/-20%	21600		22200		2.37		P
Cobalt	ug/L	+/-5	5.85		5.72		2.24		P
Copper	ug/L		3 U		3 U				P
Iron	ug/L	+/-20%	939		969		3.14		P
Magnesium	ug/L	+/-20%	5460		5580		2.24		P
Manganese	ug/L	+/-20%	238		244		2.2		P
Potassium	ug/L	+/-20%	3150		3300		4.54		P
Silica	ug/L	+/-20%	46600		47500		1.83		P
Sodium	ug/L	+/-20%	17600		18100		2.57		P
Strontium	ug/L	+/-20%	193		198		2.74		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	1.94 J		1.22 J		45.3		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1689**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAWA-17-133286D**Matrix:** WATER**Level:** Low**Sample ID:** 425079001**Duplicate ID:** 1203811032**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. 2017-1689

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>
1203808336								
	Antimony	ug/L	50	50.1		100	80-120	MS
	Arsenic	ug/L	50	50.7		101	80-120	MS
	Cadmium	ug/L	50	51		102	80-120	MS
	Chromium	ug/L	50	51.7		103	80-120	MS
	Lead	ug/L	50	49.2		98.4	80-120	MS
	Molybdenum	ug/L	50	50.9		102	80-120	MS
	Nickel	ug/L	50	51.4		103	80-120	MS
	Selenium	ug/L	50	49.4		98.7	80-120	MS
	Silver	ug/L	50	51.5		103	80-120	MS
	Thallium	ug/L	50	47.7		95.4	80-120	MS
	Uranium	ug/L	50	47.5		95.1	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-1689

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>
1203808402								
	Aluminum	ug/L	5000	5160		103	80-120	P
	Barium	ug/L	500	505		101	80-120	P
	Beryllium	ug/L	500	500		100	80-120	P
	Boron	ug/L	500	493		98.5	80-120	P
	Calcium	ug/L	5000	5140		103	80-120	P
	Cobalt	ug/L	500	514		103	80-120	P
	Copper	ug/L	500	506		101	80-120	P
	Iron	ug/L	5000	5110		102	80-120	P
	Magnesium	ug/L	5000	5210		104	80-120	P
	Manganese	ug/L	500	504		101	80-120	P
	Potassium	ug/L	5000	5250		105	80-120	P
	Silica	ug/L	10700	10500		98.3	80-120	P
	Sodium	ug/L	5000	5250		105	80-120	P
	Strontium	ug/L	500	501		100	80-120	P
	Tin	ug/L	500	509		102	80-120	P
	Vanadium	ug/L	500	507		101	80-120	P
	Zinc	ug/L	500	486		97.2	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 2017-1689

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>
1203811030	Mercury	ug/L	2	2.08		104	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1689

Client ID: CAWA-17-133314L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 425079002

Serial Dilution ID: 1203808339

<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	2.18	J	10	U	13.183			MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	.67		1	U	14.925			MS
Nickel	1.37	J	3	U	4.745			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.067	U	.335	U				MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1689 **Client ID:** CAWA-17-133314L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 425079002 **Serial Dilution ID:** 1203808405

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	73.3	J	340	U	64.951			P
Barium	6810		7110		4.451		10	P
Beryllium	1	U	5	U				P
Boron	30.2	J	75	U	5.654			P
Calcium	21600		21300		1.585		10	P
Cobalt	5.85		5.27	J	9.82			P
Copper	3	U	15	U				P
Iron	939		920		1.99			P
Magnesium	5460		5570		2.107			P
Manganese	238		250		4.632		10	P
Potassium	3150		3530		11.944	E	10	P
Silica	46600		47100		1.064		10	P
Sodium	17600		18400		4.126		10	P
Strontium	193		195		.969		10	P
Tin	2.5	U	12.5	U				P
Vanadium	1.94	J	5	U	38.072			P
Zinc	3.3	U	16.5	U				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1689 **Client ID:** CAWA-17-133286L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 425079001 **Serial Dilution ID:** 1203811036

<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

Miscellaneous

DATA EXCEPTION REPORT			
Mo.Day Yr. 27-JUN-17	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3005A/6010C	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1672788	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 425075(2017-1667),425079(2017-1664),425115(2017-1690),425121(2017-1689) Application Issues: Failed difference for SDILT			
Specification and Requirements Exception Description:		DER Disposition:	
1. Failed difference for SDILT: QC 1203808405SDILT		1. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified. 1203808405 (CAWA-17-133314SDILT) Potassium [11.9 *(0%-10%)].	

Originator's Name:
Jerry Wigfall 27-JUN-17

Data Validator/Group Leader:
Helen Camello 28-JUN-17

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-1689
Work Order #: 425121**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1673634

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
425121002	CAWA-17-133348
1203812102	Method Blank (MB)
1203812103	Laboratory Control Sample (LCS)
1203812277	Laboratory Control Sample Duplicate (LCSD)
1203812105	425300003(CAWA-17-133305) Sample Duplicate (DUP)
1203812107	425300003(CAWA-17-133305) 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.

LCS/LCSD Relative Percent Difference (RPD) Statement

The RPD between the LCS and LCSD met the acceptance limits.

Quality Control (QC) Designation

Sample 425300003 (CAWA-17-133305) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Cyanide and Total		
Analytical Batch:	1672526	Method:	WSP-CN(T)
Prep Batch :	1672525	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
425121002	CAWA-17-133348
1203807671	Method Blank (MB)
1203807672	Laboratory Control Sample (LCS)
1203808580	425115001(CAWA-17-133298) Sample Duplicate (DUP)
1203808581	425115001(CAWA-17-133298) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 425115001 (CAWA-17-133298) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1672927

Method: WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
425121001	CAWA-17-133347
1203808700	Method Blank (MB)
1203808701	Laboratory Control Sample (LCS)
1203808702	425075004(CAWA-17-133313) Sample Duplicate (DUP)
1203808703	425075004(CAWA-17-133313) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

The Ion Chromatography analysis was performed on a Dionex ICS-1600 Ion Chromatograph.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 425075004 (CAWA-17-133313) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The following sample 425121001 (CAWA-17-133347) was 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.

Analyte	425121
	001
Chloride	2X

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Manual Integrations

Samples 1203808702 (CAWA-17-133313DUP), 1203808703 (CAWA-17-133313PS) and 425121001 (CAWA-17-133347) 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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Method/Analysis Information

Product:	Ammonia Nitrogen		
Analytical Batch:	1672879	Method:	NH3
Prep Batch :	1672878	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
425121001	CAWA-17-133347
1203808632	Method Blank (MB)
1203808633	Laboratory Control Sample (LCS)
1203808634	425079004(CAWA-17-133315) Sample Duplicate (DUP)
1203808636	425079004(CAWA-17-133315) 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 425079004 (CAWA-17-133315) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1672891	Method:	TKN
Prep Batch :	1672890	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
425121002	CAWA-17-133348
1203808652	Method Blank (MB)
1203808653	Laboratory Control Sample (LCS)
1203808654	425121002(CAWA-17-133348) Sample Duplicate (DUP)
1203808656	425121002(CAWA-17-133348) 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 425121002 (CAWA-17-133348) 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 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
Nitrogen, Total Kjeldahl	1203808654 (CAWA-17-133348DUP)	abs(.243 - .385)* (+/-1 mg/L)

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

A data exception report (DER) 1641391 was generated for sample 1203808654 (CAWA-17-133348DUP) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1673506

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
425121001	CAWA-17-133347
1203810164	Method Blank (MB)
1203810165	Laboratory Control Sample (LCS)
1203810166	Laboratory Control Sample Duplicate (LCSD)
1203810167	425075002(CAWA-17-133312) Sample Duplicate (DUP)
1203810168	425075002(CAWA-17-133312) 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.

LCS/LCSD Relative Percent Difference (RPD) Statement

The RPD between the LCS and LCSD met the acceptance limits.

Quality Control (QC) Designation

Sample 425075002 (CAWA-17-133312) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1672893	Method:	PO4
Prep Batch :	1672892	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
425121001	CAWA-17-133347
1203808658	Method Blank (MB)
1203808659	Laboratory Control Sample (LCS)
1203808660	425079004(CAWA-17-133315) Sample Duplicate (DUP)
1203808661	425079004(CAWA-17-133315) 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 425079004 (CAWA-17-133315) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1673668

Method: TDS

Sample Analysis

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

Sample ID	Client ID
425121001	CAWA-17-133347
1203810561	Method Blank (MB)
1203810562	Laboratory Control Sample (LCS)
1203810564	425121001(CAWA-17-133347) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-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 425121001 (CAWA-17-133347) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1678861

Method: EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
425121001	CAWA-17-133347
1203822826	Laboratory Control Sample (LCS)
1203822828	425121001(CAWA-17-133347) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 425121001 (CAWA-17-133347) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: pH

Analytical Batch: 1673523 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
425121001	CAWA-17-133347
1203811672	Laboratory Control Sample (LCS)
1203810238	425121001(CAWA-17-133347) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 425121001 (CAWA-17-133347) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

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

Sample	Analyte	Value
1203810238 (CAWA-17-133347DUP)	pH	Received 09-JUN-17, out of holding 07-JUN-17
425121001 (CAWA-17-133347)	pH	Received 09-JUN-17, out of holding 07-JUN-17

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

A data exception report (DER) 1642299 was generated for samples 425121001 (CAWA-17-133347) and 1203810238 (CAWA-17-133347DUP) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Alkalinity

Analytical Batch: 1673522 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

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

Sample ID	Client ID
425121001	CAWA-17-133347
1203810229	Laboratory Control Sample (LCS)
1203810232	425121001(CAWA-17-133347) Sample Duplicate (DUP)
1203810235	425121001(CAWA-17-133347) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 425121001 (CAWA-17-133347) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

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Qualifier Definition Report for

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

Client SDG: 2017-1689 GEL Work Order: 425121


The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Aubrey Kingsbury

Date: 30 JUN 2017

Title: Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: June 30, 2017

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

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

Client SDG: 2017-1689

Client Sample ID: CAWA-17-133347
Sample ID: 425121001
Matrix: W
Collect Date: 07-JUN-17 10:45
Receive Date: 09-JUN-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MXL2	06/10/17	0512	1672927	1
Fluoride	J	0.0904	0.033	0.100	mg/L		1					
Sulfate		6.97	0.133	0.400	mg/L		1					
Chloride		14.5	0.134	0.400	mg/L		2	MXL2	06/12/17	1747	1672927	2
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.096	0.017	0.050	mg/L	1.00	1	KLP1	06/13/17	1318	1672879	3
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite	U	ND	0.017	0.050	mg/L		1	AXH3	06/14/17	0814	1673506	4
PO4 "As Received"												
Phosphorus, Total as P		0.128	0.020	0.050	mg/L	1.00	1	KLP1	06/13/17	1430	1672893	5
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		139	3.40	14.3	mg/L			KLP1	06/14/17	1056	1673668	6
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		62.0	1.45	4.00	mg/L			RXB5	06/14/17	1507	1673522	7
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		190	1.00	1.00	umhos/cm		1	RXB5	06/30/17	1338	1678861	8
PH "As Received"												
pH at Temp 20.9C	H	8.04	0.010	0.100	SU		1	RXB5	06/14/17	1506	1673523	9

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	06/13/17	0930	1672878
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	06/12/17	1630	1672892

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Certificate of Analysis

Report Date: June 30, 2017

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

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

Client SDG: 2017-1689

Client Sample ID: CAWA-17-133347
Sample ID: 425121001

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:300.0											
3	EPA:350.1											
4	EPA:353.2											
5	EPA 365.4 1974											
6	EPA:160.1											
7	EPA:310.1											
8	EPA:120.1											
9	EPA 150.1 1982											

Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: June 30, 2017

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

Los Alamos, New Mexico 87545

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

Client SDG: 2017-1689

Client Sample ID: CAWA-17-133348
Sample ID: 425121002
Matrix: W
Collect Date: 07-JUN-17 10:45
Receive Date: 09-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		3.75	0.330	1.00	mg/L		1	TSM	06/22/17	0012	1673634	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	06/12/17	1211	1672526	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl		0.385	0.033	0.100	mg/L	1.00	1	KLP1	06/13/17	1041	1672891	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	06/12/17	1104	1672525
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	06/12/17	1630	1672890

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

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

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: June 30, 2017

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

Contact: Mr. Keith Greene

Workorder: 425121

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

Carbon Analysis

Batch	1673634										
QC1203812105	425300003	DUP									
Total Organic Carbon Average		1.84		1.82	mg/L	1.15	^	(+/-1.00)	TSM	06/22/17	03:43
QC1203812103	LCS										
Total Organic Carbon Average	10.0			9.81	mg/L			(80%-120%)		06/21/17	17:57
QC1203812277	LCSD										
Total Organic Carbon Average	10.0			9.89	mg/L	0.873		(0%-20%)		06/21/17	18:09
QC1203812102	MB										
Total Organic Carbon Average			U	ND	mg/L					06/21/17	17:45
QC1203812107	425300003	PS									
Total Organic Carbon Average	10.0	1.84		11.1	mg/L			(75%-125%)		06/22/17	04:30

Flow Injection Analysis

Batch	1672526										
QC1203808580	425115001	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	06/12/17	12:09
QC1203807672	LCS										
Cyanide, Total	50.0				51.6	ug/L		103	(90%-110%)	06/12/17	11:44
QC1203807671	MB										
Cyanide, Total			U		ND	ug/L				06/12/17	11:43
QC1203808581	425115001	MS									
Cyanide, Total	100	U	ND		108	ug/L		108	(90%-110%)	06/12/17	12:10

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QC Summary

Workorder: 425121

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1672927										
QC1203808702	425075004	DUP									
Bromide		J	0.0828	J	0.0829	mg/L	0.121 ^	(+/-0.200)	MXL2	06/10/17	01:49
Chloride			3.64		3.64	mg/L	0.0962	(0%-20%)			
Fluoride		J	0.0877	J	0.090	mg/L	2.59 ^	(+/-0.100)			
Sulfate			3.88		3.85	mg/L	0.787	(0%-20%)			
QC1203808701	LCS										
Bromide	1.25				1.31	mg/L	105	(80%-120%)		06/09/17	23:25
Chloride	5.00				4.93	mg/L	98.5	(80%-120%)			
Fluoride	2.50				2.57	mg/L	103	(80%-120%)			
Sulfate	10.0				10.2	mg/L	102	(80%-120%)			
QC1203808700	MB										
Bromide			U		ND	mg/L				06/09/17	22:56
Chloride			U		ND	mg/L					
Fluoride			U		ND	mg/L					
Sulfate			U		ND	mg/L					
QC1203808703	425075004	PS									
Bromide	1.25	J	0.0828		1.31	mg/L	98.5	(75%-125%)		06/10/17	02:18
Chloride	5.00		3.64		8.91	mg/L	105	(75%-125%)			

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QC Summary

Workorder: 425121

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1672927										
Fluoride	2.50	J	0.0877	2.54	mg/L		98.2	(75%-125%)	MXL2	06/10/17	02:18
Sulfate	10.0		3.88	14.0	mg/L		101	(75%-125%)			
Nutrient Analysis											
Batch	1672879										
QC1203808634	425079004	DUP									
Nitrogen, Ammonia			0.182	0.173	mg/L	5.07	^	(+/-0.050)	KLP1	06/13/17	13:10
QC1203808633	LCS										
Nitrogen, Ammonia	1.00			0.937	mg/L		93.7	(90%-110%)		06/13/17	12:52
QC1203808632	MB										
Nitrogen, Ammonia			J	0.0252	mg/L					06/13/17	12:51
QC1203808636	425079004	MS									
Nitrogen, Ammonia	1.00		0.182	1.13	mg/L		94.8	(90%-110%)		06/13/17	13:11
Batch	1672891										
QC1203808654	425121002	DUP									
Nitrogen, Total Kjeldahl			0.385	0.243	mg/L	45.2*	^	(+/-0.100)	KLP1	06/13/17	10:42
QC1203808653	LCS										
Nitrogen, Total Kjeldahl	1.00			0.979	mg/L		97.9	(90%-110%)		06/13/17	10:25
QC1203808652	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					06/13/17	10:24
QC1203808656	425121002	MS									
Nitrogen, Total Kjeldahl	1.00		0.385	1.45	mg/L		107	(90%-110%)		06/13/17	10:43
Batch	1672893										
QC1203808660	425079004	DUP									
Phosphorus, Total as P			0.122	0.103	mg/L	16.9	^	(+/-0.050)	KLP1	06/13/17	14:28

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QC Summary

Workorder: 425121

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1672893										
QC1203808659	LCS										
Phosphorus, Total as P	1.00			0.982	mg/L		98.2	(80%-124%)	KLP1	06/13/17	14:24
QC1203808658	MB										
Phosphorus, Total as P			U	ND	mg/L					06/13/17	14:23
QC1203808661	425079004	MS									
Phosphorus, Total as P	1.00	0.122		1.22	mg/L		110	(63%-139%)		06/13/17	14:29
Batch	1673506										
QC1203810167	425075002	DUP									
Nitrogen, Nitrate/Nitrite		0.593		0.591	mg/L	0.338		(0%-20%)	AXH3	06/14/17	08:04
QC1203810165	LCS										
Nitrogen, Nitrate/Nitrite	1.00			0.985	mg/L		98.5	(90%-110%)		06/14/17	08:01
QC1203810166	LCSD										
Nitrogen, Nitrate/Nitrite	1.00			1.00	mg/L	1.51	100	(0%-20%)		06/14/17	08:02
QC1203810164	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					06/14/17	07:59
QC1203810168	425075002	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.593		1.55	mg/L		95.7	(90%-110%)		06/14/17	08:05
Solids Analysis											
Batch	1673668										
QC1203810564	425121001	DUP									
Total Dissolved Solids		139		143	mg/L	0		(0%-5%)	KLP1	06/14/17	10:56
QC1203810562	LCS										
Total Dissolved Solids	300			304	mg/L		101	(95%-105%)		06/14/17	10:56

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QC Summary

Workorder: 425121

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Solids Analysis											
Batch	1673668										
QC1203810561	MB										
Total Dissolved Solids			U	ND	mg/L				KLP1	06/14/17	10:56
Titration and Ion Analysis											
Batch	1673522										
QC1203810232	425121001	DUP									
Alkalinity, Total as CaCO3		62.0		61.8	mg/L	0.323		(0%-20%)	RXB5	06/14/17	15:10
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203810229	LCS										
Alkalinity, Total as CaCO3	100			105	mg/L		105	(90%-110%)		06/14/17	13:54
QC1203810235	425121001	MS									
Alkalinity, Total as CaCO3	100	62.0		166	mg/L		104	(80%-120%)		06/14/17	15:12
Batch	1673523										
QC1203810238	425121001	DUP									
pH	H	8.04	H	8.05	SU	0.124		(0%-5%)	RXB5	06/14/17	15:10
QC1203811672	LCS										
pH	7.00			7.00	SU		100	(99%-101%)		06/14/17	14:49
Batch	1678861										
QC1203822828	425121001	DUP									
Conductivity		190		197	umhos/cm	3.31		(0%-10%)	RXB5	06/30/17	13:39
QC1203822826	LCS										
Conductivity	1410			1410	umhos/cm		99.4	(95%-105%)		06/30/17	13:23

Notes:

- < Result is less than value reported
- > Result is greater than value reported
- B The target analyte was detected in the associated blank.

GEL LABORATORIES LLC

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

QC Summary

Workorder: 425121

Page 6 of 6

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

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 13-JUN-17	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 351.2, EPA 351.2 SC	Matrix Type: Liquid	Client Code: BRKL, ESHL, NCSW
Batch ID: 1672891	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 424990(38945),425115(2017-1690),425121(2017-1689),425215 Application Issues: Failed Recovery for MS/MSD, or PS/PSD Failed RPD for DUP			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Failed RPD for DUP: QC 1203808654DUP 2. Failed Recovery for MS/MSD, or PS/PSD: QC 1203808657MS		1. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: Nitrogen, Total Kjeldahl 1203808654 (CAWA-17-133348DUP) [abs(.243 - .385)* (+/- .1 mg/L)]. 2. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity. Nitrogen, Total Kjeldahl 1203808657 (38945-002MS) [111* (90%-110%)].	

Originator's Name:

Kristen Mizzell 13-JUN-17

Data Validator/Group Leader:

Aubrey Kingsbury 13-JUN-17

DATA EXCEPTION REPORT

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

Originator's Name:

Rachael Bell 15-JUN-17

Data Validator/Group Leader:

Elzbieta Szulc 15-JUN-17

July 19, 2017

gel.com

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

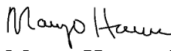
Re: LANL- WQH Water Samples
Work Order: 425121
SDG: 2017-1689

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on June 09, 2017, and analyzed for Explosives by LCMSMS, General Chemistry, Metals and Perchlorates by LCMSMS. This revised data report has been prepared and reviewed in accordance with GEL's standard operating procedures. This package has been revised to include the results for HMX, DNX, and TNX on the HE Form 1s.

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

Sincerely,


Margo Herron for
Valerie Davis
Project Manager

Chain of Custody: 2017-1689
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 425121
SDG: 2017-1689

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 425121
SDG # : 2017-1689**

June 30, 2017

Laboratory Identification:

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

Summary

Sample receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on June 09, 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>
425121001	CAWA-17-133347
425121002	CAWA-17-133348

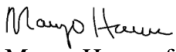
Case Narrative

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 for
Valerie Davis
Project Manager

List of current GEL Certifications as of 30 June 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

SAMPLE RECEIPT & REVIEW FORM

Client: <u>Esth</u>		SDG/AR/COC/Work Order: <u>425121</u>	
Received By: <u>ZKW</u>		Date Received: <u>6/9/17</u>	
Carrier and Tracking Number		Circle Applicable: FedEx <u>Express</u> FedEx Ground UPS Field Services Courier Other	
		<u>5908 1782 1867</u> <u>5908 1782 1856</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <u>CPM</u> mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:	

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

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials ME/T Date 6/12/17 Page 1 of 1

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

SHIP DATE: 08JUN17
ACTWGT: 45.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

TO VALERIE DAVIS

GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BAGWE0



FedEx
Express



2 of 2

MPS# 5908 1782 1867

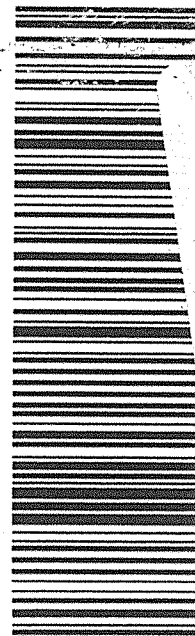
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X7 RBWA

FRI - 09 JUN 10:30A
PRIORITY OVERNIGHT

29407

SC-US CHS



RT 257
5 10:30
E

Part # 156148V-434 RIT2 06/15

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

SHIP DATE: 08JUN17
ACTWGT: 55.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

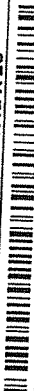
TO VALERIE DAVIS

GENERAL ENGINEERING LAB
2040 SAVAGE RD

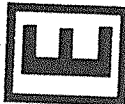
CHARLESTON SC 29407

(843) 566-8171

REF: 21PD0ASRGW04BAGWE0



FedEx
Express



1 of 2

TRK# 5908 1782 1856

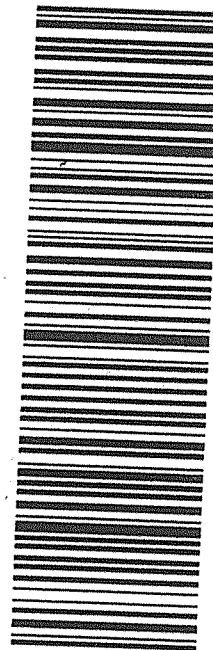
MASTER

X7 RBWA

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PRIORITY OVERNIGHT

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SC-US CHS



Part # 156148V-434 RIT2 06/15

538C1/A502/329H

J151315081307 W

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 #: 2017-1689
Work Order #: 425121**

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:	1675216
Prep Batch Number:	1675214

Sample Analysis

Sample ID	Client ID
425121001	425121001 (CAWA-17-133347)
1203814204	Interference Check Sample (ICS)
1203814194	Method Blank (MB)
1203814195	Laboratory Control Sample (LCS)
1203814196	425115002(CAWA-17-133326) Matrix Spike (MS)
1203814197	425115002(CAWA-17-133326) 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 425115002 (CAWA-17-133326) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The recoveries of Perchlorate and Perchlorate-101 were not within the acceptance limits in 1203814196 (CAWA-17-133326MS) and 1203814197 (CAWA-17-133326MSD). This was due to the background concentration in the parent sample, 425115002 (CAWA-17-133326).

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: 2017-1689 GEL Work Order: 425121

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: 1675214Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133347Date Received: 09-JUN-17GEL Job No (SDG): 2017-1689GEL Sample ID: 425121001Date Filtered: 19-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	0.132	ug/L	J	1	19-JUN-17 19:21	per0619019a
	Perchlorate Isotope Ratio			2.88			1	19-JUN-17 19:21	per0619019a
14797-73-0	Perchlorate-101	.05	.2	0.134	ug/L	J	1	19-JUN-17 19:21	per0619019a
	Perchlorate-O(18)			0.422	ug/L		1	19-JUN-17 19:21	per0619019a

^ 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): 2017-1689

Extract Batch Code: 1675214

Date Filtered: 19-JUN-17

Matrix: WATER

Sample ID: 1203814195

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.197	ug/L	99		85 - 115
Perchlorate Isotope Ratio		3.04				-
Perchlorate-101	0.200	.189	ug/L	95		85 - 115
Perchlorate-O(18)		.439	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): 2017-1689

Extract Batch Code: 1675214

Date Extracted: 19-JUN-17

GEL MS/PS ID: 1203814196

Client ID: CAWA-17-133326

GEL MSD/PSD ID: 1203814197

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	1.05	ug/L	1.12	34 *	1.16	53 *	3	30	75 - 125
Perchlorate Isotope Ratio	0	2.92		2.78		2.83		2		-
Perchlorate-101	0.200	1.05	ug/L	1.17	61 *	1.19	71 *	2	30	75 - 125
Perchlorate-O(18)	0	0.410	ug/L	0.415		.423		2		-

^ 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: 1675214Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 19-JUN-17GEL Job No (SDG): 2017-1689GEL Sample ID: 1203814194Date Filtered: 19-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	19-JUN-17 18:15	per0619013a
	Perchlorate Isotope Ratio						1	19-JUN-17 18:15	per0619013a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	19-JUN-17 18:15	per0619013a
	Perchlorate-O(18)			0.475	ug/L		1	19-JUN-17 18:15	per0619013a

^ 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: 1675214Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 19-JUN-17GEL Job No (SDG): 2017-1689GEL Sample ID: 1203814195Date Filtered: 19-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	0.197	ug/L	J	1	19-JUN-17 18:26	per0619014a
	Perchlorate Isotope Ratio			3.04			1	19-JUN-17 18:26	per0619014a
14797-73-0	Perchlorate-101	.05	.2	0.189	ug/L	J	1	19-JUN-17 18:26	per0619014a
	Perchlorate-O(18)			0.439	ug/L		1	19-JUN-17 18:26	per0619014a

^ 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: 1675214Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-1689GEL Sample ID: 1203814204Date Filtered: 19-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	0.186	ug/L	J	1	19-JUN-17 18:37	per0619015a
	Perchlorate Isotope Ratio			2.58			1	19-JUN-17 18:37	per0619015a
14797-73-0	Perchlorate-101	.05	.2	0.210	ug/L		1	19-JUN-17 18:37	per0619015a
	Perchlorate-O(18)			0.432	ug/L		1	19-JUN-17 18:37	per0619015a

^ 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: 1675214Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133326MSDate Received: 09-JUN-17GEL Job No (SDG): 2017-1689GEL Sample ID: 1203814196Date Filtered: 19-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	1.12	ug/L		1	19-JUN-17 18:59	per0619017a
	Perchlorate Isotope Ratio			2.78			1	19-JUN-17 18:59	per0619017a
14797-73-0	Perchlorate-101	.05	.2	1.17	ug/L		1	19-JUN-17 18:59	per0619017a
	Perchlorate-O(18)			0.415	ug/L		1	19-JUN-17 18:59	per0619017a

^ 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: 1675214Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAWA-17-133326MSDDate Received: 09-JUN-17GEL Job No (SDG): 2017-1689GEL Sample ID: 1203814197Date Filtered: 19-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	1.16	ug/L		1	19-JUN-17 19:10	per0619018a
	Perchlorate Isotope Ratio			2.83			1	19-JUN-17 19:10	per0619018a
14797-73-0	Perchlorate-101	.05	.2	1.19	ug/L		1	19-JUN-17 19:10	per0619018a
	Perchlorate-O(18)			0.423	ug/L		1	19-JUN-17 19:10	per0619018a

^ 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 #: 2017-1689
Work Order #: 425121**

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: 1673460

Prep Batch Number: 1673459

Sample Analysis

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

Sample ID	Client ID
425121002	CAWA-17-133348
1203810014	Method Blank (MB)
1203810015	Laboratory Control Sample (LCS)
1203810016	425121002(CAWA-17-133348) Matrix Spike (MS)
1203810017	425121002(CAWA-17-133348) Matrix Spike Duplicate (MSD)

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-068 REV# 7.

Calibration Information

Initial Calibration

All initial calibration requirements for this analysis have been met for this SDG.

Calibration Verification Standard Requirements

All continuing calibration verification standards (CCV) have not met requirements of 80-120% for 425121002 (CAWA-17-133348) in this SDG. Please refer to Form 7 of the data package for a list of recoveries. A LLOQ level standard was analyzed following the biased low CCV with all target analytes meeting acceptance limits. Since the target analyte was not detected in the associated samples, the data are reported. All continuing calibration verification standards (CCV) have not met requirements of 80-120% for 425121002 (CAWA-17-133348) 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, both the MS and MSD met acceptance limits. Since the analyte was/were not detected in the associated samples, the data are reported.

Sample	Analyte	Value
1203810015 (LCS)	TATB	151* (47%-135%)

QC Sample Designation

Client sample 425121002 (CAWA-17-133348) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

One or more of the required spiking analytes were not within the acceptance limits in the matrix spike duplicate (MSD). While the MSD exhibited a high bias, both the LCS and MS met acceptance limits for (insert compound name). Since (insert compound name) was not detected in the associated samples, the data are reported.

Sample	Analyte	Value
1203810017 (CAWA-17-133348MSD)	o-Nitrotoluene	49* (56%-119%)

MS/MSD Relative Percent Difference (RPD) Statement

The RPD values between the MS and MSD (See Below) were not within the acceptance limits. Since all other RPD values met acceptance criteria, the noted exceptions are attributed to vagaries in the extraction process. The data are reported.

Sample	Analyte	Value
1203810016MS and 1203810017MSD (CAWA-17-133348)	2,4-Diamino-6-nitrotoluene	36* (0%-30%)
	2,6-Diamino-4-nitrotoluene	32* (0%-30%)

	o-Nitrotoluene	52* (0%-30%)
	tris(o-cresyl) phosphate	36* (0%-30%)

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) 1647079 was generated for samples 1203810015 (LCS) and 1203810017 (CAWA-17-133348MSD) 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: 2017-1689 GEL Work Order: 425121

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: 01 JUL 2017

Title: Group Leader

Sample Data Summary

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133348

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 425121002

Sample Amount 870 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0625037.wiff

Date Analyzed: 27-JUN-17 12:57

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
118-96-7	2,4,6-Trinitrotoluene	.287	U	0.092	0.287
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	.287	U	0.092	0.287
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
121-82-4	RDX	.287	U	0.092	0.287
<i>121-82-4</i>	<i>RDX</i>				
13980-04-6	TNX	.287	U	0.092	0.287
<i>13980-04-6</i>	<i>TNX</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	.287	U	0.092	0.287
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
2691-41-0	HMX	.287	U	0.092	0.287
<i>2691-41-0</i>	<i>HMX</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	.287	U	0.092	0.287
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
5755-27-1	MNX	.287	U	0.092	0.287
<i>5755-27-1</i>	<i>MNX</i>				
606-20-2	2,6-Dinitrotoluene	.287	U	0.092	0.287
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
80251-29-2	DNX	.287	U	0.092	0.287
<i>80251-29-2</i>	<i>DNX</i>				
88-72-2	o-Nitrotoluene	.287	U	0.0943	0.287
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
98-95-3	Nitrobenzene	.287	U	0.092	0.287
<i>98-95-3</i>	<i>Nitrobenzene</i>				
99-08-1	m-Nitrotoluene	.287	U	0.092	0.287
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133348

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 425121002

Sample Amount 870 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-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	.287	U	0.092	0.287
99-35-4	1,3,5-Trinitrobenzene				
99-65-0	m-Dinitrobenzene	.287	U	0.092	0.287
99-65-0	m-Dinitrobenzene				
479-45-8	Tetryl	.575	U	0.092	0.575
479-45-8	Tetryl				
78-11-5	PETN	.575	U	0.115	0.575
78-11-5	PETN				
99-99-0	p-Nitrotoluene	.575	U	0.172	0.575
99-99-0	p-Nitrotoluene				
3058-38-6	TATB	1.15	U	0.345	1.15
3058-38-6	TATB				
618-87-1	3,5-Dinitroaniline	1.15	U	0.345	1.15
618-87-1	3,5-Dinitroaniline				
78-30-8	tris(o-cresyl) phosphate	1.15	U	0.345	1.15
78-30-8	tris(o-cresyl) phosphate				
59229-75-3	2,6-Diamino-4-nitrotoluene	2.87	U	0.575	2.87
59229-75-3	2,6-Diamino-4-nitrotoluene				
6629-29-4	2,4-Diamino-6-nitrotoluene	2.87	U	0.575	2.87
6629-29-4	2,4-Diamino-6-nitrotoluene				

Quality Control Summary

High Explosives Surrogate Recovery Summary**Lab Name:** GEL Laboratories LLC**GEL Job No (SDG):** 2017-1689**Lab Code:** GEL**HPLC Column:** Ultracarb Phenomenex 5u ODS (20), 250 x
4.60 mm ID

Lab Sample ID	Client Sample ID	DNT	QC Limits	Flg
425121002	CAWA-17-133348	89	55 - 115	
1203810014	MB for batch 1673459	92	55 - 115	
1203810015	LCS for batch 1673459	90	55 - 115	
1203810016	CAWA-17-133348MS	93	55 - 115	
1203810017	CAWA-17-133348MSD	99	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) 2017-1689

Extract Batch Code: 1673459

Date Extracted: 13-JUN-17

GEL LCS ID: 1203810015

GEL LCSDUP ID: .

Analysis Date/Time: 27-JUN-17 11:49

DUP Analysis Date/Time:

Reporting Units: ug/L

QC Type: LCS/LCSD

Compound	Spike Added	LCS Conc	LCS Rec #	LCSD Conc	LCSD Rec #	RPD #	RPD	Recovery Limits
2,4,6-Trinitrotoluene	5	4.29	86					69 - 113
2,4-Diamino-6-nitrotoluene	5	4.23	85					50 - 121
2,4-Dinitrotoluene	5	4.19	84					71 - 110
2,6-Diamino-4-nitrotoluene	5	4.87	97					53 - 127
2,6-Dinitrotoluene	5	3.9	78					72 - 105
2-Amino-4,6-dinitrotoluene	5	4	80					70 - 112
3,5-Dinitroaniline	5	4.88	98					70 - 121
4-Amino-2,6-dinitrotoluene	5	4.24	85					74 - 116
HMX	5	4.7	94					58 - 113
Nitrobenzene	5	5.33	107					64 - 115
PETN	5	4.65	93					57 - 126
RDX	5	4.68	94					64 - 117
1,3,5-Trinitrobenzene	5	4.67	93					70 - 110
TATB	2.5	3.79	151 *					47 - 135
Tetryl	5	3.62	72					64 - 122
m-Dinitrobenzene	5	4.76	95					74 - 117
m-Nitrotoluene	5	3.91	78					66 - 114
o-Nitrotoluene	5	3.34	67					64 - 115
p-Nitrotoluene	5	3.47	69					66 - 127
tris(o-cresyl) phosphate	5	3.47	69					43 - 104

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

* Values outside of QC limits

3
High Explosives MS/MSD Summary

Lab Name: GEL Laboratories LLC

Client ID: CAWA-17-133348

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Extract Batch Code: 1673459

Date Extracted: 13-JUN-17

GEL Spike ID: 1203810016

GEL SpikeDup ID: 1203810017

Analysis Date/Time: 27-JUN-17 15:48

MSD Analysis Date/Time: 27-JUN-17 14:05

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	5.2356	0	4.41	84	3.05	58	36 *	30	38 - 105
1,3,5-Trinitrobenzene	5.2356	0	4.23	81	4.32	83	2	30	67 - 111
2,4,6-Trinitrotoluene	5.2356	0	4.65	89	4.79	92	3	30	66 - 112
2,4-Diamino-6-nitrotoluene	5.2356	0	4.95	95	3.44	66	36 *	30	50 - 121
2,4-Dinitrotoluene	5.2356	0	4.97	95	5.02	96	1	30	69 - 113
2,6-Diamino-4-nitrotoluene	5.2356	0	4.77	91	3.45	66	32 *	30	53 - 127
2,6-Dinitrotoluene	5.2356	0	4.66	89	4.79	91	3	30	70 - 106
2-Amino-4,6-dinitrotoluene	5.2356	.0423	4.56	86	4.66	88	2	30	67 - 115
3,5-Dinitroaniline	5.2356	0	5.57	106	5.83	111	5	30	70 - 121
4-Amino-2,6-dinitrotoluene	5.2356	.043	5.08	96	4.29	81	17	30	65 - 120
HMX	5.2356	.0897	5.31	100	6.14	116	14	30	44 - 128
Nitrobenzene	5.2356	0	4.27	82	3.53	67	19	30	62 - 116
PETN	5.2356	0	5.01	96	4.54	87	10	30	51 - 131
RDX	5.2356	.0206	5.58	106	5.39	102	3	30	57 - 125
TATB	2.6178	0	3.46	132	3.22	123	7	30	38 - 149
Tetryl	5.2356	0	3.6	69	3.05	58	17	30	50 - 126
m-Dinitrobenzene	5.2356	0	5.19	99	5.38	103	3	30	74 - 117
m-Nitrotoluene	5.2356	0	4.88	93	4.97	95	2	30	59 - 120
o-Nitrotoluene	5.2356	.00667	4.41	84	2.58	49 *	52 *	30	56 - 119
p-Nitrotoluene	5.2356	0	4.42	84	4.53	87	3	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 1673459

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810014

Sample Amount 1000 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0625034.wiff

Date Analyzed: 27-JUN-17 11:15

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 1673459

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810014

Sample Amount 1000 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-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 1673459

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810015

Sample Amount 1000 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0625035.wiff

Date Analyzed: 27-JUN-17 11:49

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
88-72-2 <i>88-72-2</i>	o-Nitrotoluene <i>o-Nitrotoluene</i>	3.34		0.082	0.250
78-30-8 <i>78-30-8</i>	tris(o-cresyl) phosphate <i>tris(o-cresyl) phosphate</i>	3.47		0.300	1.00
99-99-0 <i>99-99-0</i>	p-Nitrotoluene <i>p-Nitrotoluene</i>	3.47		0.150	0.500
479-45-8 <i>479-45-8</i>	Tetryl <i>Tetryl</i>	3.62		0.080	0.500
3058-38-6 <i>3058-38-6</i>	TATB <i>TATB</i>	3.79		0.300	1.00
6629-29-4 <i>6629-29-4</i>	2,4-Diamino-6-nitrotoluene <i>2,4-Diamino-6-nitrotoluene</i>	3.79		0.500	2.50
606-20-2 <i>606-20-2</i>	2,6-Dinitrotoluene <i>2,6-Dinitrotoluene</i>	3.9		0.080	0.250
99-08-1 <i>99-08-1</i>	m-Nitrotoluene <i>m-Nitrotoluene</i>	3.91		0.080	0.250
35572-78-2 <i>35572-78-2</i>	2-Amino-4,6-dinitrotoluene <i>2-Amino-4,6-dinitrotoluene</i>	4		0.080	0.250
121-14-2 <i>121-14-2</i>	2,4-Dinitrotoluene <i>2,4-Dinitrotoluene</i>	4.19		0.080	0.250

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: LCS for batch 1673459

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810015

Sample Amount 1000 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
19406-51-0	4-Amino-2,6-dinitrotoluene	4.24		0.080	0.250
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	4.29		0.080	0.250
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
78-11-5	PETN	4.65		0.100	0.500
<i>78-11-5</i>	<i>PETN</i>				
99-35-4	1,3,5-Trinitrobenzene	4.67		0.080	0.250
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
121-82-4	RDX	4.68		0.080	0.250
<i>121-82-4</i>	<i>RDX</i>				
2691-41-0	HMX	4.7		0.080	0.250
<i>2691-41-0</i>	<i>HMX</i>				
99-65-0	m-Dinitrobenzene	4.76		0.080	0.250
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	4.87		0.500	2.50
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
618-87-1	3,5-Dinitroaniline	4.88		0.300	1.00
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
98-95-3	Nitrobenzene	5.33		0.080	0.250
<i>98-95-3</i>	<i>Nitrobenzene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133348(425121002MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810016

Sample Amount 955 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0625042.wiff

Date Analyzed: 27-JUN-17 15:48

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
13980-04-6	TNX	.262	U	0.0838	0.262
<i>13980-04-6</i>	<i>TNX</i>				
5755-27-1	MNX	.262	U	0.0838	0.262
<i>5755-27-1</i>	<i>MNX</i>				
80251-29-2	DNX	.262	U	0.0838	0.262
<i>80251-29-2</i>	<i>DNX</i>				
3058-38-6	TATB	3.46		0.314	1.05
<i>3058-38-6</i>	<i>TATB</i>				
479-45-8	Tetryl	3.6		0.0838	0.524
<i>479-45-8</i>	<i>Tetryl</i>				
99-35-4	1,3,5-Trinitrobenzene	4.23		0.0838	0.262
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
98-95-3	Nitrobenzene	4.27		0.0838	0.262
<i>98-95-3</i>	<i>Nitrobenzene</i>				
78-30-8	tris(o-cresyl) phosphate	4.41		0.314	1.05
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
88-72-2	o-Nitrotoluene	4.41		0.0859	0.262
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
99-99-0	p-Nitrotoluene	4.42		0.157	0.524
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.56		0.0838	0.262
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	4.65		0.0838	0.262
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	4.66		0.0838	0.262
<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-17-133348(425121002MS)MS

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810016

Sample Amount 955 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-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	4.77		0.524	2.62
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
99-08-1	m-Nitrotoluene	4.88		0.0838	0.262
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	4.96		0.524	2.62
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	4.97		0.0838	0.262
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
78-11-5	PETN	5.01		0.105	0.524
<i>78-11-5</i>	<i>PETN</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	5.08		0.0838	0.262
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.19		0.0838	0.262
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
2691-41-0	HMX	5.31		0.0838	0.262
<i>2691-41-0</i>	<i>HMX</i>				
618-87-1	3,5-Dinitroaniline	5.57		0.314	1.05
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
121-82-4	RDX	5.58		0.0838	0.262
<i>121-82-4</i>	<i>RDX</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133348(425121002MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810017

Sample Amount 955 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

GEL data file: EXP0625039.wiff

Date Analyzed: 27-JUN-17 14:05

Dilution Factor: 2

Concentration Units: ug/L

Cas No.	Compound	Concentration*	Q	MDL	PQL
13980-04-6	TNX	.262	U	0.0838	0.262
<i>13980-04-6</i>	<i>TNX</i>				
5755-27-1	MNX	.262	U	0.0838	0.262
<i>5755-27-1</i>	<i>MNX</i>				
80251-29-2	DNX	.262	U	0.0838	0.262
<i>80251-29-2</i>	<i>DNX</i>				
88-72-2	o-Nitrotoluene	2.58		0.0859	0.262
<i>88-72-2</i>	<i>o-Nitrotoluene</i>				
479-45-8	Tetryl	3.05		0.0838	0.524
<i>479-45-8</i>	<i>Tetryl</i>				
78-30-8	tris(o-cresyl) phosphate	3.05		0.314	1.05
<i>78-30-8</i>	<i>tris(o-cresyl) phosphate</i>				
3058-38-6	TATB	3.22		0.314	1.05
<i>3058-38-6</i>	<i>TATB</i>				
59229-75-3	2,6-Diamino-4-nitrotoluene	3.45		0.524	2.62
<i>59229-75-3</i>	<i>2,6-Diamino-4-nitrotoluene</i>				
6629-29-4	2,4-Diamino-6-nitrotoluene	3.47		0.524	2.62
<i>6629-29-4</i>	<i>2,4-Diamino-6-nitrotoluene</i>				
98-95-3	Nitrobenzene	3.53		0.0838	0.262
<i>98-95-3</i>	<i>Nitrobenzene</i>				
19406-51-0	4-Amino-2,6-dinitrotoluene	4.29		0.0838	0.262
<i>19406-51-0</i>	<i>4-Amino-2,6-dinitrotoluene</i>				
99-35-4	1,3,5-Trinitrobenzene	4.32		0.0838	0.262
<i>99-35-4</i>	<i>1,3,5-Trinitrobenzene</i>				
99-99-0	p-Nitrotoluene	4.53		0.157	0.524
<i>99-99-0</i>	<i>p-Nitrotoluene</i>				

1
High Explosives Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample ID: CAWA-17-133348(425121002MSD)MSD

Lab Code: GEL

GEL Job No (SDG) 2017-1689

Matrix: WATER

GEL Sample ID: 1203810017

Sample Amount 955 mL

Date Received: 09-JUN-17

Moisture: .

Extraction Batch ID: 1673459

Extraction Type Sol Exchange

Date Extracted: 13-JUN-17

Concentrated Extract Volume (mL) 5

Injection Volume (uL):50

Cas No.	Compound	Concentration*	Q	MDL	PQL
78-11-5	PETN	4.54		0.105	0.524
<i>78-11-5</i>	<i>PETN</i>				
35572-78-2	2-Amino-4,6-dinitrotoluene	4.66		0.0838	0.262
<i>35572-78-2</i>	<i>2-Amino-4,6-dinitrotoluene</i>				
118-96-7	2,4,6-Trinitrotoluene	4.79		0.0838	0.262
<i>118-96-7</i>	<i>2,4,6-Trinitrotoluene</i>				
606-20-2	2,6-Dinitrotoluene	4.79		0.0838	0.262
<i>606-20-2</i>	<i>2,6-Dinitrotoluene</i>				
99-08-1	m-Nitrotoluene	4.97		0.0838	0.262
<i>99-08-1</i>	<i>m-Nitrotoluene</i>				
121-14-2	2,4-Dinitrotoluene	5.02		0.0838	0.262
<i>121-14-2</i>	<i>2,4-Dinitrotoluene</i>				
99-65-0	m-Dinitrobenzene	5.38		0.0838	0.262
<i>99-65-0</i>	<i>m-Dinitrobenzene</i>				
121-82-4	RDX	5.39		0.0838	0.262
<i>121-82-4</i>	<i>RDX</i>				
618-87-1	3,5-Dinitroaniline	5.83		0.314	1.05
<i>618-87-1</i>	<i>3,5-Dinitroaniline</i>				
2691-41-0	HMX	6.14		0.0838	0.262
<i>2691-41-0</i>	<i>HMX</i>				

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-1689Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 26-JUN-17 16:29GEL Data File: EXP0625001.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
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	.69
p-Nitrotoluene	0	0

Explosives Initial Calibration Blank

Lab Name: GEL Laboratories LLCGEL Job No(SDG): 2017-1689Lab Code: GELLab Sample ID: XIBLK01Analysis Date: 26-JUN-17 17:03GEL Data File: EXP0625002.wiffInstrument ID: LCMSMS7Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	1.41
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK02

Analysis Date: 26-JUN-17 21:36

GEL Data File: EXP0625010.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
3,4-Dinitrotoluene	0	1.48
tris(o-cresyl) phosphate	0	6.15
TATB	0	1.57
3,5-Dinitroaniline	0	1.82
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	1.65
DNX	0	2.65
MNX	0	2.03
TNX	0	2.15
1,3,5-Trinitrobenzene	0	1.85
2,4,6-Trinitrotoluene	0	1.65
2,4-Dinitrotoluene	0	1.35
2,6-Dinitrotoluene	0	1.18
2-Amino-4,6-dinitrotoluene	0	1.51
4-Amino-2,6-dinitrotoluene	0	1.49
HMX	0	2.19
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	2.17
RDX	0	2.09
Tetryl	0	1.99
m-Dinitrobenzene	0	1.4
m-Nitrotoluene	0	0
o-Nitrotoluene	0	1.58
p-Nitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK03

Analysis Date: 26-JUN-17 23:52

GEL Data File: EXP0625014.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
DNX	0	1.77
MNX	0	1.47
TNX	0	1.56
1,3,5-Trinitrobenzene	0	1.24
2,4,6-Trinitrotoluene	0	1.29
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	1.27
4-Amino-2,6-dinitrotoluene	0	1.32
HMX	0	1.93
Nitrobenzene	0	0
Nitroglycerin	0	2.25
PETN	0	1.68
RDX	0	1.77
Tetryl	0	1.43
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	.62
p-Nitrotoluene	0	5
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	6.41
TATB	0	0
3,5-Dinitroaniline	0	1.36
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK04

Analysis Date: 27-JUN-17 02:09

GEL Data File: EXP0625018.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
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	1.36
p-Nitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK05

Analysis Date: 27-JUN-17 03:17

GEL Data File: EXP0625020.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
tris(o-cresyl) phosphate	0	5.22
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	0
p-Nitrotoluene	0	3.68
3,4-Dinitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK06

Analysis Date: 27-JUN-17 03:51

GEL Data File: EXP0625021.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	1.71
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	0
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK07

Analysis Date: 27-JUN-17 08:58

GEL Data File: EXP0625030.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	1.31
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
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): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK08

Analysis Date: 27-JUN-17 09:33

GEL Data File: EXP0625031.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	1.14
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): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK09

Analysis Date: 27-JUN-17 10:41

GEL Data File: EXP0625033.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	5.75
TATB	0	0
3,5-Dinitroaniline	0	0
2,4-Diamino-6-nitrotoluene	0	0
2,6-Diamino-4-nitrotoluene	0	0
DNX	0	0
MNX	0	0
TNX	0	0
1,3,5-Trinitrobenzene	0	0
2,4,6-Trinitrotoluene	0	0
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	.92
p-Nitrotoluene	0	0

4A
Explosives Continuing Calibration Blank

Lab Name: GEL Laboratories LLC

GEL Job No(SDG): 2017-1689

Lab Code: GEL

Lab Sample ID: XIBLK10

Analysis Date: 27-JUN-17 16:56

GEL Data File: EXP0625044.wiff

Instrument ID: LCMSMS7

Column: Ultracarb Phenomenex 5u ODS (20)

Compound	True	Found (ug/L)
2,4-Dinitrotoluene	0	0
2,6-Dinitrotoluene	0	0
2-Amino-4,6-dinitrotoluene	0	0
4-Amino-2,6-dinitrotoluene	0	0
HMX	0	0
Nitrobenzene	0	0
Nitroglycerin	0	0
PETN	0	0
RDX	0	0
Tetryl	0	0
m-Dinitrobenzene	0	0
m-Nitrotoluene	0	0
o-Nitrotoluene	0	.39
p-Nitrotoluene	0	0
3,4-Dinitrotoluene	0	0
tris(o-cresyl) phosphate	0	5.28
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

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 29-JUN-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: 1673460	Sample Numbers: See Below		

Potentially affected work order(s)(SDG): 425079(2017-1664),425121(2017-1689)

Application Issues:

Failed Recovery for MS/MSD, or PS/PSD

Failed RPD for MS/MSD, or PS/PSD

Failed Recovery for LCS/LCSD

**Specification and Requirements
Exception Description:**

1. The RPD values between the MS and MSD (See Below) were not within the acceptance limits.
1203810016MS and 1203810017MSD (CAWA-17-133348) recovered 2,4-Diamino-6-nitrotoluene at 36% (0%-30%), 2,6-Diamino-4-nitrotoluene at 32% (0%-30%), o-Nitrotoluene at 52% (0%-30%) and tris(o-cresyl) phosphate at 36% (0%-30%).
2. One or more of the required spiking analytes were not within the acceptance limits in the laboratory control sample (See Below).
1203810015 (LCS) recovered TATB at 151% (47%-135%).
3. One or more of the required spiking analytes were not within the acceptance limits in the matrix spike duplicate (MSD).
1203810017 (CAWA-17-133348MSD) recovered o-Nitrotoluene at 49% (56%-119%).

DER Disposition:

1. Since all other RPD values met acceptance criteria, the noted exceptions are attributed to vagaries in the extraction process. The data are reported.
2. While the LCS exhibited a high bias, both the MS and MSD met acceptance limits. Since TATB was not detected in the associated samples, the data are reported.
3. While the MSD exhibited a low bias, both the LCS and MS met acceptance limits for o-Nitrotoluene. Since o-Nitrotoluene was not detected in the associated samples, the data are reported.

Originator's Name:

Jannie Shaw-Busby 29-JUN-17

Data Validator/Group Leader:

Michael Penny 30-JUN-17

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-1689
Work Order #: 425121

Sample ID	Client ID
425121001	CAWA-17-133347
425121002	CAWA-17-133348
1203808401	Method Blank (MB) ICP
1203808402	Laboratory Control Sample (LCS)
1203808405	425079002(CAWA-17-133314L) Serial Dilution (SD)
1203808403	425079002(CAWA-17-133314D) Sample Duplicate (DUP)
1203808404	425079002(CAWA-17-133314S) Matrix Spike (MS)
1203808335	Method Blank (MB) ICP-MS
1203808336	Laboratory Control Sample (LCS)
1203808339	425079002(CAWA-17-133314L) Serial Dilution (SD)
1203808337	425079002(CAWA-17-133314D) Sample Duplicate (DUP)
1203808338	425079002(CAWA-17-133314S) Matrix Spike (MS)
1203811029	Method Blank (MB) CVAA
1203811030	Laboratory Control Sample (LCS)
1203811036	425079001(CAWA-17-133286L) Serial Dilution (SD)
1203811032	425079001(CAWA-17-133286D) Sample Duplicate (DUP)
1203811034	425079001(CAWA-17-133286S) Matrix Spike (MS)

Sample Analysis

Samples 425121001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1672788, 1672758, 1673857 and 1678964
Prep Batch :	1672787, 1672757 and 1673856
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 PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

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

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

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

The CRDL/PQL standard recoveries met the referenced advisory control limits.

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: 425079002 (CAWA-17-133314)-ICP and ICP-MS, 424741001 (CAPA-17-133353) and 425079001 (CAWA-17-133286)-CVAA.

Matrix Spike (MS/MSD) Recovery Statement

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

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20%

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

Serial Dilution % Difference Statement

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

Sample	Analyte	Value
1203808405 (CAWA-17-133314SDILT)	Potassium	11.9 *(0%-10%)

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Data Exception (DER) Documentation

A Data exception report (DER) was generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) 1646571 was generated for sample 1203808405 (CAWA-17-133314SDILT) in this SDG/batch.

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: 2017-1689 GEL Work Order: 425121

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- E %difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Review/Validation

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

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

Signature:



Name: Nik-Cole Elmore

Date: 03 JUL 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1689**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 425121001**BASIS:** As Received**DATE COLLECTED** 07-JUN-17**CLIENT ID:** CAWA-17-133347**LEVEL:** Low**DATE RECEIVED** 09-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	06/15/17 12:18	061517W1-3	1673857

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1689

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 425121001

BASIS: As Received

DATE COLLECTED 07-JUN-17

CLIENT ID: CAWA-17-133347

LEVEL: Low

DATE RECEIVED 09-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	341	ug/L		68	200	200	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-38-2	Arsenic	5	ug/L	U	2	5	5	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-39-3	Barium	79.4	ug/L		1	5	5	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-70-2	Calcium	15900	ug/L		50	200	200	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-47-3	Chromium	10	ug/L	U	3	10	10	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7439-89-6	Iron	179	ug/L		30	100	100	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7439-95-4	Magnesium	4380	ug/L		110	300	300	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7439-96-5	Manganese	6.3	ug/L	J	2	10	10	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7439-98-7	Molybdenum	0.679	ug/L		0.2	0.5	0.5	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-02-0	Nickel	2	ug/L	U	0.6	2	2	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-09-7	Potassium	4020	ug/L		50	150	150	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7631-86-9	Silica	40900	ug/L		53	213	213	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-23-5	Sodium	12600	ug/L		100	300	300	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-24-6	Strontium	106	ug/L		1	5	5	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-61-1	Uranium	0.20	ug/L	U	0.067	0.2	0.2	1	MS	BAJ	06/27/17 13:47	170627-2	1672758
7440-62-2	Vanadium	2.42	ug/L	J	1	5	5	1	P	JWJ	06/26/17 16:34	062617-1	1672788
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	JWJ	06/26/17 16:34	062617-1	1672788

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1689**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 425121001**BASIS:** As Received**DATE COLLECTED** 07-JUN-17**CLIENT ID:** CAWA-17-133347**LEVEL:** Low**DATE RECEIVED** 09-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	57.8	mg/L		0.453	1.24	1.24	1		TXT1	06/30/17 14:46		1678964

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1672758	1672757	SW846 3005A	50	mL	50	mL	06/19/17	CXW4
1672788	1672787	SW846 3005A	50	mL	50	mL	06/19/17	CXW4
1673857	1673856	EPA 245.1/245.2 Prep	20	mL	20	mL	06/14/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1689**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 425121002**BASIS:** As Received**DATE COLLECTED** 07-JUN-17**CLIENT ID:** CAWA-17-133348**LEVEL:** Low**DATE RECEIVED** 09-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	06/15/17 12:20	061517W1-3	1673857

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1689

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 425121002

BASIS: As Received

DATE COLLECTED 07-JUN-17

CLIENT ID: CAWA-17-133348

LEVEL: Low

DATE RECEIVED 09-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	614	ug/L		68	200	200	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-38-2	Arsenic	2.13	ug/L	J	2	5	5	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-39-3	Barium	85.2	ug/L		1	5	5	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-70-2	Calcium	16500	ug/L		50	200	200	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-47-3	Chromium	10	ug/L	U	3	10	10	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7439-89-6	Iron	347	ug/L		30	100	100	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7439-95-4	Magnesium	4530	ug/L		110	300	300	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7439-96-5	Manganese	11.7	ug/L		2	10	10	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7439-98-7	Molybdenum	0.655	ug/L		0.2	0.5	0.5	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-02-0	Nickel	2	ug/L	U	0.6	2	2	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-09-7	Potassium	4140	ug/L		50	150	150	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-23-5	Sodium	12900	ug/L		100	300	300	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-24-6	Strontium	110	ug/L		1	5	5	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-61-1	Uranium	0.20	ug/L	U	0.067	0.2	0.2	1	MS	BAJ	06/27/17 13:50	170627-2	1672758
7440-62-2	Vanadium	3.84	ug/L	J	1	5	5	1	P	JWJ	06/26/17 16:37	062617-1	1672788
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	JWJ	06/26/17 16:37	062617-1	1672788

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1689**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 425121002**BASIS:** As Received**DATE COLLECTED** 07-JUN-17**CLIENT ID:** CAWA-17-133348**LEVEL:** Low**DATE RECEIVED** 09-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	59.9	mg/L		0.453	1.24	1.24	1		TXT1	06/30/17 14:46		1678964

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1672758	1672757	SW846 3005A	50	mL	50	mL	06/19/17	CXW4
1672788	1672787	SW846 3005A	50	mL	50	mL	06/19/17	CXW4
1673857	1673856	EPA 245.1/245.2 Prep	20	mL	20	mL	06/14/17	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. 2017-1689

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>
1203808335	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
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Molybdenum	0.231	ug/L	+/-0.5	J	MS	0.2	0.5
	Chromium	3	ug/L	+/-10	U	MS	3	10
1203808401	Aluminum	68	ug/L	+/-200	U	P	68	200
	Boron	15	ug/L	+/-50	U	P	15	50
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Iron	30	ug/L	+/-100	U	P	30	100
	Manganese	2	ug/L	+/-10	U	P	2	10
	Silica	53	ug/L	+/-213	U	P	53	213
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Strontium	1	ug/L	+/-5	U	P	1	5
	Sodium	100	ug/L	+/-300	U	P	100	300
	Potassium	50	ug/L	+/-150	U	P	50	150
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Copper	3	ug/L	+/-10	U	P	3	10
	Calcium	50	ug/L	+/-200	U	P	50	200
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Barium	1	ug/L	+/-5	U	P	1	5
1203811029	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. 2017-1689 Client ID CAWA-17-133314S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 425079002 Spike ID: 1203808338

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Uranium	ug/L	75-125	48.9		0.067	U	50	97.8		MS
Antimony	ug/L	75-125	48.9		1	U	50	97.1		MS
Arsenic	ug/L	75-125	51.7		2.18	J	50	99.1		MS
Cadmium	ug/L	75-125	49.1		0.3	U	50	98.2		MS
Chromium	ug/L	75-125	50.1		3	U	50	99.4		MS
Lead	ug/L	75-125	48.7		0.5	U	50	97.4		MS
Molybdenum	ug/L	75-125	51.7		0.67		50	102		MS
Nickel	ug/L	75-125	52.9		1.37	J	50	103		MS
Selenium	ug/L	75-125	47.4		2	U	50	94.5		MS
Silver	ug/L	75-125	51.1		0.3	U	50	102		MS
Thallium	ug/L	75-125	47.2		0.6	U	50	94.3		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-1689 Client ID: CAWA-17-133314S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 425079002 Spike ID: 1203808404

<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	5110		73.3	J	5000	101		P
Barium	ug/L		7510		6810		500	141	N/A	P
Beryllium	ug/L	75-125	508		1	U	500	102		P
Boron	ug/L	75-125	538		30.2	J	500	102		P
Calcium	ug/L		26700		21600		5000	102	N/A	P
Cobalt	ug/L	75-125	511		5.85		500	101		P
Copper	ug/L	75-125	514		3	U	500	103		P
Iron	ug/L	75-125	6010		939		5000	101		P
Magnesium	ug/L	75-125	10600		5460		5000	102		P
Manganese	ug/L	75-125	741		238		500	101		P
Potassium	ug/L	75-125	8210		3150		5000	101		P
Silica	ug/L		58900		46600		10700	115	N/A	P
Sodium	ug/L	75-125	23100		17600		5000	110		P
Strontium	ug/L	75-125	685		193		500	98.4		P
Tin	ug/L	75-125	505		2.5	U	500	101		P
Vanadium	ug/L	75-125	515		1.94	J	500	103		P
Zinc	ug/L	75-125	482		3.3	U	500	96.4		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-1689 **Client ID:** CAWA-17-133286S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 425079001 **Spike ID:** 1203811034

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	2.06		0.067	U	2	103		AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

-5a-

Spike Summary

SDG NO. 2017-1689 **Client ID:** CAPA-17-133353PS**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 424741001 **Spike ID:** 1203811037

<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>
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*Analytical Methods:

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1689

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-133314D

Matrix: WATER

Level: Low

Sample ID: 425079002

Duplicate ID: 1203808337

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		2.18 J		2 U		200		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L		3 U		3 U				MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	0.67		0.643		4.11		MS
Nickel	ug/L	+/- 2	1.37 J		1.23 J		10.5		MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.3 U		0.3 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L		0.067 U		0.067 U				MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1689

Lab Code: GEL

Contract: ESHL00114

Client ID: CAWA-17-133314D

Matrix: WATER

Level: Low

Sample ID: 425079002

Duplicate ID: 1203808403

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L	+/-200	73.3 J		82.8 J		12.1		P
Barium	ug/L	+/-20%	6810		6960		2.24		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	30.2 J		32.2 J		6.45		P
Calcium	ug/L	+/-20%	21600		22200		2.37		P
Cobalt	ug/L	+/-5	5.85		5.72		2.24		P
Copper	ug/L		3 U		3 U				P
Iron	ug/L	+/-20%	939		969		3.14		P
Magnesium	ug/L	+/-20%	5460		5580		2.24		P
Manganese	ug/L	+/-20%	238		244		2.2		P
Potassium	ug/L	+/-20%	3150		3300		4.54		P
Silica	ug/L	+/-20%	46600		47500		1.83		P
Sodium	ug/L	+/-20%	17600		18100		2.57		P
Strontium	ug/L	+/-20%	193		198		2.74		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	1.94 J		1.22 J		45.3		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.: 2017-1689**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAWA-17-133286D**Matrix:** WATER**Level:** Low**Sample ID:** 425079001**Duplicate ID:** 1203811032**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. 2017-1689

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>
1203808336								
	Antimony	ug/L	50	50.1		100	80-120	MS
	Arsenic	ug/L	50	50.7		101	80-120	MS
	Cadmium	ug/L	50	51		102	80-120	MS
	Chromium	ug/L	50	51.7		103	80-120	MS
	Lead	ug/L	50	49.2		98.4	80-120	MS
	Molybdenum	ug/L	50	50.9		102	80-120	MS
	Nickel	ug/L	50	51.4		103	80-120	MS
	Selenium	ug/L	50	49.4		98.7	80-120	MS
	Silver	ug/L	50	51.5		103	80-120	MS
	Thallium	ug/L	50	47.7		95.4	80-120	MS
	Uranium	ug/L	50	47.5		95.1	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-1689

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>
1203808402								
	Aluminum	ug/L	5000	5160		103	80-120	P
	Barium	ug/L	500	505		101	80-120	P
	Beryllium	ug/L	500	500		100	80-120	P
	Boron	ug/L	500	493		98.5	80-120	P
	Calcium	ug/L	5000	5140		103	80-120	P
	Cobalt	ug/L	500	514		103	80-120	P
	Copper	ug/L	500	506		101	80-120	P
	Iron	ug/L	5000	5110		102	80-120	P
	Magnesium	ug/L	5000	5210		104	80-120	P
	Manganese	ug/L	500	504		101	80-120	P
	Potassium	ug/L	5000	5250		105	80-120	P
	Silica	ug/L	10700	10500		98.3	80-120	P
	Sodium	ug/L	5000	5250		105	80-120	P
	Strontium	ug/L	500	501		100	80-120	P
	Tin	ug/L	500	509		102	80-120	P
	Vanadium	ug/L	500	507		101	80-120	P
	Zinc	ug/L	500	486		97.2	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-1689

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>
1203811030	Mercury	ug/L	2	2.08		104	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1689

Client ID: CAWA-17-133314L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 425079002

Serial Dilution ID: 1203808339

<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	2.18	J	10	U	13.183			MS
Cadmium	.3	U	1.5	U				MS
Chromium	3	U	15	U				MS
Lead	.5	U	2.5	U				MS
Molybdenum	.67		1	U	14.925			MS
Nickel	1.37	J	3	U	4.745			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.067	U	.335	U				MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1689 **Client ID:** CAWA-17-133314L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 425079002 **Serial Dilution ID:** 1203808405

<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	73.3	J	340	U	64.951			P
Barium	6810		7110		4.451		10	P
Beryllium	1	U	5	U				P
Boron	30.2	J	75	U	5.654			P
Calcium	21600		21300		1.585		10	P
Cobalt	5.85		5.27	J	9.82			P
Copper	3	U	15	U				P
Iron	939		920		1.99			P
Magnesium	5460		5570		2.107			P
Manganese	238		250		4.632		10	P
Potassium	3150		3530		11.944	E	10	P
Silica	46600		47100		1.064		10	P
Sodium	17600		18400		4.126		10	P
Strontium	193		195		.969		10	P
Tin	2.5	U	12.5	U				P
Vanadium	1.94	J	5	U	38.072			P
Zinc	3.3	U	16.5	U				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1689 **Client ID:** CAWA-17-133286L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 425079001 **Serial Dilution ID:** 1203811036

<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

Miscellaneous

DATA EXCEPTION REPORT			
Mo.Day Yr. 27-JUN-17	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3005A/6010C	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1672788	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 425075(2017-1667),425079(2017-1664),425115(2017-1690),425121(2017-1689) Application Issues: Failed difference for SDILT			
Specification and Requirements Exception Description:		DER Disposition:	
1. Failed difference for SDILT: QC 1203808405SDILT		1. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified. 1203808405 (CAWA-17-133314SDILT) Potassium [11.9 *(0%-10%)].	

Originator's Name:
Jerry Wigfall 27-JUN-17

Data Validator/Group Leader:
Helen Camello 28-JUN-17

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-1689
Work Order #: 425121**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1673634

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
425121002	CAWA-17-133348
1203812102	Method Blank (MB)
1203812103	Laboratory Control Sample (LCS)
1203812277	Laboratory Control Sample Duplicate (LCSD)
1203812105	425300003(CAWA-17-133305) Sample Duplicate (DUP)
1203812107	425300003(CAWA-17-133305) 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.

LCS/LCSD Relative Percent Difference (RPD) Statement

The RPD between the LCS and LCSD met the acceptance limits.

Quality Control (QC) Designation

Sample 425300003 (CAWA-17-133305) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Cyanide and Total		
Analytical Batch:	1672526	Method:	WSP-CN(T)
Prep Batch :	1672525	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
425121002	CAWA-17-133348
1203807671	Method Blank (MB)
1203807672	Laboratory Control Sample (LCS)
1203808580	425115001(CAWA-17-133298) Sample Duplicate (DUP)
1203808581	425115001(CAWA-17-133298) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 425115001 (CAWA-17-133298) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product: Ion Chromatography
Analytical Batch: 1672927 **Method:** WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
425121001	CAWA-17-133347
1203808700	Method Blank (MB)
1203808701	Laboratory Control Sample (LCS)
1203808702	425075004(CAWA-17-133313) Sample Duplicate (DUP)
1203808703	425075004(CAWA-17-133313) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

The Ion Chromatography analysis was performed on a Dionex ICS-1600 Ion Chromatograph.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 425075004 (CAWA-17-133313) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The following sample 425121001 (CAWA-17-133347) was 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.

Analyte	425121
	001
Chloride	2X

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Manual Integrations

Samples 1203808702 (CAWA-17-133313DUP), 1203808703 (CAWA-17-133313PS) and 425121001 (CAWA-17-133347) 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:	1672879	Method:	NH3
Prep Batch :	1672878	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
425121001	CAWA-17-133347
1203808632	Method Blank (MB)
1203808633	Laboratory Control Sample (LCS)
1203808634	425079004(CAWA-17-133315) Sample Duplicate (DUP)
1203808636	425079004(CAWA-17-133315) 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 425079004 (CAWA-17-133315) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1672891	Method:	TKN
Prep Batch :	1672890	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
425121002	CAWA-17-133348
1203808652	Method Blank (MB)
1203808653	Laboratory Control Sample (LCS)
1203808654	425121002(CAWA-17-133348) Sample Duplicate (DUP)
1203808656	425121002(CAWA-17-133348) 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 425121002 (CAWA-17-133348) 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 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
Nitrogen, Total Kjeldahl	1203808654 (CAWA-17-133348DUP)	abs(.243 - .385)* (+/-1 mg/L)

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

A data exception report (DER) 1641391 was generated for sample 1203808654 (CAWA-17-133348DUP) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1673506

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
425121001	CAWA-17-133347
1203810164	Method Blank (MB)
1203810165	Laboratory Control Sample (LCS)
1203810166	Laboratory Control Sample Duplicate (LCSD)
1203810167	425075002(CAWA-17-133312) Sample Duplicate (DUP)
1203810168	425075002(CAWA-17-133312) 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.

LCS/LCSD Relative Percent Difference (RPD) Statement

The RPD between the LCS and LCSD met the acceptance limits.

Quality Control (QC) Designation

Sample 425075002 (CAWA-17-133312) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1672893	Method:	PO4
Prep Batch :	1672892	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
425121001	CAWA-17-133347
1203808658	Method Blank (MB)
1203808659	Laboratory Control Sample (LCS)
1203808660	425079004(CAWA-17-133315) Sample Duplicate (DUP)
1203808661	425079004(CAWA-17-133315) 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 425079004 (CAWA-17-133315) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1673668

Method: TDS

Sample Analysis

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

Sample ID	Client ID
425121001	CAWA-17-133347
1203810561	Method Blank (MB)
1203810562	Laboratory Control Sample (LCS)
1203810564	425121001(CAWA-17-133347) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-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 425121001 (CAWA-17-133347) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1678861

Method: EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
425121001	CAWA-17-133347
1203822826	Laboratory Control Sample (LCS)
1203822828	425121001(CAWA-17-133347) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 425121001 (CAWA-17-133347) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: pH

Analytical Batch: 1673523 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
425121001	CAWA-17-133347
1203811672	Laboratory Control Sample (LCS)
1203810238	425121001(CAWA-17-133347) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 425121001 (CAWA-17-133347) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

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

Sample	Analyte	Value
1203810238 (CAWA-17-133347DUP)	pH	Received 09-JUN-17, out of holding 07-JUN-17
425121001 (CAWA-17-133347)	pH	Received 09-JUN-17, out of holding 07-JUN-17

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

A data exception report (DER) 1642299 was generated for samples 425121001 (CAWA-17-133347) and 1203810238 (CAWA-17-133347DUP) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Alkalinity

Analytical Batch: 1673522 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

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

Sample ID	Client ID
425121001	CAWA-17-133347
1203810229	Laboratory Control Sample (LCS)
1203810232	425121001(CAWA-17-133347) Sample Duplicate (DUP)
1203810235	425121001(CAWA-17-133347) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 425121001 (CAWA-17-133347) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2017-1689 GEL Work Order: 425121


The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Aubrey Kingsbury

Date: 30 JUN 2017

Title: Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: June 30, 2017

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

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

Client SDG: 2017-1689

Client Sample ID: CAWA-17-133347
Sample ID: 425121001
Matrix: W
Collect Date: 07-JUN-17 10:45
Receive Date: 09-JUN-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MXL2	06/10/17	0512	1672927	1
Fluoride	J	0.0904	0.033	0.100	mg/L		1					
Sulfate		6.97	0.133	0.400	mg/L		1					
Chloride		14.5	0.134	0.400	mg/L		2	MXL2	06/12/17	1747	1672927	2
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.096	0.017	0.050	mg/L	1.00	1	KLP1	06/13/17	1318	1672879	3
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite	U	ND	0.017	0.050	mg/L		1	AXH3	06/14/17	0814	1673506	4
PO4 "As Received"												
Phosphorus, Total as P		0.128	0.020	0.050	mg/L	1.00	1	KLP1	06/13/17	1430	1672893	5
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		139	3.40	14.3	mg/L			KLP1	06/14/17	1056	1673668	6
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		62.0	1.45	4.00	mg/L			RXB5	06/14/17	1507	1673522	7
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		190	1.00	1.00	umhos/cm		1	RXB5	06/30/17	1338	1678861	8
PH "As Received"												
pH at Temp 20.9C	H	8.04	0.010	0.100	SU		1	RXB5	06/14/17	1506	1673523	9

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	06/13/17	0930	1672878
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	06/12/17	1630	1672892

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: June 30, 2017

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

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

Client SDG: 2017-1689

Client Sample ID: CAWA-17-133347
Sample ID: 425121001

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:300.0											
3	EPA:350.1											
4	EPA:353.2											
5	EPA 365.4 1974											
6	EPA:160.1											
7	EPA:310.1											
8	EPA:120.1											
9	EPA 150.1 1982											

Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: June 30, 2017

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

Los Alamos, New Mexico 87545

Contact: Mr. Keith Greene

Client SDG: 2017-1689

Project: LANL- WQH Water Samples

Client Sample ID: CAWA-17-133348

Project: ESHL00114

Sample ID: 425121002

Client ID: ARSL004

Matrix: W

Collect Date: 07-JUN-17 10:45

Receive Date: 09-JUN-17

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average		3.75	0.330	1.00	mg/L		1	TSM	06/22/17	0012	1673634	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	06/12/17	1211	1672526	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl		0.385	0.033	0.100	mg/L	1.00	1	KLP1	06/13/17	1041	1672891	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	06/12/17	1104	1672525
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	06/12/17	1630	1672890

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 30, 2017

Page 1 of 6

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

Contact: Mr. Keith Greene

Workorder: 425121

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

Carbon Analysis

Batch	1673634										
QC1203812105	425300003	DUP									
Total Organic Carbon Average		1.84		1.82	mg/L	1.15	^	(+/-1.00)	TSM	06/22/17	03:43
QC1203812103	LCS										
Total Organic Carbon Average	10.0			9.81	mg/L			98.1	(80%-120%)	06/21/17	17:57
QC1203812277	LCSD										
Total Organic Carbon Average	10.0			9.89	mg/L	0.873		98.9	(0%-20%)	06/21/17	18:09
QC1203812102	MB										
Total Organic Carbon Average			U	ND	mg/L					06/21/17	17:45
QC1203812107	425300003	PS									
Total Organic Carbon Average	10.0	1.84		11.1	mg/L			92.9	(75%-125%)	06/22/17	04:30

Flow Injection Analysis

Batch	1672526										
QC1203808580	425115001	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	06/12/17	12:09
QC1203807672	LCS										
Cyanide, Total	50.0				51.6	ug/L		103	(90%-110%)	06/12/17	11:44
QC1203807671	MB										
Cyanide, Total			U		ND	ug/L				06/12/17	11:43
QC1203808581	425115001	MS									
Cyanide, Total	100	U	ND		108	ug/L		108	(90%-110%)	06/12/17	12:10

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1672927										
QC1203808702	425075004	DUP									
Bromide	J	0.0828	J	0.0829	mg/L	0.121	^	(+/-0.200)	MXL2	06/10/17	01:49
Chloride		3.64		3.64	mg/L	0.0962		(0%-20%)			
Fluoride	J	0.0877	J	0.090	mg/L	2.59	^	(+/-0.100)			
Sulfate		3.88		3.85	mg/L	0.787		(0%-20%)			
QC1203808701	LCS										
Bromide	1.25			1.31	mg/L		105	(80%-120%)		06/09/17	23:25
Chloride	5.00			4.93	mg/L		98.5	(80%-120%)			
Fluoride	2.50			2.57	mg/L		103	(80%-120%)			
Sulfate	10.0			10.2	mg/L		102	(80%-120%)			
QC1203808700	MB										
Bromide			U	ND	mg/L					06/09/17	22:56
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203808703	425075004	PS									
Bromide	1.25	J	0.0828	1.31	mg/L		98.5	(75%-125%)		06/10/17	02:18
Chloride	5.00		3.64	8.91	mg/L		105	(75%-125%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1672927										
Fluoride	2.50	J	0.0877	2.54	mg/L		98.2	(75%-125%)	MXL2	06/10/17	02:18
Sulfate	10.0		3.88	14.0	mg/L		101	(75%-125%)			
Nutrient Analysis											
Batch	1672879										
QC1203808634	425079004	DUP									
Nitrogen, Ammonia			0.182	0.173	mg/L	5.07	^	(+/-0.050)	KLP1	06/13/17	13:10
QC1203808633	LCS										
Nitrogen, Ammonia	1.00			0.937	mg/L		93.7	(90%-110%)		06/13/17	12:52
QC1203808632	MB										
Nitrogen, Ammonia			J	0.0252	mg/L					06/13/17	12:51
QC1203808636	425079004	MS									
Nitrogen, Ammonia	1.00		0.182	1.13	mg/L		94.8	(90%-110%)		06/13/17	13:11
Batch	1672891										
QC1203808654	425121002	DUP									
Nitrogen, Total Kjeldahl			0.385	0.243	mg/L	45.2*	^	(+/-0.100)	KLP1	06/13/17	10:42
QC1203808653	LCS										
Nitrogen, Total Kjeldahl	1.00			0.979	mg/L		97.9	(90%-110%)		06/13/17	10:25
QC1203808652	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					06/13/17	10:24
QC1203808656	425121002	MS									
Nitrogen, Total Kjeldahl	1.00		0.385	1.45	mg/L		107	(90%-110%)		06/13/17	10:43
Batch	1672893										
QC1203808660	425079004	DUP									
Phosphorus, Total as P			0.122	0.103	mg/L	16.9	^	(+/-0.050)	KLP1	06/13/17	14:28

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1672893										
QC1203808659	LCS										
Phosphorus, Total as P	1.00			0.982	mg/L		98.2	(80%-124%)	KLP1	06/13/17	14:24
QC1203808658	MB										
Phosphorus, Total as P			U	ND	mg/L					06/13/17	14:23
QC1203808661	425079004	MS									
Phosphorus, Total as P	1.00	0.122		1.22	mg/L		110	(63%-139%)		06/13/17	14:29
Batch	1673506										
QC1203810167	425075002	DUP									
Nitrogen, Nitrate/Nitrite		0.593		0.591	mg/L	0.338		(0%-20%)	AXH3	06/14/17	08:04
QC1203810165	LCS										
Nitrogen, Nitrate/Nitrite	1.00			0.985	mg/L		98.5	(90%-110%)		06/14/17	08:01
QC1203810166	LCSD										
Nitrogen, Nitrate/Nitrite	1.00			1.00	mg/L	1.51	100	(0%-20%)		06/14/17	08:02
QC1203810164	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					06/14/17	07:59
QC1203810168	425075002	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.593		1.55	mg/L		95.7	(90%-110%)		06/14/17	08:05
Solids Analysis											
Batch	1673668										
QC1203810564	425121001	DUP									
Total Dissolved Solids		139		143	mg/L	0		(0%-5%)	KLP1	06/14/17	10:56
QC1203810562	LCS										
Total Dissolved Solids	300			304	mg/L		101	(95%-105%)		06/14/17	10:56

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Solids Analysis											
Batch	1673668										
QC1203810561	MB										
Total Dissolved Solids			U	ND	mg/L				KLP1	06/14/17	10:56
Titration and Ion Analysis											
Batch	1673522										
QC1203810232	425121001	DUP									
Alkalinity, Total as CaCO3		62.0		61.8	mg/L	0.323		(0%-20%)	RXB5	06/14/17	15:10
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203810229	LCS										
Alkalinity, Total as CaCO3	100			105	mg/L		105	(90%-110%)		06/14/17	13:54
QC1203810235	425121001	MS									
Alkalinity, Total as CaCO3	100	62.0		166	mg/L		104	(80%-120%)		06/14/17	15:12
Batch	1673523										
QC1203810238	425121001	DUP									
pH	H	8.04	H	8.05	SU	0.124		(0%-5%)	RXB5	06/14/17	15:10
QC1203811672	LCS										
pH	7.00			7.00	SU		100	(99%-101%)		06/14/17	14:49
Batch	1678861										
QC1203822828	425121001	DUP									
Conductivity		190		197	umhos/cm	3.31		(0%-10%)	RXB5	06/30/17	13:39
QC1203822826	LCS										
Conductivity	1410			1410	umhos/cm		99.4	(95%-105%)		06/30/17	13:23

Notes:

- < Result is less than value reported
- > Result is greater than value reported
- B The target analyte was detected in the associated blank.

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

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 13-JUN-17	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 351.2, EPA 351.2 SC	Matrix Type: Liquid	Client Code: BRKL, ESHL, NCSW
Batch ID: 1672891	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 424990(38945),425115(2017-1690),425121(2017-1689),425215 Application Issues: Failed Recovery for MS/MSD, or PS/PSD Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
1. Failed RPD for DUP: QC 1203808654DUP 2. Failed Recovery for MS/MSD, or PS/PSD: QC 1203808657MS		1. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: Nitrogen, Total Kjeldahl 1203808654 (CAWA-17-133348DUP) [abs(.243 - .385)* (+/-1 mg/L)]. 2. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity. Nitrogen, Total Kjeldahl 1203808657 (38945-002MS) [111* (90%-110%)].	

Originator's Name:

Kristen Mizzell 13-JUN-17

Data Validator/Group Leader:

Aubrey Kingsbury 13-JUN-17

DATA EXCEPTION REPORT

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

Originator's Name:

Rachael Bell 15-JUN-17

Data Validator/Group Leader:

Elzbieta Szulc 15-JUN-17