

The order of this data package is as follows:

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

Comments:

[illegible]

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11097

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q2

SAMPLE ID: CAMO-17-129304

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	02-15-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	10:29		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	SIMR-2		FIELD PREP:	F	
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	WSP-All Metals	1 LITER POLY	1	HNO3 ICE	✓	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:

Dissolved Oxygen _____ mg/L Flow (in gpm) _____ GPM Oxidation-Reduction Potential _____ mV
pH _____ SU Specific Conductance _____ uS/cm Temperature _____ deg C
Turbidity _____ NTU

COLLECTED BY (PRINT): A. Toshi, A. Vigil

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 02-15-2017 11:40	RECEIVED BY (Printed Name) (Signature)	Date/Time 2/15/17 11:40
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 01/18/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11097

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q2

SAMPLE ID: CAMO-17-129320

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	02-15-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	10:29		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	SIMR-2		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:

None

LOCATION COMMENTS:

Sampled \approx 50' from running diesel generator

FIELD PARAMETERS:

Dissolved Oxygen	7.45	mg/L	Flow (in gpm)	3.65	GPM	Oxidation-Reduction Potential	251.6	mV
pH	7.87	SU	Specific Conductance	131.8	uS/cm	Temperature	19.9	deg C
Turbidity	0.95	NTU						

COLLECTED BY (PRINT):

A. Tosh, A. Vigil

RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time
Darren Hughes <i>[Signature]</i>	02-15-2017 11:40	Sherwood <i>[Signature]</i>	2/15/17 11:40
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 01/18/2017

DATA VALIDATION REPORT

Chain Of Custody No. 2017-1031

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
416862	EPA:120.1	1				
416862	EPA:150.1	1				
416862	EPA:160.1	1				
416862	EPA:245.2	2				
416862	EPA:300.0	1				
416862	EPA:310.1	1				
416862	EPA:335.4	1				
416862	EPA:350.1	1				
416862	EPA:351.2	1				
416862	EPA:353.2	1				
416862	EPA:365.4	1				
416862	SM:A2340B	1				
416862	SW-846:6010C	1				
416862	SW-846:6020	1				
416862	SW-846:6850	1				
416862	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
416862	EPA:120.1	1640753	1640753	1										1			2				
416862	EPA:150.1	1641364	1641364	1										1			1				
416862	EPA:160.1	1640261	1640261	1					1					1			1				
416862	EPA:245.2	1643872	1643869	2					1	1				1			1				
416862	EPA:300.0	1640559	1640559	1					1					1			1				
416862	EPA:310.1	1641366	1641366	1						1				1			1				
416862	EPA:335.4	1641124	1641123	1					1	1				1			1				
416862	EPA:350.1	1640304	1640302	1					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
416862	EPA:351.2	1639245	1639244	1					1	2				1			2				
416862	EPA:353.2	1641424	1641424	1					1					1			2				
416862	EPA:365.4	1639607	1639606	1					1	1				1			1				
416862	SM:A2340B	1647934	1647934	1																	
416862	SW-846:6010C	1640509	1640508	1					1	1				1			1				
416862	SW-846:6020	1640455	1640454	1					1	1				1			1				
416862	SW-846:6850	1643139	1643138	1					1	1	1			1							
416862	SW-846:9060	1639822	1639822	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-17-129294	1203731715	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-17-129302	1203731716	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-17-129304	416862001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203731714	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-17-129304	416862001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CASA-17-129327	1203733169	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203733168	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-129304	416862001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CASA-17-129327	1203730489	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203730486	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203730485	MB	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-129304	416862001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-129320	416862002	REG	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-129327	1203738957	DUP	1	0	0	0
EPA:245.2	INORGANIC	CASA-17-129327	1203738958	MS	0	0	1	0
EPA:245.2	INORGANIC	LCS	1203738956	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203738955	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-129304	416862001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-129354	1203731282	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203731281	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203731280	MB	4	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-129304	416862001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-17-129327	1203733171	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CASA-17-129327	1203733172	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203733170	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-129320	1203732633	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-129320	1203732636	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-129320	416862002	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203732631	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203732630	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-17-129304	416862001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-17-129327	1203730605	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CASA-17-129327	1203730606	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203730604	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203730603	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-129320	416862002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-129324	1203728877	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-129324	1203728878	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-129331	1203728044	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CASA-17-129331	1203728045	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203728043	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203728042	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-17-129304	416862001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-17-129323	1203733272	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CASA-17-129325	1203733271	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203733270	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203733269	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-129294	1203728893	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-129294	1203728894	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-129304	416862001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203728890	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203728889	MB	1	0	0	0
SM:A2340B	INORGANIC	CAMO-17-129304	416862001	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-129304	416862001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-129354	1203731182	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-129354	1203731183	MS	0	0	17	0
SW-846:6010C	INORGANIC	LCS	1203731181	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203731180	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-17-129304	416862001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-17-129354	1203731014	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAMO-17-129354	1203731015	MS	0	0	11	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	LCS	1203731013	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203731012	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-129294	1203737091	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-129294	1203737092	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-129304	416862001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203737090	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203737089	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-129311	1203731502	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-129320	416862002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203731501	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203731500	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	1203731180	METHOD BLANK	SW-846:6010C	W	Potassium	80.1	J	ug/L	150

No.

6. Any surrogate recoveries outside the control limits?

No.

DATA VALIDATION REPORT

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
CASA-17-129331	1203728045		EPA:351.2	Total Kjeldahl Nitrogen	1639244	02-28-2017	W	80		110	90	110		

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

None.

Reason Code

Description

J_LAB

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

DATA VALIDATION REPORT

Reason Code

Description

NQ

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

U_LAB

The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-17-129304	SIMR-2	REG	EPA:120.1	0	1
CAMO-17-129304	SIMR-2	REG	EPA:150.1	0	1
CAMO-17-129304	SIMR-2	REG	EPA:160.1	0	1
CAMO-17-129304	SIMR-2	REG	EPA:245.2	0	1
CAMO-17-129304	SIMR-2	REG	EPA:300.0	0	4
CAMO-17-129304	SIMR-2	REG	EPA:310.1	0	2
CAMO-17-129304	SIMR-2	REG	EPA:350.1	0	1
CAMO-17-129304	SIMR-2	REG	EPA:353.2	0	1
CAMO-17-129304	SIMR-2	REG	EPA:365.4	0	1
CAMO-17-129304	SIMR-2	REG	SM:A2340B	0	1
CAMO-17-129304	SIMR-2	REG	SW-846:6010C	0	17
CAMO-17-129304	SIMR-2	REG	SW-846:6020	0	11
CAMO-17-129304	SIMR-2	REG	SW-846:6850	0	1
CAMO-17-129320	SIMR-2	REG	EPA:245.2	0	1
CAMO-17-129320	SIMR-2	REG	EPA:335.4	0	1
CAMO-17-129320	SIMR-2	REG	EPA:351.2	0	1
CAMO-17-129320	SIMR-2	REG	SW-846:9060	0	1

March 13, 2017

gel.com

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

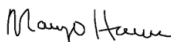
Re: LANL- WQH Water Samples
Work Order: 416862
SDG: 2017-1031

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on February 17, 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: 2017-1031
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 416862
SDG: 2017-1031

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 416862
SDG # : 2017-1031**

March 13, 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 February 17, 2017 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
416862001	CAMO-17-129304
416862002	CAMO-17-129320

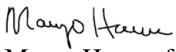
Case Narrative

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 for
Valerie Davis
Project Manager

List of current GEL Certifications as of 13 March 2017

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
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	SC000122016-21
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Chain of Custody and Supporting Documentation



SAMPLE RECEIPT & REVIEW FORM

Client: <u>ESHL</u>		SDG/AR/COC/Work Order: <u>416862</u>
Received By: <u>Thur</u>		Date Received: <u>2/17/17</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>Open</u>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags <u>(blue ice)</u> Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>1°C</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <u>IR23-16</u>
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 VOA vials contain acid preservation?			<input checked="" type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?			<input checked="" type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
14 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
16 Carrier and tracking number.				Circle Applicable: <input checked="" type="checkbox"/> FedEx Air <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>5908 1781 7371</u>

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials For Date 2/20/17 Page 1 of 1

ORIGIN ID:SAFA (505) 665-9966
KEITH GREENE
LOS ALAMOS NATL LAB.
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545
UNITED STATES US

SHIP DATE: 16FEB17
ACTWGT: 58.0 LB MAN
CAD: 0014176/CAFE2916

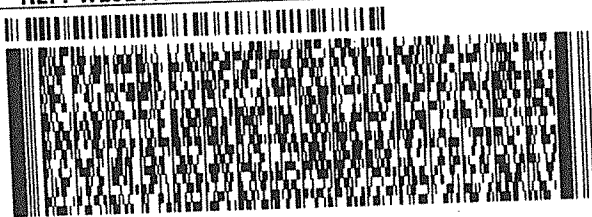
BILL SENDER

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

CHARLESTON SC 29407

(843) 556-8171

REF: WE6L11581000



FedEx
Express



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TRK# 5908 1781 7371
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PRIORITY OVERNIGHT

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SC-US CHS

Part # 156148V-434 R112 06/15



538C1/3388/3298

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 #: 2017-1031
Work Order #: 416862**

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:	1643139
Prep Batch Number:	1643138

Sample Analysis

Sample ID	Client ID
416862001	416862001 (CAMO-17-129304)
1203737093	Interference Check Sample (ICS)
1203737089	Method Blank (MB)
1203737090	Laboratory Control Sample (LCS)
1203737091	416658001(CAMO-17-129294) Matrix Spike (MS)
1203737092	416658001(CAMO-17-129294) 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 416658001 (CAMO-17-129294) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPDs between the MS and MSD met the acceptance limits.

Internal Standard Area Acceptance

The internal standard areas were within the required acceptance criteria for all samples and QC.

Retention Time

During the analysis of Perchlorate by LC/MS/MS, retention time shifts are commonly observed. These retention time shifts, which are caused by fouling of the column by the sample matrices, are problematic when the retention time is used as one of the criterion for confirmation. To overcome this problem, a known amount of O(18) labeled Perchlorate was added to each sample as a retention time standard. The presence of Perchlorate was confirmed by the relative retention time (RRT) of the Perchlorate peak and the O(18) standard. A RRT window of 0.98 to 1.02, as required by DOD QSM 5.0, has been used. In addition to the isotopic ratio, the presence of Perchlorate in the samples associated with this data package have been confirmed using the relative retention criteria stated above, not the absolute retention time.

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG.

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

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

Manual Integrations

Manual integrations were not required for any data file associated with this SDG.

Method Comments

The samples in this SDG were not originally analyzed using EPA Method 314.0.

Additional Comments

The Perchlorate Isotope Ratio on the Form I may differ slightly from the ratio on the corresponding raw data due to rounding rules and/or significant figures or due to software limitations when there are manual integrations, dilutions or other factors. The ratio value of the Form I is the correct value. The retention time marker, Perchlorate-O (18), is added to all samples, instrument blanks, and standards prior to injection. It is used to verify the retention time of Perchlorate and Perchlorate-101 and to insure an accurate injection occurred. Due to various anions affecting the recovery of Perchlorate-O (18) and not Perchlorate and Perchlorate-101, the calibration curves of Perchlorate and Perchlorate-101 are internally corrected for using Perchlorate-O (18).

Perchlorate Isotope Ratio

The Perchlorate isotope ratio met acceptance criteria for all samples and QC samples. Please see the isotope ratio criteria in the Miscellaneous Section.

System Configuration

The laboratory utilizes a Waters LC 2795 liquid chromatography instrument for Perchlorate analysis. It is coupled with a Micromass Quattro Ultima Mass Spectrometer/Mass Spectrometer. It is designated as LCMSMS #2. It is fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis. The laboratory may also utilize an Agilent 1100 liquid chromatography instrument for Perchlorate analysis. It is coupled with an Applied Biosystems 4000 Mass Spectrometer/Mass Spectrometer, designated as LCMSMS #3 or LCMSMS #4. It is also fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis.

Electronic Packaging Comment

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

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

Chromatographic Columns

The LC-MS/MS Perchlorate analysis was performed on a Quatro Ultima LC/MS/MS.

Chromatographic separation of Perchlorate is accomplished through analysis on the following anion column:

Dionex: IonPac AG-16 2 x 50 mm.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2017-1031 GEL Work Order: 416862

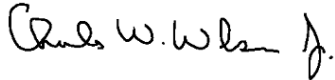
The Qualifiers in this report are defined as follows:

- * 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: 09 MAR 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: 1643138Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-129304Date Received: 17-FEB-17GEL Job No (SDG): 2017-1031GEL Sample ID: 416862001Date Filtered: 28-FEB-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	0.429	ug/L		1	28-FEB-17 18:23	per0228029a
	Perchlorate Isotope Ratio			3.07			1	28-FEB-17 18:23	per0228029a
14797-73-0	Perchlorate-101	.05	.2	0.416	ug/L		1	28-FEB-17 18:23	per0228029a
	Perchlorate-O(18)			0.478	ug/L		1	28-FEB-17 18:23	per0228029a

^ 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): 2017-1031

Extract Batch Code: 1643138

Date Filtered: 28-FEB-17

Matrix: WATER

Sample ID: 1203737090

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.201	ug/L	101		85 - 115
Perchlorate Isotope Ratio		3.05				-
Perchlorate-101	0.200	.196	ug/L	98		85 - 115
Perchlorate-O(18)		.489	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): 2017-1031

Extract Batch Code: 1643138

Date Extracted: 28-FEB-17

GEL MS/PS ID: 1203737091

Client ID: CAMO-17-129294

GEL MSD/PSD ID: 1203737092

QC Type: MS

Compound^	Spike Added	Sample Conc	Units	MS Conc	MS Rec #	MSD Conc	MSD Rec #	RPD #	RPD Limit	Recovery Limit
Perchlorate	0.200	0.394	ug/L	0.620	113	.618	112	0	30	75 - 125
Perchlorate Isotope Ratio	0	2.98		3.04		3.1		2		-
Perchlorate-101	0.200	0.393	ug/L	0.606	107	.593	100	2	30	75 - 125
Perchlorate-O(18)	0	0.506	ug/L	0.501		.505		1		-

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

Quality Control Data

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1643138Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 28-FEB-17GEL Job No (SDG): 2017-1031GEL Sample ID: 1203737089Date Filtered: 28-FEB-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	28-FEB-17 16:23	per0228013a
	Perchlorate Isotope Ratio						1	28-FEB-17 16:23	per0228013a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	28-FEB-17 16:23	per0228013a
	Perchlorate-O(18)			0.483	ug/L		1	28-FEB-17 16:23	per0228013a

^ 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: 1643138Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 28-FEB-17GEL Job No (SDG): 2017-1031GEL Sample ID: 1203737090Date Filtered: 28-FEB-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	28-FEB-17 16:31	per0228014a
	Perchlorate Isotope Ratio			3.05			1	28-FEB-17 16:31	per0228014a
14797-73-0	Perchlorate-101	.05	.2	0.196	ug/L	J	1	28-FEB-17 16:31	per0228014a
	Perchlorate-O(18)			0.489	ug/L		1	28-FEB-17 16:31	per0228014a

^ 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: 1643138Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-1031GEL Sample ID: 1203737093Date Filtered: 28-FEB-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	0.218	ug/L		1	28-FEB-17 16:38	per0228015a
	Perchlorate Isotope Ratio			3			1	28-FEB-17 16:38	per0228015a
14797-73-0	Perchlorate-101	.05	.2	0.216	ug/L		1	28-FEB-17 16:38	per0228015a
	Perchlorate-O(18)			0.514	ug/L		1	28-FEB-17 16:38	per0228015a

^ 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: 1643138Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-129294MSDate Received: 15-FEB-17GEL Job No (SDG): 2017-1031GEL Sample ID: 1203737091Date Filtered: 28-FEB-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	0.620	ug/L		1	28-FEB-17 16:53	per0228017a
	Perchlorate Isotope Ratio			3.04			1	28-FEB-17 16:53	per0228017a
14797-73-0	Perchlorate-101	.05	.2	0.606	ug/L		1	28-FEB-17 16:53	per0228017a
	Perchlorate-O(18)			0.501	ug/L		1	28-FEB-17 16:53	per0228017a

^ 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: 1643138Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-129294MSDDate Received: 15-FEB-17GEL Job No (SDG): 2017-1031GEL Sample ID: 1203737092Date Filtered: 28-FEB-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	0.618	ug/L		1	28-FEB-17 17:01	per0228018a
	Perchlorate Isotope Ratio			3.1			1	28-FEB-17 17:01	per0228018a
14797-73-0	Perchlorate-101	.05	.2	0.593	ug/L		1	28-FEB-17 17:01	per0228018a
	Perchlorate-O(18)			0.505	ug/L		1	28-FEB-17 17:01	per0228018a

^ 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 =

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

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-1031
Work Order #: 416862

Sample ID	Client ID
416862001	CAMO-17-129304
416862002	CAMO-17-129320
1203731180	Method Blank (MB) ICP
1203731181	Laboratory Control Sample (LCS)
1203731184	416868001(CAMO-17-129354L) Serial Dilution (SD)
1203731182	416868001(CAMO-17-129354D) Sample Duplicate (DUP)
1203731183	416868001(CAMO-17-129354S) Matrix Spike (MS)
1203731012	Method Blank (MB) ICP-MS
1203731013	Laboratory Control Sample (LCS)
1203731016	416868001(CAMO-17-129354L) Serial Dilution (SD)
1203731014	416868001(CAMO-17-129354D) Sample Duplicate (DUP)
1203731015	416868001(CAMO-17-129354S) Matrix Spike (MS)
1203738955	Method Blank (MB) CVAA
1203738956	Laboratory Control Sample (LCS)
1203738959	416771001(CASA-17-129327L) Serial Dilution (SD)
1203738957	416771001(CASA-17-129327D) Sample Duplicate (DUP)
1203738958	416771001(CASA-17-129327S) Matrix Spike (MS)

Sample Analysis

Samples 416862001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1640509, 1640455, 1643872 and 1647934
Prep Batch :	1640508, 1640454 and 1643869
Standard Operating Procedures:	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
Analytical Method:	SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B
Prep Method :	SW846 3005A and EPA 245.1/245.2 Prep

Preparation/Analytical Method Verification

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

System Configuration

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

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

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

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.

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. 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 (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: 416868001 (CAMO-17-129354)-ICP and ICP-MS and 416771001 (CASA-17-129327)-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: 2017-1031 GEL Work Order: 416862

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: 16 MAR 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1031**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 416862001**BASIS:** As Received**DATE COLLECTED** 15-FEB-17**CLIENT ID:** CAMO-17-129304**LEVEL:** Low**DATE RECEIVED** 17-FEB-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	AXS5	03/03/17 10:48	030317W1-5	1643872

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1031

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 416862001

BASIS: As Received

DATE COLLECTED 15-FEB-17

CLIENT ID: CAMO-17-129304

LEVEL: Low

DATE RECEIVED 17-FEB-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	03/15/17 13:55	031517B-1	1640509
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	SKJ	03/11/17 01:10	170310-3	1640455
7440-38-2	Arsenic	5	ug/L	U	1.7	5	5	1	MS	SKJ	03/13/17 09:48	170313-4	1640455
7440-39-3	Barium	22.2	ug/L		1	5	5	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	SKJ	03/10/17 22:43	170310-2	1640455
7440-70-2	Calcium	12200	ug/L		50	200	200	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7440-47-3	Chromium	5.19	ug/L	J	3	10	10	1	MS	SKJ	03/10/17 22:43	170310-2	1640455
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	SKJ	03/10/17 22:43	170310-2	1640455
7439-95-4	Magnesium	2970	ug/L		110	300	300	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7439-98-7	Molybdenum	1.26	ug/L		0.3	0.5	0.5	1	MS	SKJ	03/13/17 09:48	170313-4	1640455
7440-02-0	Nickel	2	ug/L	U	0.5	2	2	1	MS	SKJ	03/10/17 22:43	170310-2	1640455
7440-09-7	Potassium	1550	ug/L		50	150	150	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7782-49-2	Selenium	2.24	ug/L	J	2	5	5	1	MS	SKJ	03/13/17 09:48	170313-4	1640455
7631-86-9	Silica	67300	ug/L		53	213	213	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7440-22-4	Silver	1	ug/L	U	0.4	1	1	1	MS	SKJ	03/10/17 22:43	170310-2	1640455
7440-23-5	Sodium	9520	ug/L		100	300	300	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7440-24-6	Strontium	50.6	ug/L		1	5	5	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7440-28-0	Thallium	0.715	ug/L	J	0.6	2	2	1	MS	SKJ	03/10/17 22:43	170310-2	1640455
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7440-61-1	Uranium	0.475	ug/L		0.067	0.2	0.2	1	MS	SKJ	03/10/17 22:43	170310-2	1640455
7440-62-2	Vanadium	5.26	ug/L		1	5	5	1	P	JWJ	03/15/17 13:55	031517B-1	1640509
7440-66-6	Zinc	28.5	ug/L		3.3	10	10	1	P	JWJ	03/15/17 13:55	031517B-1	1640509

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1031**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 416862001**BASIS:** As Received**DATE COLLECTED** 15-FEB-17**CLIENT ID:** CAMO-17-129304**LEVEL:** Low**DATE RECEIVED** 17-FEB-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	42.8	mg/L		0.453	1.24	1.24	1		TXT1	03/15/17 16:38		1647934

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1640455	1640454	SW846 3005A	50	mL	50	mL	02/20/17	SXW1
1640509	1640508	SW846 3005A	50	mL	50	mL	02/20/17	SXW1
1643872	1643869	EPA 245.1/245.2 Prep	20	mL	20	mL	03/02/17	JXH5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1031**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 416862002**BASIS:** As Received**DATE COLLECTED** 15-FEB-17**CLIENT ID:** CAMO-17-129320**LEVEL:** Low**DATE RECEIVED** 17-FEB-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	AXS5	03/03/17 10:50	030317W1-5	1643872

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1643872	1643869	EPA 245.1/245.2 Prep	20	mL	20	mL	03/02/17	JXH5

***Analytical Methods:**

AV EPA 245.1/245.2

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2017-1031

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>
1203731012	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	1.7	ug/L	+/-5	U	MS	1.7	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	0.3	ug/L	+/-0.5	U	MS	0.3	0.5
	Nickel	0.5	ug/L	+/-2	U	MS	0.5	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.4	ug/L	+/-1	U	MS	0.4	1
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203731180	Aluminum	68	ug/L	+/-200	U	P	68	200
	Barium	1	ug/L	+/-5	U	P	1	5
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Calcium	50	ug/L	+/-200	U	P	50	200
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Sodium	100	ug/L	+/-300	U	P	100	300
	Copper	3	ug/L	+/-10	U	P	3	10
	Iron	30	ug/L	+/-100	U	P	30	100
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Manganese	2	ug/L	+/-10	U	P	2	10
	Potassium	80.1	ug/L	+/-150	J	P	50	150
	Silica	53	ug/L	+/-213	U	P	53	213
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1203738955	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. 2017-1031 Client ID CAMO-17-129354S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 416868001 Spike ID: 1203731015

<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	48.3		1	U	50	95.5		MS
Arsenic	ug/L	75-125	52.2		1.7	U	50	102		MS
Cadmium	ug/L	75-125	50.4		0.3	U	50	101		MS
Chromium	ug/L	75-125	53.8		5.06	J	50	97.5		MS
Lead	ug/L	75-125	52.1		0.5	U	50	104		MS
Molybdenum	ug/L	75-125	52.1		0.995		50	102		MS
Nickel	ug/L	75-125	49.1		0.5	U	50	97.6		MS
Selenium	ug/L	75-125	52.5		2	U	50	101		MS
Silver	ug/L	75-125	50.4		0.4	U	50	101		MS
Thallium	ug/L	75-125	46.7		0.6	U	50	92.7		MS
Uranium	ug/L	75-125	53.5		0.51		50	106		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-1031 Client ID CAMO-17-129354S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 416868001 Spike ID: 1203731183

<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	4900		68	U	5000	97.5		P
Barium	ug/L	75-125	496		22.7		500	94.7		P
Beryllium	ug/L	75-125	483		1	U	500	96.6		P
Boron	ug/L	75-125	488		15	U	500	95		P
Calcium	ug/L	75-125	20300		15900		5000	89.4		P
Cobalt	ug/L	75-125	477		1	U	500	95.5		P
Copper	ug/L	75-125	486		3	U	500	96.9		P
Iron	ug/L	75-125	4800		30	U	5000	95.9		P
Magnesium	ug/L	75-125	8210		3370		5000	96.8		P
Manganese	ug/L	75-125	468		2	U	500	93.7		P
Potassium	ug/L	75-125	6540		1850		5000	93.8		P
Silica	ug/L		76500		67000		10700	89.2	N/A	P
Sodium	ug/L	75-125	15300		10300		5000	99.5		P
Strontium	ug/L	75-125	531		55.3		500	95.2		P
Tin	ug/L	75-125	472		2.5	U	500	94.3		P
Vanadium	ug/L	75-125	483		6.59		500	95.2		P
Zinc	ug/L	75-125	460		5.59	J	500	90.9		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-1031 Client ID: CASA-17-129327S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 416771001 Spike ID: 1203738958

<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	2.03		0.067	U	2	101		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1031

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-17-129354D

Matrix: WATER

Level: Low

Sample ID: 416868001

Duplicate ID: 1203731014

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		1.7 U		1.7 U				MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L	+/-10	5.06 J		4.69 J		7.63		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	0.995		1.12		11.6		MS
Nickel	ug/L		0.5 U		0.5 U				MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.4 U		0.4 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L	+/- .2	0.51		0.515		.976		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1031

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-17-129354D

Matrix: WATER

Level: Low

Sample ID: 416868001

Duplicate ID: 1203731182

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-5	22.7		22.3		1.81		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	15900		15700		1.15		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%	3370		3350		.467		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1850		1820		1.75		P
Silica	ug/L	+/-20%	67000		65700		1.91		P
Sodium	ug/L	+/-20%	10300		10100		1.45		P
Strontium	ug/L	+/-20%	55.3		54.8		.978		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	6.59		6.29		4.65		P
Zinc	ug/L	+/-10	5.59 J		6.08 J		8.51		P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1031**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CASA-17-129327D**Matrix:** WATER**Level:** Low**Sample ID:** 416771001**Duplicate ID:** 1203738957**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. 2017-1031

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>
1203731013								
	Antimony	ug/L	50	48.4		96.8	80-120	MS
	Arsenic	ug/L	50	51.1		102	80-120	MS
	Cadmium	ug/L	50	51.3		103	80-120	MS
	Chromium	ug/L	50	51.3		103	80-120	MS
	Lead	ug/L	50	53.7		107	80-120	MS
	Molybdenum	ug/L	50	53.4		107	80-120	MS
	Nickel	ug/L	50	52		104	80-120	MS
	Selenium	ug/L	50	52.9		106	80-120	MS
	Silver	ug/L	50	52.7		105	80-120	MS
	Thallium	ug/L	50	48.1		96.2	80-120	MS
	Uranium	ug/L	50	53.4		107	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-1031

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>
1203731181	Potassium	ug/L	5000	5080		102	80-120	P
	Silica	ug/L	10700	10400		97	80-120	P
	Sodium	ug/L	5000	4830		96.6	80-120	P
	Strontium	ug/L	500	488		97.7	80-120	P
	Tin	ug/L	500	488		97.5	80-120	P
	Vanadium	ug/L	500	490		98	80-120	P
	Zinc	ug/L	500	467		93.5	80-120	P
	Aluminum	ug/L	5000	5030		101	80-120	P
	Barium	ug/L	500	490		98	80-120	P
	Beryllium	ug/L	500	492		98.5	80-120	P
	Boron	ug/L	500	489		97.9	80-120	P
	Calcium	ug/L	5000	5120		102	80-120	P
	Cobalt	ug/L	500	494		98.7	80-120	P
	Copper	ug/L	500	493		98.5	80-120	P
	Iron	ug/L	5000	4940		98.7	80-120	P
	Magnesium	ug/L	5000	4970		99.4	80-120	P
	Manganese	ug/L	500	484		96.9	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-1031

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>
1203738956	Mercury	ug/L	2	2.1		105	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1031

Client ID: CAMO-17-129354L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 416868001

Serial Dilution ID: 1203731016

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	1.7	U	8.5	U				MS
Cadmium	.3	U	1.5	U				MS
Chromium	5.06	J	15	U	3.812			MS
Lead	.5	U	2.5	U				MS
Molybdenum	.995		1.5	U	20.101			MS
Nickel	.5	U	2.5	U				MS
Selenium	2	U	10	U				MS
Silver	.4	U	2	U				MS
Thallium	.6	U	3	U				MS
Uranium	.51		.49	J	3.922			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1031 Client ID CAMO-17-129354L

Contract: ESHL00114

Matrix: LIQUID Level: Low

Sample ID: 416868001 Serial Dilution ID: 1203731184

Analyte	Initial Value ug/L	C	Serial Value ug/L	C	% Difference	Qual	Acceptance Limit	M*
Aluminum	68	U	340	U				P
Barium	22.7		21.3	J	6.232			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	15900		16900		6.403		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3370		3610		7.086			P
Manganese	2	U	10	U				P
Potassium	1850		1980		6.833			P
Silica	67000		67500		.788		10	P
Sodium	10300		11000		7.17		10	P
Strontium	55.3		57.2		3.376		10	P
Tin	2.5	U	12.5	U				P
Vanadium	6.59		5.33	J	19.045			P
Zinc	5.59	J	16.5	U	164.985			P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1031 **Client ID:** CASA-17-129327L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 416771001 **Serial Dilution ID:** 1203738959

<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 #: 2017-1031
Work Order #: 416862**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1639822

Method: SW 9060 Total Organic Carbon

Sample Analysis

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

Sample ID	Client ID
416862002	CAMO-17-129320
1203731500	Method Blank (MB)
1203731501	Laboratory Control Sample (LCS)
1203731502	416658004(CAMO-17-129311) Sample Duplicate (DUP)
1203731504	416658004(CAMO-17-129311) 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# 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 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 (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 416658004 (CAMO-17-129311) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product:	Cyanide and Total		
Analytical Batch:	1641124	Method:	WSP-CN(T)
Prep Batch :	1641123	Method:	EPA 335.4

Sample Analysis

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

Sample ID	Client ID
416862002	CAMO-17-129320
1203732630	Method Blank (MB)
1203732631	Laboratory Control Sample (LCS)
1203732633	416862002(CAMO-17-129320) Sample Duplicate (DUP)
1203732636	416862002(CAMO-17-129320) 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# 18.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 416862002 (CAMO-17-129320) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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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: 1640559

Method: WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
416862001	CAMO-17-129304
1203731280	Method Blank (MB)
1203731281	Laboratory Control Sample (LCS)
1203731282	416868001(CAMO-17-129354) Sample Duplicate (DUP)
1203731283	416868001(CAMO-17-129354) 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 (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 416868001 (CAMO-17-129354) 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 1203731282 (CAMO-17-129354DUP), 1203731283 (CAMO-17-129354PS) and 416862001 (CAMO-17-129304) were manually integrated to correctly position the baseline as set in the calibration standards.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Ammonia Nitrogen		
Analytical Batch:	1640304	Method:	NH3
Prep Batch :	1640302	Method:	EPA 350.1 Prep

Sample Analysis

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

Sample ID	Client ID
416862001	CAMO-17-129304
1203730603	Method Blank (MB)
1203730604	Laboratory Control Sample (LCS)
1203730605	416771001(CASA-17-129327) Sample Duplicate (DUP)
1203730606	416771001(CASA-17-129327) 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 (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 416771001 (CASA-17-129327) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1639245	Method:	TKN
Prep Batch :	1639244	Method:	EPA 351.2 Prep

Sample Analysis

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

Sample ID	Client ID
416862002	CAMO-17-129320
1203728042	Method Blank (MB)
1203728043	Laboratory Control Sample (LCS)
1203728044	416562002(CASA-17-129331) Sample Duplicate (DUP)
1203728877	416572002(CASA-17-129324) Sample Duplicate (DUP)
1203728045	416562002(CASA-17-129331) Matrix Spike (MS)
1203728878	416572002(CASA-17-129324) 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 (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 416562002 (CASA-17-129331) and 416572002 (CASA-17-129324) were selected for QC analysis.

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

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

Analyte	Sample	Value
Nitrogen, Total Kjeldahl	1203728045 (CASA-17-129331MS)	80* (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

Sample1203728042 (MB) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

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

A data exception report (DER) 1608537 was generated for sample 1203728045 (CASA-17-129331MS) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1641424

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
416862001	CAMO-17-129304
1203733269	Method Blank (MB)
1203733270	Laboratory Control Sample (LCS)
1203733271	416562001(CASA-17-129325) Sample Duplicate (DUP)
1203733272	416572001(CASA-17-129323) Sample Duplicate (DUP)
1203733273	416562001(CASA-17-129325) Post Spike (PS)
1203733274	416572001(CASA-17-129323) 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 (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 416562001 (CASA-17-129325) and 416572001 (CASA-17-129323) were selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The following samples 1203733272 (CASA-17-129323DUP) and 1203733274 (CASA-17-129323PS) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1639607	Method:	PO4
Prep Batch :	1639606	Method:	EPA 365.4 Prep

Sample Analysis

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

Sample ID	Client ID
416862001	CAMO-17-129304
1203728889	Method Blank (MB)
1203728890	Laboratory Control Sample (LCS)
1203728893	416658001(CAMO-17-129294) Sample Duplicate (DUP)
1203728894	416658001(CAMO-17-129294) 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 (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 416658001 (CAMO-17-129294) 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: 1640261

Method: TDS

Sample Analysis

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

Sample ID	Client ID
416862001	CAMO-17-129304
1203730485	Method Blank (MB)
1203730486	Laboratory Control Sample (LCS)
1203730489	416771001(CASA-17-129327) 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 (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Consecutive Weight Checks

All consecutive weight checks were met.

Quality Control (QC) Designation

Sample 416771001 (CASA-17-129327) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1640753

Method: EPA120.1 Specific Conductivity

Sample Analysis

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

Sample ID	Client ID
416862001	CAMO-17-129304
1203731714	Laboratory Control Sample (LCS)
1203731715	416658001(CAMO-17-129294) Sample Duplicate (DUP)
1203731716	416958001(CAMO-17-129302) 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# 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 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 (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 416658001 (CAMO-17-129294) and 416958001 (CAMO-17-129302) 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: 1641364 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
416862001	CAMO-17-129304
1203733168	Laboratory Control Sample (LCS)
1203733169	416771001(CASA-17-129327) 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 (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 416771001 (CASA-17-129327) 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
1203733169 (CASA-17-129327DUP)	pH	Received 16-FEB-17, out of holding 14-FEB-17
416862001 (CAMO-17-129304)	pH	Received 17-FEB-17, out of holding 15-FEB-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) 1607567 was generated for samples 416862001 (CAMO-17-129304) and 1203733169 (CASA-17-129327DUP) 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: 1641366 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

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

Sample ID	Client ID
416862001	CAMO-17-129304
1203733170	Laboratory Control Sample (LCS)
1203733171	416771001(CASA-17-129327) Sample Duplicate (DUP)
1203733172	416771001(CASA-17-129327) 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 manually operated 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 (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 416771001 (CASA-17-129327) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Certification Statement

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

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Qualifier Definition Report for

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

Client SDG: 2017-1031 GEL Work Order: 416862

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature:



Name: Kristen Mizzell

Date: 14 MAR 2017

Title: Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: March 14, 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: 2017-1031

Client Sample ID: CAMO-17-129304
Sample ID: 416862001
Matrix: W
Collect Date: 15-FEB-17 10:29
Receive Date: 17-FEB-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	02/18/17	0103	1640559	1
Chloride		2.17	0.067	0.200	mg/L		1					
Fluoride		0.138	0.033	0.100	mg/L		1					
Sulfate		2.79	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia		0.0781	0.017	0.050	mg/L	1.00	1	KLP1	02/21/17	0927	1640304	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.660	0.017	0.050	mg/L		1	KLP1	02/27/17	1403	1641424	3
PO4 "As Received"												
Phosphorus, Total as P		0.145	0.020	0.050	mg/L	1.00	1	KLP1	02/28/17	1352	1639607	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		160	3.40	14.3	mg/L			KLP1	02/17/17	1246	1640261	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		63.0	1.45	4.00	mg/L			RXB5	02/22/17	1644	1641366	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		136	1.00	1.00	umhos/cm		1	VH1	02/22/17	1106	1640753	7
PH "As Received"												
pH at Temp 15.2C	H	7.98	0.010	0.100	SU		1	RXB5	02/22/17	1643	1641364	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	02/20/17	1620	1640302
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	02/27/17	1900	1639606

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Certificate of Analysis

Report Date: March 14, 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: 2017-1031

Client Sample ID: CAMO-17-129304
Sample ID: 416862001

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: March 14, 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: 2017-1031

Client Sample ID: CAMO-17-129320
Sample ID: 416862002
Matrix: W
Collect Date: 15-FEB-17 10:29
Receive Date: 17-FEB-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	02/25/17	0923	1639822	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	02/21/17	1118	1641124	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	J	0.0767	0.033	0.100	mg/L	1.00	1	KLP1	02/28/17	1046	1639245	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	02/21/17	1042	1641123
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	02/27/17	1900	1639244

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

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

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: March 14, 2017

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

Contact: Mr. Keith Greene

Workorder: 416862

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1639822										
QC1203731502	416658004	DUP									
Total Organic Carbon Average		U	ND	U	ND	mg/L	N/A		TSM	02/24/17	20:30
QC1203731501	LCS										
Total Organic Carbon Average	10.0				10.8	mg/L	108	(80%-120%)		02/24/17	18:15
QC1203731500	MB										
Total Organic Carbon Average			U	ND	mg/L					02/24/17	17:28
QC1203731504	416658004	PS									
Total Organic Carbon Average	10.0	U	ND		11.0	mg/L	108	(75%-125%)		02/24/17	21:14
Flow Injection Analysis											
Batch	1641124										
QC1203732633	416862002	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	02/21/17	11:19
QC1203732631	LCS										
Cyanide, Total	50.0				50.1	ug/L	100	(90%-110%)		02/21/17	11:02
QC1203732630	MB										
Cyanide, Total			U	ND	ug/L					02/21/17	11:01
QC1203732636	416862002	MS									
Cyanide, Total	100	U	ND		105	ug/L	105	(90%-110%)		02/21/17	11:20
Ion Chromatography											
Batch	1640559										
QC1203731282	416868001	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MXL2	02/18/17	02:51

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QC Summary

Workorder: 416862

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1640559										
Chloride		2.46		2.40	mg/L	2.66		(0%-20%)	MXL2	02/18/17	02:51
Fluoride		0.215		0.211	mg/L	1.74	^	(+/-0.100)			
Sulfate		2.82		2.80	mg/L	0.743		(0%-20%)			
QC1203731281 LCS											
Bromide	1.25			1.19	mg/L		94.9	(80%-120%)		02/17/17	21:28
Chloride	5.00			4.94	mg/L		98.8	(80%-120%)			
Fluoride	2.50			2.53	mg/L		101	(80%-120%)			
Sulfate	10.0			10.1	mg/L		101	(80%-120%)			
QC1203731280 MB											
Bromide			U	ND	mg/L					02/17/17	21:01
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203731283 416868001 PS											
Bromide	1.25	U	ND	1.24	mg/L		95.7	(75%-125%)		02/18/17	03:18
Chloride	5.00		2.46	7.20	mg/L		94.8	(75%-125%)			
Fluoride	2.50		0.215	2.40	mg/L		87.2	(75%-125%)			
Sulfate	10.0		2.82	12.5	mg/L		96.7	(75%-125%)			

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QC Summary

Workorder: 416862

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1639245										
QC1203728044	416562002	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A		KLP1	02/28/17	10:19
QC1203728877	416572002	DUP									
Nitrogen, Total Kjeldahl		U	ND	U	ND	mg/L	N/A			02/28/17	10:21
QC1203728043	LCS										
Nitrogen, Total Kjeldahl	1.00				1.08	mg/L		108 (90%-110%)		02/28/17	10:17
QC1203728042	MB										
Nitrogen, Total Kjeldahl			U		ND	mg/L				02/28/17	10:42
QC1203728045	416562002	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND		0.800	mg/L		80* (90%-110%)		02/28/17	10:20
QC1203728878	416572002	MS									
Nitrogen, Total Kjeldahl	1.00	U	ND		0.909	mg/L		90.9 (90%-110%)		02/28/17	10:22
Batch	1639607										
QC1203728893	416658001	DUP									
Phosphorus, Total as P			0.171		0.158	mg/L	7.9 ^	(+/-0.050)	KLP1	02/28/17	13:38
QC1203728890	LCS										
Phosphorus, Total as P	1.00				1.01	mg/L		101 (80%-124%)		02/28/17	13:24
QC1203728889	MB										
Phosphorus, Total as P			U		ND	mg/L				02/28/17	13:24
QC1203728894	416658001	MS									
Phosphorus, Total as P	1.00		0.171		1.33	mg/L		116 (63%-139%)		02/28/17	13:39
Batch	1640304										
QC1203730605	416771001	DUP									
Nitrogen, Ammonia			0.0578	J	0.048	mg/L	18.5 ^	(+/-0.050)	KLP1	02/21/17	09:23

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QC Summary

Workorder: 416862

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1640304										
QC1203730604	LCS										
Nitrogen, Ammonia	1.00			1.03	mg/L		103	(90%-110%)	KLP1	02/21/17	09:10
QC1203730603	MB										
Nitrogen, Ammonia			U	ND	mg/L					02/21/17	09:09
QC1203730606	416771001	MS									
Nitrogen, Ammonia	1.00	0.0578		1.04	mg/L		98.2	(90%-110%)		02/21/17	09:24
Batch	1641424										
QC1203733271	416562001	DUP									
Nitrogen, Nitrate/Nitrite		0.438		0.434	mg/L	0.917		(0%-20%)	KLP1	02/27/17	13:31
QC1203733272	416572001	DUP									
Nitrogen, Nitrate/Nitrite		5.81		5.30	mg/L	9.18		(0%-20%)		02/27/17	13:34
QC1203733270	LCS										
Nitrogen, Nitrate/Nitrite	1.00			0.937	mg/L		93.7	(90%-110%)		02/27/17	13:28
QC1203733269	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					02/27/17	13:27
QC1203733273	416562001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.438		1.39	mg/L		95.2	(90%-110%)		02/27/17	13:32
QC1203733274	416572001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.581		1.49	mg/L		90.9	(90%-110%)		02/27/17	13:35
Solids Analysis											
Batch	1640261										
QC1203730489	416771001	DUP									
Total Dissolved Solids		211		204	mg/L	3.44		(0%-5%)	KLP1	02/17/17	12:46

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QC Summary

Workorder: 416862

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Solids Analysis											
Batch	1640261										
QC1203730486	LCS										
Total Dissolved Solids	300			300	mg/L		100	(95%-105%)	KLP1	02/17/17	12:46
QC1203730485	MB										
Total Dissolved Solids			U	ND	mg/L					02/17/17	12:46
Titration and Ion Analysis											
Batch	1640753										
QC1203731715	416658001	DUP									
Conductivity			142	142	umhos/cm	0.0704		(0%-10%)	VH1	02/22/17	11:02
QC1203731716	416958001	DUP									
Conductivity			135	135	umhos/cm	0.445		(0%-10%)		02/22/17	11:07
QC1203731714	LCS										
Conductivity	1410			1410	umhos/cm		99.4	(95%-105%)		02/22/17	11:02
Batch	1641364										
QC1203733169	416771001	DUP									
pH		H	7.64	H	7.67	SU	0.392	(0%-5%)	RXB5	02/22/17	16:34
QC1203733168	LCS										
pH	7.00			6.99	SU		99.9	(99%-101%)		02/22/17	16:09
Batch	1641366										
QC1203733171	416771001	DUP									
Alkalinity, Total as CaCO3			70.0	72.0	mg/L	2.82		(0%-20%)	RXB5	02/22/17	16:36
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				
QC1203733170	LCS										
Alkalinity, Total as CaCO3	100			109	mg/L		109	(90%-110%)		02/22/17	16:11

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QC Summary

Workorder: 416862

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1641366										
QC1203733172	416771001	MS									
Alkalinity, Total as CaCO3	100	70.0		178	mg/L		108	(80%-120%)	RXB5	02/22/17	16:36

Notes:

- < Result is less than value reported
- > Result is greater than value reported
- B The target analyte was detected in the associated blank.
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- H Analytical holding time was exceeded
- J Value is estimated
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.
- ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
- d 5-day BOD--The 2:1 depletion requirement was not met for this sample
- e 5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes
- h Preparation or preservation holding time was exceeded

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

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

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

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

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

Miscellaneous

DATA EXCEPTION REPORT			
Mo.Day Yr. 23-FEB-17	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ELECTRODE	Test / Method: EPA 150.1	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1641364	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 416771(2017-1017),416862(2017-1031),416868(2017-1029),416958(2017-1050) Application Issues: Sample received out of holding			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Sample received out of holding: 416771 001,003 416862 001 416868 001 416958 001,003 QC 1203733169DUP		1. Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified. 1203733169 (CASA-17-129327DUP) [Received 16-FEB-17, out of holding 14-FEB-17]. 416771001 (CASA-17-129327) [Received 16-FEB-17, out of holding 14-FEB-17]. 416771003 (CASA-17-129661) [Received 16-FEB-17, out of holding 14-FEB-17]. 416862001 (CAMO-17-129304) [Received 17-FEB-17, out of holding 15-FEB-17]. 416868001 (CAMO-17-129354) [Received 17-FEB-17, out of holding 15-FEB-17]. 416958001 (CAMO-17-129302) [Received 18-FEB-17, out of holding 16-FEB-17]. 416958003 (CASA-17-129341) [Received 18-FEB-17, out of holding 16-FEB-17].	

Originator's Name:

Rachael Bell 23-FEB-17

Data Validator/Group Leader:

Elzbieta Szulc 07-MAR-17

DATA EXCEPTION REPORT			
Mo.Day Yr. 28-FEB-17	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 351.2, EPA 351.2 SC	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1639245	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 416562(2017-1003),416572(2017-1005),416657(2017-1012),416658(2017-1011),416767(2017-1018),416771(2017-1017),416862(2017-1031),417067(2017-1053) Application Issues: Failed Recovery for MS/MSD, or PS/PSD			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Failed Recovery for MS/MSD, or PS/PSD: QC 1203728045MS		1. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity. Nitrogen, Total Kjeldahl 1203728045 (CASA-17-129331MS) [80* (90%-110%)].	

Originator's Name:
Kristen Mizzell 28-FEB-17

Data Validator/Group Leader:
Aubrey Kingsbury 28-FEB-17