

The order of this data package is as follows:

1. Chain-of-Custody/Lab Request
2. Copies of field COCs
3. Validation Report
4. Laboratory analysis

Comments:



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11212

EVENT NAME: Mortandad/Sandia (Cr Inv/MDA C)  
MY2017 Q3

SAMPLE ID: CAMO-17-132206

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05-09-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	12:27		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-33 S1		FIELD PREP:	F	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:	↓		SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:			EXCAVATED:		YES / NO / <input checked="" type="radio"/> 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 Dissolved Oxygen \_\_\_\_\_ Flow (in gpm) \_\_\_\_\_  
Oxidation-Reduction Potential \_\_\_\_\_ pH \_\_\_\_\_ Specific Conductance \_\_\_\_\_  
Temperature \_\_\_\_\_ Turbidity \_\_\_\_\_

COLLECTED BY (PRINT): D. Jaramillo, W. Pryce

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 5/9/2017 1410	RECEIVED BY (Printed Name) (Signature)	Date/Time 5/9/17 1410
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 04/25/2017



## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11212

EVENT NAME: Mortandad/Sandia (Cr Inv/MDA C)  
MY2017 Q3

SAMPLE ID: CAMO-17-132226

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05-09-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	12:27		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSD	
LOCATION ID:	R-33 S1		FIELD PREP:	UF	
LOCATION TYPE:	NA		FIELD QC TYPE:	REG	
TOP DEPTH:			SAMPLE USAGE:	INV	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	MSGP-Hg	1 LITER POLY	1	HNO3	Y	NA
	WSP-CN(T)	250 ML POLY	1	NAOH		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

## SAMPLE COMMENTS:

Sampled ~50 ft. from running diesel generator. Rain lightning + wind during purge. Tent in use over well-head.

## LOCATION COMMENTS:

None

## FIELD PARAMETERS:

Sample Time	12:27	HH:MM	Dissolved Oxygen	5.23	Flow (in gpm)	3.19
Oxidation-Reduction Potential	149.9		pH	7.59	Specific Conductance	142.5
Temperature	18.9		Turbidity	0.43		

COLLECTED BY (PRINT): D. Jaramillo, W. Pryce

RELINQUISHED BY (Printed Name) Daniel Jaramillo (Signature) <i>DJ</i>	Date/Time 5/9/17 1410	RECEIVED BY (Printed Name) S. Sherwood (Signature) <i>S. Sherwood</i>	Date/Time 5/9/17 1410
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 04/25/2017

## DATA VALIDATION REPORT

Chain Of Custody No. 2017-1506

### 1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
422853	EPA:120.1	1				
422853	EPA:150.1	1				
422853	EPA:160.1	1				
422853	EPA:170.0	2				
422853	EPA:245.2	2				
422853	EPA:300.0	1				
422853	EPA:310.1	1				
422853	EPA:335.4	1				
422853	EPA:350.1	1				
422853	EPA:351.2	1				
422853	EPA:353.2	1				
422853	EPA:365.4	1				
422853	SM:A2340B	1				
422853	SW-846:6010C	1				
422853	SW-846:6020	1				
422853	SW-846:6850	1				
422853	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
422853	EPA:120.1	1668500	1668500	1										1			2				
422853	EPA:150.1	1666469	1666469	1										1			1				
422853	EPA:160.1	1665050	1665050	1					1					1			1				
422853	EPA:170.0	NA	NA	2																	
422853	EPA:245.2	1665127	1665125	2					1	1				1			1				
422853	EPA:300.0	1667911	1667911	1					1					1			1				
422853	EPA:310.1	1666465	1666465	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
422853	EPA:335.4	1664861	1664860	1					1	1				1	1			1			
422853	EPA:350.1	1664592	1664591	1					1	1				1				1			
422853	EPA:351.2	1665040	1665039	1					1	1				1				1			
422853	EPA:353.2	1665008	1665008	1					1					1				1			
422853	EPA:365.4	1664600	1664599	1					1	1				1				1			
422853	SM:A2340B	1671958	1671958	1																	
422853	SW-846:6010C	1664554	1664553	1					1	1				1				1			
422853	SW-846:6020	1664562	1664561	1					1	1				1				1			
422853	SW-846:6850	1666241	1666240	1					1	1	1			1							
422853	SW-846:9060	1665822	1665822	1					1					1				1			

### 2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:120.1	GENERAL CHEMISTRY	CAMO-17-132200	1203797706	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-17-132206	1203797705	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-17-132206	422853001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203797704	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-17-132206	422853001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-17-132323	1203792737	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203792736	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-132206	1203790129	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-132206	422853001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203789409	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203789408	MB	1	0	0	0
EPA:170.0	VOC	CAMO-17-132206	422853001	REG	1	0	0	0
EPA:170.0	VOC	CAMO-17-132226	422853002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132206	1203789672	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132206	1203789673	MS	0	0	1	0
EPA:245.2	INORGANIC	CAMO-17-132206	422853001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132226	422853002	REG	1	0	0	0
EPA:245.2	INORGANIC	LCS	1203789671	LCS	0	0	1	0

## DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:245.2	INORGANIC	MB	1203789670	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-132206	1203796224	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-132206	422853001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203796223	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203796222	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-132206	422853001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-17-132323	1203792717	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-17-132323	1203792720	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203792713	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-132225	1203788967	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-132225	1203788969	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-132226	422853002	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203788965	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	LCSD	1203789218	LCSD	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203788964	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-17-132206	422853001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-17-132323	1203788278	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-17-132323	1203788279	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203788275	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203788274	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-132226	422853002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-132332	1203789381	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-132332	1203789383	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203789378	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203789377	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-17-132206	422853001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203789286	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203789285	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	WST15-17-135038	1203789288	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-132206	1203788303	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-132206	1203788305	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-132206	422853001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203788295	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203788294	MB	1	0	0	0
SM:A2340B	INORGANIC	CAMO-17-132206	422853001	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-132206	1203788181	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-132206	1203788182	MS	0	0	17	0
SW-846:6010C	INORGANIC	CAMO-17-132206	422853001	REG	17	0	0	0
SW-846:6010C	INORGANIC	LCS	1203788180	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203788179	MB	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-846:6020	INORGANIC	CAMO-17-132206	1203788201	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAMO-17-132206	1203788202	MS	0	0	11	0
SW-846:6020	INORGANIC	CAMO-17-132206	422853001	REG	11	0	0	0
SW-846:6020	INORGANIC	LCS	1203788200	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203788199	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-132206	422853001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-17-132322	1203792176	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CASA-17-132322	1203792177	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203792175	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203792174	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-132226	422853002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CASA-17-132331	1203791710	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203791231	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203791230	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Blank FS ID	Blank Lab Sample	Blank Type	Analytical Method	Sample	Parameter Name	Blank Lab Result	Lab Qualifier	Blank Lab Units	Blank Lab Detection Limit
MB	1203788179	METHOD BLANK	SW-846:6010C	W	Calcium	51.3	J	ug/L	200
MB	1203788179	METHOD BLANK	SW-846:6010C	W	Vanadium	-1.23	J	ug/L	5.00
MB	1203788199	METHOD BLANK	SW-846:6020	W	Uranium	0.074	J	ug/L	0.200
MB	1203788274	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0497	J	mg/L	0.050



## DATA VALIDATION REPORT

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
CAMO-17-132206	1203788274	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.0497	mg/L	0.0534		0.050	Y	5	100	Y
CAMO-17-132206	1203788179	METHOD BLANK	SW-846:6010C	Vanadium	-1.23	ug/L	5.12		5.00	Y			
CAMO-17-132206	1203788199	METHOD BLANK	SW-846:6020	Uranium	0.074	ug/L	0.833		0.200	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
CAMO-17-132225	1203788969		EPA:335.4	Cyanide (Total)	1664860	05-18-2017	W	113		110	90	10		

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

## DATA VALIDATION REPORT

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
CAMO-17-132206	422853001	1203790129	EPA:160.1	Total Dissolved	W	153	143	mg/L	Y	Y	6.76	5

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-33 S1	2017-1506	CAMO-17-132206	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	I4	N	0.0534	mg/L	0.0534	mg/L			W	05/09/2017		1664592	VAL	Y
R-33 S1	2017-1506	CAMO-17-132206	REG	INIT	GENERAL CHEMISTRY	EPA:160.1	Total Dissolved Solids		J	I10b	Y	153	mg/L	153	mg/L			W	05/09/2017		1665050	VAL	Y
R-33 S1	2017-1506	CAMO-17-132206	REG	INIT	INORGANIC	SW-846:6020	Uranium		J	I4a	Y	0.833	ug/L	0.833	ug/L			W	05/09/2017		1664562	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.
I4a	The affected analytes are considered estimated and biased high because this analyte was identified in the method blank but was >5x
J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualify. The analyte is detected in the sample.
U_LAB	The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-17-132206	R-33 S1	REG	EPA:120.1	0	1
CAMO-17-132206	R-33 S1	REG	EPA:150.1	0	1

## DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-17-132206	R-33 S1	REG	EPA:160.1	0	1
CAMO-17-132206	R-33 S1	REG	EPA:170.0	0	1
CAMO-17-132206	R-33 S1	REG	EPA:245.2	0	1
CAMO-17-132206	R-33 S1	REG	EPA:300.0	0	4
CAMO-17-132206	R-33 S1	REG	EPA:310.1	0	2
CAMO-17-132206	R-33 S1	REG	EPA:350.1	0	1
CAMO-17-132206	R-33 S1	REG	EPA:353.2	0	1
CAMO-17-132206	R-33 S1	REG	EPA:365.4	0	1
CAMO-17-132206	R-33 S1	REG	SM:A2340B	0	1
CAMO-17-132206	R-33 S1	REG	SW-846:6010C	0	17
CAMO-17-132206	R-33 S1	REG	SW-846:6020	0	11
CAMO-17-132206	R-33 S1	REG	SW-846:6850	0	1
CAMO-17-132226	R-33 S1	REG	EPA:170.0	0	1
CAMO-17-132226	R-33 S1	REG	EPA:245.2	0	1
CAMO-17-132226	R-33 S1	REG	EPA:335.4	0	1
CAMO-17-132226	R-33 S1	REG	EPA:351.2	0	1
CAMO-17-132226	R-33 S1	REG	SW-846:9060	0	1

June 05, 2017

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

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

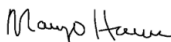
Re: LANL- WQH Water Samples  
Work Order: 422853  
SDG: 2017-1506

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on May 11, 2017, and analyzed for 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: 2017-1506  
Enclosures



**ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)**  
**LANL- WQH Water Samples**  
**Work Order #: 422853**  
**SDG: 2017-1506**

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# Case Narrative

**Case Narrative for  
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)  
LANL- WQH Water Samples  
Workorder #: 422853  
SDG # : 2017-1506**

**June 05, 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 May 11, 2017 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

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

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
422853001	CAMO-17-132206
422853002	CAMO-17-132226

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

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

*Margo Herron*  
Margo Herron for  
Valerie Davis  
Project Manager

**List of current GEL Certifications as of 05 June 2017**

<b>State</b>	<b>Certification</b>
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122017-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-22
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# **Chain of Custody and Supporting Documentation**







Laboratories LLC

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <b>ESHLC</b>		SDG/AR/COC/Work Order: <b>422853</b>	
Received By: <b>ZKW</b>		Date Received: <b>5/11/17</b>	
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <b>5908 1782 0584</b> <b>5908 1782 0595</b> <b>5908 1782 0600</b>	
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 ≤ deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet Ice <input checked="" type="checkbox"/> Ice Packs Dry ice None Other: _____ *all temperatures are recorded in Celsius <b>TEMP: 22</b>
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 type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe) <b>One PCB Cont. for -135039 rec'd broken</b>
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 type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected: <b>See Below</b>
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):

\* We didn't receive a 2nd vial for -135041  
 \* We only received the vials for -135022  
 \* We didn't receive samples -132206 or -132226

PM (or PMA) review: Initials

**JP**

Date

**5/11/17**

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GL-CHL-SR-001 Rev 5



Laboratories LLC

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <b>ESHL</b>		SDG/AR/COC/Work Order: <b>422072</b>	
Received By: <b>ZKW</b>		Date Received: <b>5/12/17</b>	
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <b>5908 1782 0654</b> <b>5908 1782 0643</b> <b>5908 1782 0632</b>	
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> cpm / mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet Ice <input checked="" type="checkbox"/> Ice Pack Dry ice None Other: _____ *all temperatures are recorded in Celsius <b>TEMP: 2</b>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR3-16</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No ___ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes ___ No ___ N/A ___ <input checked="" type="checkbox"/> Sample ID's and containers affected: _____
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
11 Number of containers received match number indicated on COC?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: <b>we rec'd all Missing Samples from 5/11/17 except the 2nd vial for -135041</b>
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials

**MEAT**

Date

**5/15/17**

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of

GL-CHL-SR-001 Rev 5

**Subject:** RE: Samples Received on 5/11/17  
**From:** "Greene, Keith Robert" <kgreene@lanl.gov>  
**Date:** 5/11/2017 1:05 PM  
**To:** Linda Pullano <lop@gel.com>

2017-1506 is still here will receive tomorrow

**From:** Linda Pullano [mailto:lop@gel.com]  
**Sent:** Thursday, May 11, 2017 11:03 AM  
**To:** Greene, Keith Robert <kgreene@lanl.gov>  
**Cc:** team.davis <team.davis@gel.com>  
**Subject:** Samples Received on 5/11/17

Hi Keith,

We received samples today for four Chains of Custody and have identified a couple of items needing attention:

**COC 2017-1503** One VOA vial not two were received for WST54-17-135622

**COC 2017-1504** One VOA vial not two were received for WST15-17-135041  
One PCB container was received broken for WST15-17-135039

**COC 2017-1506** We did not receive any of the samples for this COC (CAMO-17-132206 and CAMO-17-132226)

Regards,  
**Linda O. Pullano**  
Project Manager Assistant



2040 Savage Road, Charleston, SC 29407 | PO Box 30712, Charleston, SC 29417  
Office Main: 843.556.8171 ext. 4409 | Fax: 843.766.1178  
E-Mail: [lop@gel.com](mailto:lop@gel.com) | Website: [www.gel.com](http://www.gel.com)  
Environmental | Engineering | Surveying | Analytical Testing

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Ask me about GEL's new testing capability for Perfluorinated chemicals (PFCs)!  
<http://www.gellaboratories.com>

# **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 #: 2017-1506  
Work Order #: 422853**

**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: 1666241

Prep Batch Number: 1666240

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
422853001	422853001 (CAMO-17-132206)
1203792178	Interference Check Sample (ICS)
1203792174	Method Blank (MB)
1203792175	Laboratory Control Sample (LCS)
1203792176	422637001(CASA-17-132322) Matrix Spike (MS)
1203792177	422637001(CASA-17-132322) 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 422637001 (CASA-17-132322) was chosen for matrix spike and matrix spike duplicate analysis.

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

In sample 1203792176 (MS) a low recovery of 65% was observed for Perchlorate-101. In sample 1203792177 (MSD) a low recovery of 71% and 50% were observed for Perchlorate and Perchlorate-101, respectively. The acceptance range is from 75-125%. The outliers observed for the matrix spikes may be due to the background concentration in the parent sample, 422637001 (CASA-17-132322). Recoveries in 1203792175 (LCS) and 1203792178 (ICS) were acceptable. 1203792176 (CASA-17-132322MS) and 1203792177 (CASA-17-132322MSD).

##### **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**

A data exception report (DER) 1635606 was generated for samples 1203792176 (CASA-17-132322MS) and 1203792177 (CASA-17-132322MSD) in this SDG/batch.

##### **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: 2017-1506 GEL Work Order: 422853

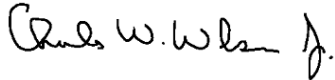
#### The Qualifiers in this report are defined as follows:

- \* 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: Charles Wilson

Date: 31 MAY 2017

Title: Analyst II

# **Sample Data Summary**

## Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1666240Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-132206Date Received: 11-MAY-17GEL Job No (SDG): 2017-1506GEL Sample ID: 422853001Date Filtered: 18-MAY-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	0.435	ug/L		1	19-MAY-17 18:37	per0519026a
	Perchlorate Isotope Ratio			3.1			1	19-MAY-17 18:37	per0519026a
14797-73-0	Perchlorate-101	.05	.2	0.397	ug/L		1	19-MAY-17 18:37	per0519026a
	Perchlorate-O(18)			0.479	ug/L		1	19-MAY-17 18:37	per0519026a

^ 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): 2017-1506

Extract Batch Code: 1666240

Date Filtered: 18-MAY-17

Matrix: WATER

Sample ID: 1203792175

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.201	ug/L	101		85 - 115
Perchlorate Isotope Ratio		2.89				-
Perchlorate-101	0.200	.197	ug/L	99		85 - 115
Perchlorate-O(18)		.473	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):** 2017-1506

**Extract Batch Code:** 1666240

**Date Extracted:** 18-MAY-17

**GEL MS/PS ID:** 1203792176

**Client ID:** CASA-17-132322

**GEL MSD/PSD ID:** 1203792177

**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	1.57	ug/L	1.72	79	1.71	71 *	1	30	75 - 125
Perchlorate Isotope Ratio	0	2.91		2.95		2.98		1		-
Perchlorate-101	0.200	1.52	ug/L	1.65	65 *	1.62	50 *	2	30	75 - 125
Perchlorate-O(18)	0	0.505	ug/L	0.501		.527		5		-

^ 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: 1666240Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 18-MAY-17GEL Job No (SDG): 2017-1506GEL Sample ID: 1203792174Date Filtered: 18-MAY-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-MAY-17 16:40	per0519013a
	Perchlorate Isotope Ratio						1	19-MAY-17 16:40	per0519013a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	19-MAY-17 16:40	per0519013a
	Perchlorate-O(18)			0.478	ug/L		1	19-MAY-17 16:40	per0519013a

^ 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: 1666240Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 18-MAY-17GEL Job No (SDG): 2017-1506GEL Sample ID: 1203792175Date Filtered: 18-MAY-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	0.201	ug/L		1	19-MAY-17 16:49	per0519014a
	Perchlorate Isotope Ratio			2.89			1	19-MAY-17 16:49	per0519014a
14797-73-0	Perchlorate-101	.05	.2	0.197	ug/L	J	1	19-MAY-17 16:49	per0519014a
	Perchlorate-O(18)			0.473	ug/L		1	19-MAY-17 16:49	per0519014a

^ 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 LLC

Client Sample No.

ICSLab Code: GEL

Date Received:

Instrument: LCMSMSGEL Job No (SDG): 2017-1506Method: SW846 6850 ModifiedGEL Sample ID: 1203792178Matrix: WATERDate Filtered: 18-MAY-17Extraction Batch ID: 1666240Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL

%Solids:

Concentrated Extract Volume: 10.0

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.202	ug/L		1	19-MAY-17 16:58	per0519015a
	Perchlorate Isotope Ratio			3.12			1	19-MAY-17 16:58	per0519015a
14797-73-0	Perchlorate-101	.05	.2	0.183	ug/L	J	1	19-MAY-17 16:58	per0519015a
	Perchlorate-O(18)			0.521	ug/L		1	19-MAY-17 16:58	per0519015a

^ 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: 1666240Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-17-132322MSDate Received: 09-MAY-17GEL Job No (SDG): 2017-1506GEL Sample ID: 1203792176Date Filtered: 18-MAY-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	1.72	ug/L		1	19-MAY-17 17:16	per0519017a
	Perchlorate Isotope Ratio			2.95			1	19-MAY-17 17:16	per0519017a
14797-73-0	Perchlorate-101	.05	.2	1.65	ug/L		1	19-MAY-17 17:16	per0519017a
	Perchlorate-O(18)			0.501	ug/L		1	19-MAY-17 17:16	per0519017a

^ 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: 1666240Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CASA-17-132322MSDDate Received: 09-MAY-17GEL Job No (SDG): 2017-1506GEL Sample ID: 1203792177Date Filtered: 18-MAY-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	1.71	ug/L		1	19-MAY-17 17:25	per0519018a
	Perchlorate Isotope Ratio			2.98			1	19-MAY-17 17:25	per0519018a
14797-73-0	Perchlorate-101	.05	.2	1.62	ug/L		1	19-MAY-17 17:25	per0519018a
	Perchlorate-O(18)			0.527	ug/L		1	19-MAY-17 17:25	per0519018a

^ 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 =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

# Miscellaneous

### DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 25-MAY-17	<b>Division:</b> Federal	<b>Quality Criteria:</b> Others	<b>Type:</b> Process
<b>Instrument Type:</b> LC-MS/MS	<b>Test / Method:</b> SW846-6850 Modified	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ARSL004
<b>Batch ID:</b> 1666241	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 422637(2017-1489),422638(2017-1490),422730(2017-1496),422853(2017-1506),422859(2017-1505),422869(2017-1504),423072(2017-1517),423077(2017-1516),423224(2017-1524) <b>Application Issues:</b> Failed Recovery for MS/MSD, or PS/PSD			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. In sample 1203792176 (MS) a low recovery of 65% was observed for Perchlorate-101. In sample 1203792177 (MSD) a low recovery of 71% and 50% were observed for Perchlorate and Perchlorate-101, respectively. The acceptance range is from 75-125%.		1. The outliers observed for the matrix spikes may be due to the background concentration in the parent sample, 422637001 (CASA-17-132322). Recoveries in 1203792175 (LCS) and 1203792178 (ICS) were acceptable. Will report data and note in case narrative.	

**Originator's Name:**

Grace Cappelmann 25-MAY-17

**Data Validator/Group Leader:**

Charles Wilson 31-MAY-17

# Metals Analysis

# Case Narrative



**Metals**  
**Technical Case Narrative**  
**ARS International, LLC (ARSL)**  
**SDG #: 2017-1506**  
**Work Order #: 422853**

<b>Sample ID</b>	<b>Client ID</b>
422853001	CAMO-17-132206
422853002	CAMO-17-132226
1203788179	Method Blank (MB) <b>ICP</b>
1203788180	Laboratory Control Sample (LCS)
1203788183	422853001(CAMO-17-132206L) Serial Dilution (SD)
1203788181	422853001(CAMO-17-132206D) Sample Duplicate (DUP)
1203788182	422853001(CAMO-17-132206S) Matrix Spike (MS)
1203788199	Method Blank (MB) <b>ICP-MS</b>
1203788200	Laboratory Control Sample (LCS)
1203788203	422853001(CAMO-17-132206L) Serial Dilution (SD)
1203788201	422853001(CAMO-17-132206D) Sample Duplicate (DUP)
1203788202	422853001(CAMO-17-132206S) Matrix Spike (MS)
1203789670	Method Blank (MB) <b>CVAA</b>
1203789671	Laboratory Control Sample (LCS)
1203789674	422853001(CAMO-17-132206L) Serial Dilution (SD)
1203789672	422853001(CAMO-17-132206D) Sample Duplicate (DUP)
1203789673	422853001(CAMO-17-132206S) Matrix Spike (MS)

**Sample Analysis**

Samples 422853001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

**Method/Analysis Information**

<b>Analytical Batch:</b>	1664554, 1664562, 1665127 and 1671958
<b>Prep Batch :</b>	1664553, 1664561 and 1665125
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 28, GL-MA-E-006 REV# 13, GL-MA-E-014 REV# 29, GL-MA-E-010 REV# 34 and GL-GC-E-107 REV# 10
<b>Analytical Method:</b>	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
<b>Prep Method :</b>	SW846 3005A and EPA 245.1/245.2 Prep

**Preparation/Analytical Method Verification**

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

**System Configuration**

The Hardness as CaCO<sub>3</sub> is calculated from Calcium and Magnesium results.

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

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

### **Calibration Information**

#### **Instrument Calibration**

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

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

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 422853001 (CAMO-17-132206)-ICP.

#### **ICSA/ICSAB Statement**

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria. However, the ICSA contained 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: 422853001 (CAMO-17-132206)-ICP, ICP-MS and CVAA.

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

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration

is less than four times (4X) the spike concentration added. The matrix spike met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes.

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

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. The relative percent differences (RPD) between the sample and its duplicate (DUP) were within acceptable limits for all applicable analytes.

#### **Serial Dilution % Difference Statement**

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

#### **Technical Information**

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

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

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

All procedures were performed as stated in the SOP.

##### **Sample Dilutions**

The samples in this SDG did not require dilutions.

##### **Preparation Information**

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

#### **Miscellaneous Information**

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

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

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

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

A data exception report was not required for this SDG.

##### **Additional Comments**

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

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

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

**Certification Statement**

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

## **GEL LABORATORIES LLC**

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

### **Qualifier Definition Report for**

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

Client SDG: 2017-1506 GEL Work Order: 422853

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

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

#### **Review/Validation**

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

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

**Signature:**



**Name: Nik-Cole Elmore**

**Date: 07 JUN 2017**

**Title: Data Validator**

# **Sample Data Summary**

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

**SDG No:** 2017-1506**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 422853001**BASIS:** As Received**DATE COLLECTED** 09-MAY-17**CLIENT ID:** CAMO-17-132206**LEVEL:** Low**DATE RECEIVED** 11-MAY-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	05/16/17 10:27	051617W2-5	1665127

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

SDG No: 2017-1506

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 422853001

BASIS: As Received

DATE COLLECTED 09-MAY-17

CLIENT ID: CAMO-17-132206

LEVEL: Low

DATE RECEIVED 11-MAY-17

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	200	ug/L	U	68	200	200	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	05/25/17 23:21	170525-3	1664562
7440-38-2	Arsenic	2.59	ug/L	J	2	5	5	1	MS	PRB	05/25/17 23:21	170525-3	1664562
7440-39-3	Barium	33.1	ug/L		1	5	5	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	05/25/17 23:21	170525-3	1664562
7440-70-2	Calcium	12300	ug/L		50	200	200	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7440-47-3	Chromium	5.28	ug/L	J	3	10	10	1	MS	PRB	05/25/17 23:21	170525-3	1664562
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	05/26/17 18:54	170526-4	1664562
7439-95-4	Magnesium	3860	ug/L		110	300	300	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7439-98-7	Molybdenum	1.13	ug/L		0.2	0.5	0.5	1	MS	PRB	05/25/17 23:21	170525-3	1664562
7440-02-0	Nickel	1.33	ug/L	J	0.6	2	2	1	MS	PRB	05/25/17 23:21	170525-3	1664562
7440-09-7	Potassium	1630	ug/L		50	150	150	1	P	HSC	06/07/17 06:28	060717-1	1664554
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	05/25/17 23:21	170525-3	1664562
7631-86-9	Silica	79800	ug/L		53	213	213	1	P	HSC	06/07/17 06:28	060717-1	1664554
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	PRB	05/25/17 23:21	170525-3	1664562
7440-23-5	Sodium	12900	ug/L		100	300	300	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7440-24-6	Strontium	52.9	ug/L		1	5	5	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	05/26/17 18:54	170526-4	1664562
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7440-61-1	Uranium	0.833	ug/L		0.067	0.2	0.2	1	MS	PRB	05/26/17 18:54	170526-4	1664562
7440-62-2	Vanadium	5.12	ug/L		1	5	5	1	P	JWJ	05/18/17 15:50	051817-2	1664554
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	JWJ	05/18/17 15:50	051817-2	1664554



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

**SDG No:** 2017-1506**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 422853001**BASIS:** As Received**DATE COLLECTED** 09-MAY-17**CLIENT ID:** CAMO-17-132206**LEVEL:** Low**DATE RECEIVED** 11-MAY-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	46.6	mg/L		0.453	1.24	1.24	1		TXT1	06/07/17 13:00		1671958

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1664554	1664553	SW846 3005A	50	mL	50	mL	05/15/17	SXW1
1664562	1664561	SW846 3005A	50	mL	50	mL	05/15/17	SXW1
1665127	1665125	EPA 245.1/245.2 Prep	20	mL	20	mL	05/15/17	AXS5

**\*Analytical Methods:**

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

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

**SDG No:** 2017-1506**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 422853002**BASIS:** As Received**DATE COLLECTED** 09-MAY-17**CLIENT ID:** CAMO-17-132226**LEVEL:** Low**DATE RECEIVED** 11-MAY-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	05/16/17 10:35	051617W2-5	1665127

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1665127	1665125	EPA 245.1/245.2 Prep	20	mL	20	mL	05/15/17	AXS5

**\*Analytical Methods:**

AV EPA 245.2 1974

# **Quality Control Summary**

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

SDG NO. 2017-1506

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>
1203788179	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	51.3	ug/L	+/-200	J	P	50	200
	Beryllium	1	ug/L	+/-5	U	P	1	5
	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	-1.23	ug/L	+/-5	J	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
1203788199	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	2	ug/L	+/-5	U	MS	2	5
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Uranium	0.074	ug/L	+/-0.2	J	MS	0.067	0.2
1203789670	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. 2017-1506 Client ID: CAMO-17-132206S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 422853001 Spike ID: 1203788182

<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	5220		68	U	5000	104		P
Barium	ug/L	75-125	549		33.1		500	103		P
Beryllium	ug/L	75-125	518		1	U	500	104		P
Boron	ug/L	75-125	530		15	U	500	103		P
Calcium	ug/L	75-125	17300		12300		5000	99.6		P
Cobalt	ug/L	75-125	513		1	U	500	103		P
Copper	ug/L	75-125	536		3	U	500	107		P
Iron	ug/L	75-125	5360		30	U	5000	107		P
Magnesium	ug/L	75-125	9010		3860		5000	103		P
Manganese	ug/L	75-125	514		2	U	500	103		P
Potassium	ug/L	75-125	6950		1630		5000	106		P
Silica	ug/L		91400		79800		10700	109	N/A	P
Sodium	ug/L	75-125	18300		12900		5000	108		P
Strontium	ug/L	75-125	566		52.9		500	103		P
Tin	ug/L	75-125	514		2.5	U	500	103		P
Vanadium	ug/L	75-125	528		5.12		500	105		P
Zinc	ug/L	75-125	522		3.3	U	500	104		P

\*Analytical Methods:

P SW846 3005A/6010C

## METALS

-5a-

## Matrix Spike Summary

SDG NO. 2017-1506 Client ID CAMO-17-132206S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 422853001 Spike ID: 1203788202

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Antimony	ug/L	75-125	48.5		1	U	50	96.5		MS
Arsenic	ug/L	75-125	50.5		2.59	J	50	95.9		MS
Cadmium	ug/L	75-125	50.2		0.3	U	50	100		MS
Chromium	ug/L	75-125	52.9		5.28	J	50	95.3		MS
Lead	ug/L	75-125	52.4		0.5	U	50	105		MS
Molybdenum	ug/L	75-125	51.7		1.13		50	101		MS
Nickel	ug/L	75-125	48.8		1.33	J	50	95		MS
Selenium	ug/L	75-125	49.2		2	U	50	97.9		MS
Silver	ug/L	75-125	49.8		0.3	U	50	99.6		MS
Thallium	ug/L	75-125	46.9		0.6	U	50	93.6		MS
Uranium	ug/L	75-125	52.5		0.833		50	103		MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

-5a-

## Matrix Spike Summary

**SDG NO.** 2017-1506 **Client ID:** CAMO-17-132206S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 422853001 **Spike ID:** 1203789673

<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		0.067	U	2	100		AV

## \*Analytical Methods:

AV EPA 245.1/245.2

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

SDG No.: 2017-1506

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-17-132206D

Matrix: WATER

Level: Low

Sample ID: 422853001

Duplicate ID: 1203788181

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-20%	33.1		32.1		2.89		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	12300		11900		3.18		P
Cobalt	ug/L		1 U		1 U				P
Copper	ug/L		3 U		3 U				P
Iron	ug/L		30 U		30 U				P
Magnesium	ug/L	+/-20%	3860		3750		2.87		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1630		1580		3.01		P
Silica	ug/L	+/-20%	79800		77900		2.35		P
Sodium	ug/L	+/-20%	12900		12500		2.98		P
Strontium	ug/L	+/-20%	52.9		51		3.62		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	5.12		4.82 J		6		P
Zinc	ug/L		3.3 U		3.3 U				P

\*Analytical Methods:

P SW846 3005A/6010C



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

SDG No.: 2017-1506

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-17-132206D

Matrix: WATER

Level: Low

Sample ID: 422853001

Duplicate ID: 1203788201

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L	+/-5	2.59 J		2.53 J		2.15		MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L	+/-10	5.28 J		5.02 J		4.97		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.13		1.16		2.44		MS
Nickel	ug/L	+/-2	1.33 J		1.19 J		11.5		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	+/- .2	0.833		0.919		9.82		MS

\*Analytical Methods:

MS SW846 3005A/6020A

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

**SDG No.:** 2017–1506**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAMO–17–132206D**Matrix:** WATER**Level:** Low**Sample ID:** 422853001**Duplicate ID:** 1203789672**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. 2017-1506

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>
1203788180								
	Aluminum	ug/L	5000	5300		106	80-120	P
	Barium	ug/L	500	528		106	80-120	P
	Beryllium	ug/L	500	520		104	80-120	P
	Boron	ug/L	500	515		103	80-120	P
	Calcium	ug/L	5000	5380		108	80-120	P
	Cobalt	ug/L	500	524		105	80-120	P
	Copper	ug/L	500	530		106	80-120	P
	Iron	ug/L	5000	5460		109	80-120	P
	Magnesium	ug/L	5000	5400		108	80-120	P
	Manganese	ug/L	500	525		105	80-120	P
	Potassium	ug/L	5000	5320		106	80-120	P
	Silica	ug/L	10700	11300		105	80-120	P
	Sodium	ug/L	5000	5510		110	80-120	P
	Strontium	ug/L	500	531		106	80-120	P
	Tin	ug/L	500	519		104	80-120	P
	Vanadium	ug/L	500	523		105	80-120	P
	Zinc	ug/L	500	523		105	80-120	P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

-7-

## Laboratory Control Sample Summary

SDG NO. 2017-1506

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>
1203788200								
	Antimony	ug/L	50	49.2		98.4	80-120	MS
	Arsenic	ug/L	50	50.6		101	80-120	MS
	Cadmium	ug/L	50	52.5		105	80-120	MS
	Chromium	ug/L	50	49.4		98.8	80-120	MS
	Lead	ug/L	50	51.6		103	80-120	MS
	Molybdenum	ug/L	50	50.4		101	80-120	MS
	Nickel	ug/L	50	51.6		103	80-120	MS
	Selenium	ug/L	50	48.4		96.9	80-120	MS
	Silver	ug/L	50	52.4		105	80-120	MS
	Thallium	ug/L	50	45.4		90.8	80-120	MS
	Uranium	ug/L	50	49.3		98.6	80-120	MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

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## Laboratory Control Sample Summary

SDG NO. 2017-1506

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>
1203789671	Mercury	ug/L	2	2.03		102	85-115	AV

## \*Analytical Methods:

AV EPA 245.1/245.2

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2017-1506 **Client ID:** CAMO-17-132206L

**Contract:** ESHL00114

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

**Sample ID:** 422853001 **Serial Dilution ID:** 1203788183

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	33.1		35.5		7.312			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	12300		12700		3.353		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3860		4100		6.293			P
Manganese	2	U	10	U				P
Potassium	1630		1510		6.9			P
Silica	79800		79600		.203		10	P
Sodium	12900		13600		5.576		10	P
Strontium	52.9		54		2.178		10	P
Tin	2.5	U	12.5	U				P
Vanadium	5.12		5	U	40.138			P
Zinc	3.3	U	16.6	J				P

## \*Analytical Methods:

P SW846 3005A/6010C

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2017-1506 **Client ID:** CAMO-17-132206L

**Contract:** ESHL00114

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

**Sample ID:** 422853001 **Serial Dilution ID:** 1203788203

<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>
Antimony	1	U	5	U				MS
Arsenic	2.59	J	10	U	10.66			MS
Cadmium	.3	U	1.5	U				MS
Chromium	5.28	J	15	U	8.996			MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.13		1.44	J	26.543			MS
Nickel	1.33	J	3	U	17.758			MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.833		.87	J	4.442			MS

## \*Analytical Methods:

MS SW846 3005A/6020A

## METALS

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## Serial Dilution Sample Summary

**SDG NO.** 2017-1506 **Client ID:** CAMO-17-132206L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 422853001 **Serial Dilution ID:** 1203789674

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Mercury	.067	U	.335	U				AV

## \*Analytical Methods:

AV EPA 245.1/245.2



# **General Chem Analysis**

# Case Narrative

**General Chemistry  
Technical Case Narrative  
ARS International, LLC (ARSL)  
SDG #: 2017-1506  
Work Order #: 422853**

**Method/Analysis Information**

**Product:** Carbon and Total Organic

**Analytical Batch:** 1665822

**Method:** SW 9060 Total Organic Carbon

**Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
422853002	CAMO-17-132226
1203791230	Method Blank (MB)
1203791231	Laboratory Control Sample (LCS)
1203791710	422637002(CASA-17-132331) Sample Duplicate (DUP)
1203791711	422637002(CASA-17-132331) Post Spike (PS)

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

**SOP Reference**

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

**Preparation/Analytical Method Verification**

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

**Calibration Information**

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

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

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

**Calibration Verification Information (CCV)**

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

acceptance limits.

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

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

The MB analyzed with this SDG met the acceptance criteria.

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

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.

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

Sample 422637002 (CASA-17-132331) was selected for QC analysis.

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

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

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

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

### **Technical Information**

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

#### **Holding Times**

All samples in this SDG met the specified holding time.

#### **Sample Preservation/Integrity**

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

#### **Sample Dilutions**

The samples in this SDG did not require dilutions.

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

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

### **Miscellaneous Information**

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

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

#### **Additional Comments**

Additional comments were not required for this SDG.

#### **Electronic Packaging Comment**

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

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

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Cyanide and Total</b>		
<b>Analytical Batch:</b>	1664861	<b>Method:</b>	WSP-CN(T)
<b>Prep Batch :</b>	1664860	<b>Method:</b>	EPA 335.4

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
422853002	CAMO-17-132226
1203788964	Method Blank (MB)
1203788965	Laboratory Control Sample (LCS)
1203789218	Laboratory Control Sample Duplicate (LCSD)
1203788967	423072002(CAMO-17-132225) Sample Duplicate (DUP)
1203788969	423072002(CAMO-17-132225) 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.

### **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 423072002 (CAMO-17-132225) was selected for QC analysis.

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

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

Analyte	Sample	Value
Cyanide, Total	1203788969 (CAMO-17-132225MS)	113* (90%-110%)

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

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

A data exception report (DER) 1633248 was generated for sample 1203788969 (CAMO-17-132225MS) 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:** Ion Chromatography

**Analytical Batch:** 1667911

**Method:** WSP-ANIONS

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
422853001	CAMO-17-132206
1203796222	Method Blank (MB)
1203796223	Laboratory Control Sample (LCS)
1203796224	422853001(CAMO-17-132206) Sample Duplicate (DUP)
1203796225	422853001(CAMO-17-132206) Post Spike (PS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Continuing Calibration Blanks**

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

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

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

### **Y Intercept Rule**

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

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

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

The MB analyzed with this SDG met the acceptance criteria.

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

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.

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

Sample 422853001 (CAMO-17-132206) was selected for QC analysis.

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

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

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

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

### **Technical Information**

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

#### **Holding Times**

All samples in this SDG met the specified holding time.

#### **Sample Dilutions**

The samples in this SDG did not require dilutions.

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

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

### **Miscellaneous Information**

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

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

#### **Manual Integrations**

Samples 1203796224 (CAMO-17-132206DUP), 1203796225 (CAMO-17-132206PS) and 422853001 (CAMO-17-132206) were manually integrated to correctly position the baseline as set in the calibration standards.

#### **Additional Comments**

Additional comments were not required for this SDG.

#### **Electronic Packaging Comment**

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

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

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Ammonia Nitrogen</b>		
<b>Analytical Batch:</b>	1664592	<b>Method:</b>	NH3
<b>Prep Batch :</b>	1664591	<b>Method:</b>	EPA 350.1 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
422853001	CAMO-17-132206
1203788274	Method Blank (MB)
1203788275	Laboratory Control Sample (LCS)
1203788278	422730001(CASA-17-132323) Sample Duplicate (DUP)
1203788279	422730001(CASA-17-132323) 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 422730001 (CASA-17-132323) was selected for QC analysis.

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

Samples 1203788274 (MB) and 1203788275 (LCS) were re-analyzed due to instrument failure. The results from the reanalysis are reported.

**Miscellaneous Information**

**Data Exception (DER) Documentation**

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

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

<b>Product:</b>	<b>Total Kjeldahl Nitrogen</b>		
<b>Analytical Batch:</b>	1665040	<b>Method:</b>	TKN
<b>Prep Batch :</b>	1665039	<b>Method:</b>	EPA 351.2 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
422853002	CAMO-17-132226
1203789377	Method Blank (MB)
1203789378	Laboratory Control Sample (LCS)
1203789381	422730002(CASA-17-132332) Sample Duplicate (DUP)
1203789383	422730002(CASA-17-132332) 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 422730002 (CASA-17-132332) 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**

Sample1203789378 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported. Samples1203789377 (MB) and 1203789378 (LCS) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

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

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

**Additional Comments**



Additional comments were not required for this SDG.

**Electronic Packaging Comment**

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

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

### **Method/Analysis Information**

**Product:** Nitrate Nitrite by Cadmium Reduction

**Analytical Batch:** 1665008

**Method:** NO3NO2

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
422853001	CAMO-17-132206
1203789285	Method Blank (MB)
1203789286	Laboratory Control Sample (LCS)
1203789288	422869001(WST15-17-135038) Sample Duplicate (DUP)
1203789291	422869001(WST15-17-135038) Post Spike (PS)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8500 Series.

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Calibration Verification Information**

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

### **Continuing Calibration Blanks**

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

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

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

**Y Intercept Rule**

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

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

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample Duplicate (LCSD)**

An LCSD was not used in place of matrix QC.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 422869001 (WST15-17-135038) was selected for QC analysis.

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

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

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Preservation/Integrity**

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

**Sample Dilutions**

The following sample 422853001 (CAMO-17-132206) in this sample group was diluted due to matrix interference. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	422853
	001
Nitrogen, Nitrate/Nitrite	5X

**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**

<b>Product:</b>	<b>Total Phosphorus</b>		
<b>Analytical Batch:</b>	1664600	<b>Method:</b>	PO4
<b>Prep Batch :</b>	1664599	<b>Method:</b>	EPA 365.4 Prep

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
422853001	CAMO-17-132206
1203788294	Method Blank (MB)
1203788295	Laboratory Control Sample (LCS)
1203788303	422853001(CAMO-17-132206) Sample Duplicate (DUP)
1203788305	422853001(CAMO-17-132206) 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 422853001 (CAMO-17-132206) 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:** 1665050

**Method:** TDS

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
422853001	CAMO-17-132206
1203789408	Method Blank (MB)
1203789409	Laboratory Control Sample (LCS)
1203790129	422853001(CAMO-17-132206) 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 422853001 (CAMO-17-132206) was selected for QC analysis.

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

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

Analyte	Sample	Value
Total Dissolved Solids	1203790129 (CAMO-17-132206DUP)	6.76* (0%-5%)

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**Data Exception (DER) Documentation**

A data exception report (DER) 1632988 was generated for sample 1203790129 (CAMO-17-132206DUP) 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:** Specific Conductivity

**Analytical Batch:** 1668500

**Method:** EPA120.1 Specific Conductivity

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
422853001	CAMO-17-132206
1203797704	Laboratory Control Sample (LCS)
1203797705	422853001(CAMO-17-132206) Sample Duplicate (DUP)
1203797706	423194001(CAMO-17-132200) Sample Duplicate (DUP)

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

### **SOP Reference**

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

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

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

### **Calibration Information**

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

### **Initial Calibration**

All initial calibration requirements have been met for this SDG.

### **Initial Standardization**

The titrant was properly standardized

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

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

An LCSD was not used in place of matrix QC.

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

The LCS spike recovery met the acceptance limits.

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

Samples 422853001 (CAMO-17-132206) and 423194001 (CAMO-17-132200) were selected for QC analysis.

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

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

**Technical Information**

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

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

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

**Miscellaneous Information**

**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:** 1666469 **Method:** PH

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
422853001	CAMO-17-132206
1203792736	Laboratory Control Sample (LCS)
1203792737	422730001(CASA-17-132323) 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 422730001 (CASA-17-132323) 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
1203792737 (CASA-17-132323DUP)	pH	Received 10-MAY-17, out of holding 08-MAY-17
422853001 (CAMO-17-132206)	pH	Received 11-MAY-17, out of holding 09-MAY-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) 1633517 was generated for samples 422853001 (CAMO-17-132206) and 1203792737 (CASA-17-132323DUP) 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:** 1666465      **Method:** EPA 310.1 Total Alkalinity

### **Sample Analysis**

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

<b>Sample ID</b>	<b>Client ID</b>
422853001	CAMO-17-132206
1203792713	Laboratory Control Sample (LCS)
1203792717	422730001(CASA-17-132323) Sample Duplicate (DUP)
1203792720	422730001(CASA-17-132323) 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 422730001 (CASA-17-132323) 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**

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### **Qualifier Definition Report for**

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

Client SDG: 2017-1506 GEL Work Order: 422853


#### **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:** 05 JUN 2017

**Title:** Analyst I



# **Sample Data Summary**

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: June 5, 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: 2017-1506

Client Sample ID: CAMO-17-132206  
Sample ID: 422853001  
Matrix: W  
Collect Date: 09-MAY-17 12:27  
Receive Date: 11-MAY-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	05/23/17	2339	1667911	1
Chloride		2.43	0.067	0.200	mg/L		1					
Fluoride		0.222	0.033	0.100	mg/L		1					
Sulfate		3.70	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0534	0.017	0.050	mg/L	1.00	1	KLP1	05/15/17	1335	1664592	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.500	0.085	0.250	mg/L		5	AXH3	05/17/17	0617	1665008	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.0422	0.020	0.050	mg/L	1.00	1	KLP1	05/16/17	1432	1664600	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		153	3.40	14.3	mg/L			KLP1	05/16/17	1528	1665050	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		64.8	1.45	4.00	mg/L			RXB5	05/18/17	1923	1666465	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		131	1.00	1.00	umhos/cm		1	VH1	05/30/17	1522	1668500	7
PH "As Received"												
pH at Temp 18.0C	H	7.84	0.010	0.100	SU		1	RXB5	05/18/17	1921	1666469	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	05/15/17	1134	1664591
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	05/15/17	1700	1664599

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## Certificate of Analysis

Report Date: June 5, 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: 2017-1506

Client Sample ID: CAMO-17-132206  
Sample ID: 422853001

Project: ESHL00114  
Client ID: ARSL004

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

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

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 5, 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: 2017-1506

Client Sample ID: CAMO-17-132226  
Sample ID: 422853002  
Matrix: W  
Collect Date: 09-MAY-17 12:27  
Receive Date: 11-MAY-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	U	ND	0.330	1.00	mg/L		1	TSM	05/20/17	0731	1665822	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	05/18/17	0954	1664861	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl		0.123	0.033	0.100	mg/L	1.00	1	KLP1	05/24/17	1026	1665040	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	05/18/17	0902	1664860
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	05/23/17	1700	1665039

The following Analytical Methods were performed:

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

### Notes:

Column headers are defined as follows:

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

# **Quality Control Summary**

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: June 5, 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: 422853

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1665822										
QC1203791710	422637002	DUP									
Total Organic Carbon Average	J	0.332	U	ND	mg/L	200	^		TSM	05/20/17	02:26
QC1203791231	LCS										
Total Organic Carbon Average	10.0			9.84	mg/L		98.4	(80%-120%)		05/20/17	01:27
QC1203791230	MB										
Total Organic Carbon Average			U	ND	mg/L					05/20/17	01:16
QC1203791711	422637002	PS									
Total Organic Carbon Average	10.0	J	0.332	9.82	mg/L		94.9	(75%-125%)		05/20/17	03:13
<b>Flow Injection Analysis</b>											
Batch	1664861										
QC1203788967	423072002	DUP									
Cyanide, Total		5.42		5.45	ug/L	0.552	^	(+/-5.00)	AXH3	05/18/17	10:21
QC1203788965	LCS										
Cyanide, Total	50.0			54.3	ug/L		109	(90%-110%)		05/18/17	09:51
QC1203789218	LCSD										
Cyanide, Total	50.0			54.8	ug/L	0.917	110	(0%-20%)		05/18/17	09:52
QC1203788964	MB										
Cyanide, Total			U	ND	ug/L					05/18/17	09:50
QC1203788969	423072002	MS									
Cyanide, Total	100		5.42	118	ug/L		113 *	(90%-110%)		05/18/17	10:22

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## QC Summary

Workorder: 422853

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1667911										
QC1203796224	422853001	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MXL2	05/24/17	00:08
Chloride			2.43		2.43	mg/L	0.0246	(0%-20%)			
Fluoride			0.222		0.223	mg/L	0.449 ^	(+/-0.100)			
Sulfate			3.70		3.64	mg/L	1.83	(0%-20%)			
QC1203796223	LCS										
Bromide	1.25				1.32	mg/L	106	(80%-120%)		05/23/17	23:10
Chloride	5.00				5.13	mg/L	103	(80%-120%)			
Fluoride	2.50				2.63	mg/L	105	(80%-120%)			
Sulfate	10.0				10.4	mg/L	104	(80%-120%)			
QC1203796222	MB										
Bromide			U		ND	mg/L				05/23/17	22:41
Chloride			U		ND	mg/L					
Fluoride			U		ND	mg/L					
Sulfate			U		ND	mg/L					
QC1203796225	422853001	PS									
Bromide	1.25	U	ND		1.40	mg/L	109	(75%-125%)		05/24/17	00:37
Chloride	5.00		2.43		7.94	mg/L	110	(75%-125%)			

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## QC Summary

Workorder: 422853

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1667911										
Fluoride	2.50	0.222		2.85	mg/L		105	(75%-125%)	MXL2	05/24/17	00:37
Sulfate	10.0	3.70		14.5	mg/L		108	(75%-125%)			
<b>Nutrient Analysis</b>											
Batch	1664592										
QC1203788278	422730001	DUP									
Nitrogen, Ammonia		J	0.0457	U	ND	mg/L	200	^	KLP1	05/15/17	13:21
QC1203788275	LCS										
Nitrogen, Ammonia	1.00			0.932	mg/L		93.2	(90%-110%)		05/15/17	13:20
QC1203788274	MB										
Nitrogen, Ammonia		J	0.0497		mg/L					05/15/17	13:19
QC1203788279	422730001	MS									
Nitrogen, Ammonia	1.00	J	0.0457		0.971	mg/L		92.5	(90%-110%)		05/15/17 13:22
Batch	1664600										
QC1203788303	422853001	DUP									
Phosphorus, Total as P		J	0.0422	J	0.0439	mg/L	3.95	^	(+/-0.050)	KLP1	05/16/17 14:33
QC1203788295	LCS										
Phosphorus, Total as P	1.00			0.957	mg/L		95.7	(80%-124%)		05/16/17	14:20
QC1203788294	MB										
Phosphorus, Total as P		U		ND	mg/L					05/16/17	14:20
QC1203788305	422853001	MS									
Phosphorus, Total as P	1.00	J	0.0422		1.10	mg/L		106	(63%-139%)		05/16/17 14:34
Batch	1665008										
QC1203789288	422869001	DUP									
Nitrogen, Nitrate/Nitrite		U	ND	U	ND	mg/L	N/A		AXH3	05/17/17	06:20



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## QC Summary

Workorder: 422853

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Nutrient Analysis</b>											
Batch	1665008										
QC1203789286	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.01	mg/L		101	(90%-110%)	AXH3	05/17/17	06:12
QC1203789285	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					05/17/17	06:11
QC1203789291	422869001	PS									
Nitrogen, Nitrate/Nitrite	1.00	U	ND	0.949	mg/L		94.9	(90%-110%)		05/17/17	06:22
Batch	1665040										
QC1203789381	422730002	DUP									
Nitrogen, Total Kjeldahl		0.130	J	0.050	mg/L	88.9	^	(+/-0.100)	KLP1	05/24/17	10:22
QC1203789378	LCS										
Nitrogen, Total Kjeldahl	1.00			1.05	mg/L		105	(90%-110%)		05/24/17	10:18
QC1203789377	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					05/24/17	10:06
QC1203789383	422730002	MS									
Nitrogen, Total Kjeldahl	1.00	0.130		1.20	mg/L		107	(90%-110%)		05/24/17	10:22
<b>Solids Analysis</b>											
Batch	1665050										
QC1203790129	422853001	DUP									
Total Dissolved Solids		153		143	mg/L	6.76*		(0%-5%)	KLP1	05/16/17	15:28
QC1203789409	LCS										
Total Dissolved Solids	300			289	mg/L		96.2	(95%-105%)		05/16/17	15:28
QC1203789408	MB										
Total Dissolved Solids			U	ND	mg/L					05/16/17	15:28

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## QC Summary

Workorder: 422853

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1666465										
QC1203792717	422730001	DUP									
Alkalinity, Total as CaCO3		42.4		41.8	mg/L	1.43		(0%-20%)	RXB5	05/18/17	18:51
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203792713	LCS										
Alkalinity, Total as CaCO3	100			106	mg/L		106	(90%-110%)		05/18/17	18:33
QC1203792720	422730001	MS									
Alkalinity, Total as CaCO3	100	42.4		149	mg/L		106	(80%-120%)		05/18/17	18:54
Batch	1666469										
QC1203792737	422730001	DUP									
pH	H	7.98	H	7.98	SU	0		(0%-5%)	RXB5	05/18/17	18:52
QC1203792736	LCS										
pH	7.00			6.99	SU		99.9	(99%-101%)		05/18/17	18:33
Batch	1668500										
QC1203797705	422853001	DUP									
Conductivity		131		133	umhos/cm	1.52		(0%-10%)	VH1	05/30/17	15:23
QC1203797706	423194001	DUP									
Conductivity		511		512	umhos/cm	0.196		(0%-10%)		05/30/17	15:26
QC1203797704	LCS										
Conductivity	1410			1400	umhos/cm		99.2	(95%-105%)		05/30/17	15:09

- Notes:**
- < Result is less than value reported
  - > Result is greater than value reported
  - B The target analyte was detected in the associated blank.
  - E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
  - H Analytical holding time was exceeded

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 422853

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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			
<b>Mo.Day Yr.</b> 17-MAY-17	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> BALANCE ANALYTICAL	<b>Test / Method:</b> EPA 160.1, SM 2540C	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL
<b>Batch ID:</b> 1665050	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 422853(2017-1506)</b> <b>Application Issues:</b> Failed RPD for DUP			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>  1. Failed RPD for DUP: QC   1203790129DUP		1. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: Total Dissolved Solids 1203790129 (CAMO-17-132206DUP) [6.76* (0%-5%)].	

**Originator's Name:**  
Kristen Mizzell      17-MAY-17

**Data Validator/Group Leader:**  
Aubrey Kingsbury      18-MAY-17

DATA EXCEPTION REPORT			
<b>Mo.Day Yr.</b> 18-MAY-17	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LACHAT Flow Injection Analyzer	<b>Test / Method:</b> EPA 335.4, SW846 9012B	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> ESHL, WASP
<b>Batch ID:</b> 1664861	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 422853(2017-1506),423037,423072(2017-1517),423077(2017-1516),423224(2017-1524)</b> <b>Application Issues:</b> Failed Recovery for MS/MSD, or PS/PSD			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
1. Failed Recovery for MS/MSD, or PS/PSD: QC 1203788968MS,1203788969MS		1. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity. Cyanide, Total 1203788968 (17-WS-05-120MS) [77.4* (90.0%-110.0%)] and 1203788969 (CAMO-17-132225MS) [113* (90%-110%)].	

**Originator's Name:**

Aubrey Kingsbury 18-MAY-17

**Data Validator/Group Leader:**

Kristen Mizzell 18-MAY-17

### DATA EXCEPTION REPORT

<b>Mo.Day Yr.</b> 18-MAY-17	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ELECTRODE	<b>Test / Method:</b> EPA 150.1, SM 4500-H B, SW846 9040C	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> CARE, ESHL, FLET, NFSR
<b>Batch ID:</b> 1666469	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG):</b> 422623,422722,422730(2017-1496),422778(CAH-17-041a),422853(2017-1506),422859(2017-1505),422869(2017-1504),423409(EUI-10506) <b>Application Issues:</b> Sample received out of holding			
<b>Specification and Requirements</b> <b>Exception Description:</b>		<b>DER Disposition:</b>	
1. Sample received out of holding:  422623 001  422722 001  422730 001,003,005  422778 001  422853 001  422859 001  422869 001,005  423409 001  QC 1203792737DUP,1203792989DUP		1. Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified. 1203792737 (CASA-17-132323DUP) [Received 10-MAY-17, out of holding 08-MAY-17]. 1203792989 (Bi-Annual SewerDUP) [Received 10-MAY-17, out of holding 09-MAY-17]. 422623001 (Inflow 12) [Received 08-MAY-17, out of holding 08-MAY-17]. 422722001 (Outflow 11) [Received 09-MAY-17, out of holding 09-MAY-17]. 422730001 (CASA-17-132323) [Received 10-MAY-17, out of holding 08-MAY-17]. 422730003 (CASA-17-132324) [Received 10-MAY-17, out of holding 08-MAY-17]. 422730005 (CAMO-17-132524) [Received 10-MAY-17, out of holding 08-MAY-17]. 422778001 (Bi-Annual Sewer) [Received 10-MAY-17, out of holding 09-MAY-17]. 422853001 (CAMO-17-132206) [Received 11-MAY-17, out of holding 09-MAY-17]. 422859001 (CAMO-17-132199) [Received 11-MAY-17, out of holding 09-MAY-17]. 422869001 (WST15-17-135038) [Received 11-MAY-17, out of holding 09-MAY-17]. 422869005 (WST15-17-135039) [Received 11-MAY-17, out of holding 09-MAY-17]. 423409001 (1001-02-0001 L126115) [Received 17-MAY-17, out of holding 15-MAY-17].	

**Originator's Name:**

Rachael Bell 18-MAY-17

**Data Validator/Group Leader:**

Elzbieta Szulc 19-MAY-17