

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: 11212

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

SAMPLE ID: CAMO-17-132215

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05/18/2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	12:48		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-50 S2		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	Y	NA
	WSP- GENINORG+PerChlorate	1 LITER POLY	1	ICE		
	WSP- NH3+NO3/NO2	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

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

COLLECTED BY (PRINT):

A. Stanfield, T. Walker

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 5/18/2017 1345	RECEIVED BY (Printed Name) (Signature)	Date/Time 5/18/17 1345
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 04/25/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11212

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

SAMPLE ID: CAMO-17-132235

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	05-18-2017	OK	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	12:48		MEDIA:	UA	
PRS ID:	NA		SAMPLE TECH CODE:	GSP	
LOCATION ID:	R-50 S2		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-LL-H-3	1 LITER POLY	1	NONE		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS:

Sampled \approx 40' from running diesel generator; gusty (\approx 15 mph) wind during sampling.

LOCATION COMMENTS:

None

FIELD PARAMETERS:

Sample Time	12:48	HH:MM	Dissolved Oxygen ($\frac{mg}{L}$)	7.61	Flow (in gpm)	2.54
Oxidation-Reduction Potential (mV)	252.2		pH (SW)	7.93	Specific Conductance ($\frac{\mu S}{cm}$)	135.8
Temperature (C)	20.6		Turbidity (NTU)	0.21		

COLLECTED BY (PRINT): A. Stanfield, T. Walker

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 5/18/2017 1345	RECEIVED BY (Printed Name) (Signature)	Date/Time 5/18/17 1345
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

DATA VALIDATION REPORT

Chain Of Custody No. 2017-1566

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
423831	EPA:120.1	1				
423831	EPA:150.1	1				
423831	EPA:160.1	1				
423831	EPA:170.0	2				
423831	EPA:245.2	2				
423831	EPA:300.0	1				
423831	EPA:310.1	1				
423831	EPA:335.4	1				
423831	EPA:350.1	1				
423831	EPA:351.2	1				
423831	EPA:353.2	1				
423831	EPA:365.4	1				
423831	SM:A2340B	1				
423831	SW-846:6010C	1				
423831	SW-846:6020	1				
423831	SW-846:6850	1				
423831	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
423831	EPA:120.1	1668501	1668501	1										1			1				
423831	EPA:150.1	1669863	1669863	1										1			1				
423831	EPA:160.1	1667981	1667981	1					1					1			1				
423831	EPA:170.0	NA	NA	2																	
423831	EPA:245.2	1671798	1671792	2					1	1				1			1				
423831	EPA:300.0	1669023	1669023	1					1					1			1				
423831	EPA:310.1	1669161	1669161	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
423831	EPA:335.4	1667161	1667160	1					1	1				1			1				
423831	EPA:350.1	1667975	1667974	1					1	1				1			1				
423831	EPA:351.2	1667979	1667978	1					1	2				1			2				
423831	EPA:353.2	1667873	1667873	1					1					1			1				
423831	EPA:365.4	1667977	1667976	1					1	1				1			1				
423831	SM:A2340B	1674846	1674846	1																	
423831	SW-846:6010C	1667736	1667735	1					1	1				1			1				
423831	SW-846:6020	1667775	1667773	1					1	1				1			1				
423831	SW-846:6850	1670986	1670985	1					1	1	1			1							
423831	SW-846:9060	1667273	1667273	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-17-132215	423831001	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CASA-17-132339	1203797708	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1203797707	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-17-132214	1203801186	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-17-132215	423831001	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1203801184	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-132210	1203796432	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-17-132215	423831001	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1203796431	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1203796430	MB	1	0	0	0
EPA:170.0	VOC	CAMO-17-132215	423831001	REG	1	0	0	0
EPA:170.0	VOC	CAMO-17-132235	423831002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132215	423831001	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132235	423831002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132523	1203805740	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAMO-17-132523	1203805742	MS	0	0	1	0
EPA:245.2	INORGANIC	LCS	1203805739	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1203805738	MB	1	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-132212	1203798955	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-17-132215	423831001	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1203798954	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1203798953	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-132214	1203799304	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-132214	1203799307	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-17-132215	423831001	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1203799302	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-132235	423831002	REG	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-133050	1203794409	DUP	1	0	0	0
EPA:335.4	GENERAL CHEMISTRY	CAMO-17-133050	1203794412	MS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	LCS	1203794407	LCS	0	0	1	0
EPA:335.4	GENERAL CHEMISTRY	MB	1203794406	MB	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-17-132215	423831001	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-17-132523	1203796418	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-17-132523	1203796419	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1203796417	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1203796416	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-132235	423831002	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-133048	1203796428	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-17-133048	1203796429	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1203796427	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1203796426	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	SWWS46-17-136911	1203797902	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	SWWS46-17-136911	1203797903	MS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-17-132215	1203796104	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-17-132215	423831001	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1203796102	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1203796101	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-132215	423831001	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-132523	1203796422	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-17-132523	1203796423	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1203796421	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1203796420	MB	1	0	0	0
SM:A2340B	INORGANIC	CAMO-17-132215	423831001	REG	1	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-132215	423831001	REG	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-132523	1203795759	DUP	17	0	0	0
SW-846:6010C	INORGANIC	CAMO-17-132523	1203795760	MS	0	0	17	0
SW-846:6010C	INORGANIC	LCS	1203795758	LCS	0	0	17	0
SW-846:6010C	INORGANIC	MB	1203795757	MB	17	0	0	0

DATA VALIDATION REPORT

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
SW-846:6020	INORGANIC	CAMO-17-132215	423831001	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-17-132523	1203795858	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAMO-17-132523	1203795859	MS	0	0	11	0
SW-846:6020	INORGANIC	LCS	1203795857	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1203795856	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-132215	1203803790	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-132215	1203803791	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-17-132215	423831001	REG	1	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	LCS	1203803789	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1203803788	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-132235	423831002	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-17-133049	1203795680	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1203795679	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1203795678	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	1203796416	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.031	J	mg/L	0.050
MB	1203796420	METHOD BLANK	EPA:365.4	W	Total Phosphate as Phosphorus	0.025	J	mg/L	0.050

DATA VALIDATION REPORT

Field Sample ID	Blank Lab	Blank Type	Analytical Method	Parameter Name	Blank Lab Result	Blank Lab Units	Lab Result	Lab Qualifier	Lab Detection Limit	Detect Flag	Detect to Nondetect Factor	Detect to Estimated Factor	Use Factors
CAMO-17-132215	1203796416	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	0.031	mg/L	0.0315	J	0.050	Y	5	100	Y
CAMO-17-132215	1203796420	METHOD BLANK	EPA:365.4	Total Phosphate as Phosphorus	0.025	mg/L	0.0296	J	0.050	Y	5	100	Y

6. Any surrogate recoveries outside the control limits?

No.

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

No.

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

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

DATA VALIDATION REPORT

13. Display Flagged Data.

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Paramter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-50 S2	2017-1566	CAMO-17-132215	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen	J	U	I4	N	0.0315	mg/L	0.0315	mg/L			W	05/18/2017		1667975	VAL	Y
R-50 S2	2017-1566	CAMO-17-132215	REG	INIT	GENERAL CHEMISTRY	EPA:365.4	Total Phosphate as Phosphorus	J	U	I4	N	0.0296	mg/L	0.0296	mg/L			W	05/18/2017		1667977	VAL	Y

Reason Code

Description

I4	the sample result is =<5x the concentration of related analyte in the method blank.
J_LAB	The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL
NQ	The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualify. The analyte is detected in the sample.
U_LAB	The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-17-132215	R-50 S2	REG	EPA:120.1	0	1
CAMO-17-132215	R-50 S2	REG	EPA:150.1	0	1
CAMO-17-132215	R-50 S2	REG	EPA:160.1	0	1
CAMO-17-132215	R-50 S2	REG	EPA:170.0	0	1
CAMO-17-132215	R-50 S2	REG	EPA:245.2	0	1
CAMO-17-132215	R-50 S2	REG	EPA:300.0	0	4
CAMO-17-132215	R-50 S2	REG	EPA:310.1	0	2
CAMO-17-132215	R-50 S2	REG	EPA:350.1	0	1
CAMO-17-132215	R-50 S2	REG	EPA:353.2	0	1
CAMO-17-132215	R-50 S2	REG	EPA:365.4	0	1
CAMO-17-132215	R-50 S2	REG	SM:A2340B	0	1
CAMO-17-132215	R-50 S2	REG	SW-846:6010C	0	17
CAMO-17-132215	R-50 S2	REG	SW-846:6020	0	11
CAMO-17-132215	R-50 S2	REG	SW-846:6850	0	1
CAMO-17-132235	R-50 S2	REG	EPA:170.0	0	1
CAMO-17-132235	R-50 S2	REG	EPA:245.2	0	1

DATA VALIDATION REPORT

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAMO-17-132235	R-50 S2	REG	EPA:335.4	0	1
CAMO-17-132235	R-50 S2	REG	EPA:351.2	0	1
CAMO-17-132235	R-50 S2	REG	SW-846:9060	0	1



June 16, 2017

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

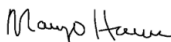
Re: LANL- WQH Water Samples
Work Order: 423831
SDG: 2017-1566

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on May 23, 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: 2017-1566
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 423831
SDG: 2017-1566

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 423831
SDG # : 2017-1566**

June 16, 2017

Laboratory Identification:

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

Summary

Sample receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on May 23, 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>
423831001	CAMO-17-132215
423831002	CAMO-17-132235

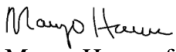
Case Narrative

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 16 June 2017

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

Chain of Custody and Supporting Documentation

Chain of Custody/Analysis Request

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: 22MAY17
ACTGCT: 53.0 LB MAN
CAD: 0014176/CAFE2916

BILL SENDER

TO VALERIE DAVIS

GENERAL ENGINEERING LAB
2040 SAVAGE RD

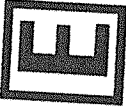
CHARLESTON SC 29407

(643) 566-8171

REF: 21PD0ASRGW04BAGWE0



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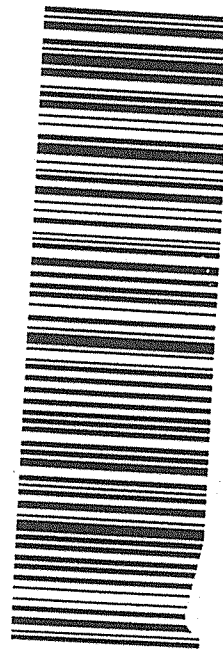
TUE - 23 MAY 10:30A
PRIORITY OVERNIGHT

TRK# 5908 1782 1157

0201

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29407
SC-US CHS



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1157
05:23

Part # 156149V-434 RIT2 06/15

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

SHIP DATE: 22MAY17
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CAD: 0014176/CAFE2916

BILL SENDER

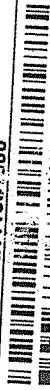
TO VALERIE DAVIS

GENERAL ENGINEERING LAB
2040 SAVAGE RD

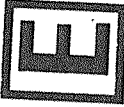
CHARLESTON SC 29407

(643) 566-8171

REF: WE6L111557000



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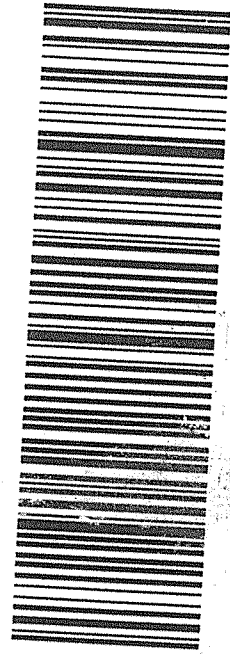
TUE - 23 MAY 10:30A
PRIORITY OVERNIGHT

TRK# 5908 1782 1168

0201

X7 RBWA

29407
SC-US CHS



538C1/8734/329B

11513150813011V

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 #: 2017-1566
Work Order #: 423831**

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: 1670986

Prep Batch Number: 1670985

Sample Analysis

Sample ID	Client ID
423831001	423831001 (CAMO-17-132215)
1203803792	Interference Check Sample (ICS)
1203803788	Method Blank (MB)
1203803789	Laboratory Control Sample (LCS)
1203803790	423831001(CAMO-17-132215) Matrix Spike (MS)
1203803791	423831001(CAMO-17-132215) 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 423831001 (CAMO-17-132215) 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: 2017-1566 GEL Work Order: 423831

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Michael Penny

Date: 06 JUN 2017

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1670985Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-132215Date Received: 23-MAY-17GEL Job No (SDG): 2017-1566GEL Sample ID: 423831001Date Filtered: 05-JUN-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.346	ug/L		1	05-JUN-17 18:59	per0605016a
	Perchlorate Isotope Ratio			2.75			1	05-JUN-17 18:59	per0605016a
14797-73-0	Perchlorate-101	.05	.2	0.369	ug/L		1	05-JUN-17 18:59	per0605016a
	Perchlorate-O(18)			0.480	ug/L		1	05-JUN-17 18:59	per0605016a

^ 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): 2017-1566

Extract Batch Code: 1670985

Date Filtered: 05-JUN-17

Matrix: WATER

Sample ID: 1203803789

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.197	ug/L	99		85 - 115
Perchlorate Isotope Ratio		2.79				-
Perchlorate-101	0.200	.207	ug/L	104		85 - 115
Perchlorate-O(18)		.469	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): 2017-1566

Extract Batch Code: 1670985

Date Extracted: 05-JUN-17

GEL MS/PS ID: 1203803790

Client ID: CAMO-17-132215

GEL MSD/PSD ID: 1203803791

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	0.346	ug/L	0.527	91	.514	84	2	30	75 - 125
Perchlorate Isotope Ratio	0	2.75		2.83		2.91		3		-
Perchlorate-101	0.200	0.369	ug/L	0.546	89	.519	75	5	30	75 - 125
Perchlorate-O(18)	0	0.480	ug/L	0.515		.517		0		-

^ 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: 1670985Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 05-JUN-17GEL Job No (SDG): 2017-1566GEL Sample ID: 1203803788Date Filtered: 05-JUN-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.200	ug/L	U	1	05-JUN-17 18:32	per0605013a
	Perchlorate Isotope Ratio						1	05-JUN-17 18:32	per0605013a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	05-JUN-17 18:32	per0605013a
	Perchlorate-O(18)			0.483	ug/L		1	05-JUN-17 18:32	per0605013a

^ 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: 1670985Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 05-JUN-17GEL Job No (SDG): 2017-1566GEL Sample ID: 1203803789Date Filtered: 05-JUN-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.197	ug/L	J	1	05-JUN-17 18:41	per0605014a
	Perchlorate Isotope Ratio			2.79			1	05-JUN-17 18:41	per0605014a
14797-73-0	Perchlorate-101	.05	.2	0.207	ug/L		1	05-JUN-17 18:41	per0605014a
	Perchlorate-O(18)			0.469	ug/L		1	05-JUN-17 18:41	per0605014a

^ 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: 1670985Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-1566GEL Sample ID: 1203803792Date Filtered: 05-JUN-17Injection Volume (uL): 20

%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.190	ug/L	J	1	05-JUN-17 18:50	per0605015a
	Perchlorate Isotope Ratio			2.71			1	05-JUN-17 18:50	per0605015a
14797-73-0	Perchlorate-101	.05	.2	0.205	ug/L		1	05-JUN-17 18:50	per0605015a
	Perchlorate-O(18)			0.512	ug/L		1	05-JUN-17 18:50	per0605015a

^ 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: 1670985Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-132215MSDate Received: 23-MAY-17GEL Job No (SDG): 2017-1566GEL Sample ID: 1203803790Date Filtered: 05-JUN-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.527	ug/L		1	05-JUN-17 19:08	per0605017a
	Perchlorate Isotope Ratio			2.83			1	05-JUN-17 19:08	per0605017a
14797-73-0	Perchlorate-101	.05	.2	0.546	ug/L		1	05-JUN-17 19:08	per0605017a
	Perchlorate-O(18)			0.515	ug/L		1	05-JUN-17 19:08	per0605017a

^ 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: 1670985Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-132215MSDDate Received: 23-MAY-17GEL Job No (SDG): 2017-1566GEL Sample ID: 1203803791Date Filtered: 05-JUN-17Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.514	ug/L		1	05-JUN-17 19:17	per0605018a
	Perchlorate Isotope Ratio			2.91			1	05-JUN-17 19:17	per0605018a
14797-73-0	Perchlorate-101	.05	.2	0.519	ug/L		1	05-JUN-17 19:17	per0605018a
	Perchlorate-O(18)			0.517	ug/L		1	05-JUN-17 19:17	per0605018a

^ 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 #: 2017-1566
Work Order #: 423831

Sample ID	Client ID
423831001	CAMO-17-132215
423831002	CAMO-17-132235
1203795757	Method Blank (MB) ICP
1203795758	Laboratory Control Sample (LCS)
1203795761	423833001(CAMO-17-132523L) Serial Dilution (SD)
1203795759	423833001(CAMO-17-132523D) Sample Duplicate (DUP)
1203795760	423833001(CAMO-17-132523S) Matrix Spike (MS)
1203795856	Method Blank (MB) ICP-MS
1203795857	Laboratory Control Sample (LCS)
1203795860	423833001(CAMO-17-132523L) Serial Dilution (SD)
1203795858	423833001(CAMO-17-132523D) Sample Duplicate (DUP)
1203795859	423833001(CAMO-17-132523S) Matrix Spike (MS)
1203805738	Method Blank (MB) CVAA
1203805739	Laboratory Control Sample (LCS)
1203805744	423833001(CAMO-17-132523L) Serial Dilution (SD)
1203805740	423833001(CAMO-17-132523D) Sample Duplicate (DUP)
1203805742	423833001(CAMO-17-132523S) Matrix Spike (MS)

Sample Analysis

Samples 423831001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

Analytical Batch:	1667736, 1667775, 1671798 and 1674846
Prep Batch :	1667735, 1667773 and 1671792
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-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm.

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

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

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

ICSA/ICSAB Statement

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria. For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Continuing Calibration Blanks (CCB) Requirements

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

Continuing Calibration Verification (CCV) Requirements

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 423833001 (CAMO-17-132523)-ICP, ICP-MS and CVAA.

Matrix Spike (MS/MSD) Recovery Statement

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

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate

value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. The relative percent differences (RPD) between the sample and its duplicate (DUP) were within acceptable limits for all applicable analytes.

Serial Dilution % Difference Statement

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

Technical Information

Holding Time Specifications

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

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

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

Miscellaneous Information

Electronic Packaging Comment

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

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

Data Exception (DER) Documentation

A data exception report was not required for this SDG.

Additional Comments

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

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

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report for

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

Client SDG: 2017-1566 GEL Work Order: 423831

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: 19 JUN 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1566**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 423831001**BASIS:** As Received**DATE COLLECTED** 18-MAY-17**CLIENT ID:** CAMO-17-132215**LEVEL:** Low**DATE RECEIVED** 23-MAY-17**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	06/08/17 10:49	060817W2-6	1671798

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1566

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 423831001

BASIS: As Received

DATE COLLECTED 18-MAY-17

CLIENT ID: CAMO-17-132215

LEVEL: Low

DATE RECEIVED 23-MAY-17

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	200	ug/L	U	68	200	200	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	PRB	06/14/17 19:01	170614-2	1667775
7440-38-2	Arsenic	5	ug/L	U	2	5	5	1	MS	PRB	06/15/17 16:42	170615-5	1667775
7440-39-3	Barium	24.7	ug/L		1	5	5	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7440-42-8	Boron	50	ug/L	U	15	50	50	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7440-43-9	Cadmium	1	ug/L	U	0.3	1	1	1	MS	PRB	06/14/17 19:01	170614-2	1667775
7440-70-2	Calcium	11400	ug/L		50	200	200	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7440-47-3	Chromium	3.98	ug/L	J	3	10	10	1	MS	PRB	06/14/17 19:01	170614-2	1667775
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7440-50-8	Copper	10	ug/L	U	3	10	10	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	PRB	06/15/17 00:28	170614-4	1667775
7439-95-4	Magnesium	3800	ug/L		110	300	300	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7439-96-5	Manganese	10	ug/L	U	2	10	10	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7439-98-7	Molybdenum	1.18	ug/L		0.2	0.5	0.5	1	MS	PRB	06/14/17 19:01	170614-2	1667775
7440-02-0	Nickel	0.804	ug/L	J	0.6	2	2	1	MS	PRB	06/14/17 19:01	170614-2	1667775
7440-09-7	Potassium	1290	ug/L		50	150	150	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7782-49-2	Selenium	5	ug/L	U	2	5	5	1	MS	PRB	06/14/17 19:01	170614-2	1667775
7631-86-9	Silica	73400	ug/L		53	213	213	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7440-22-4	Silver	1	ug/L	U	0.3	1	1	1	MS	PRB	06/14/17 19:01	170614-2	1667775
7440-23-5	Sodium	10400	ug/L		100	300	300	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7440-24-6	Strontium	50.3	ug/L		1	5	5	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7440-28-0	Thallium	2	ug/L	U	0.6	2	2	1	MS	PRB	06/15/17 00:28	170614-4	1667775
7440-31-5	Tin	10	ug/L	U	2.5	10	10	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7440-61-1	Uranium	0.496	ug/L		0.067	0.2	0.2	1	MS	PRB	06/15/17 00:28	170614-4	1667775
7440-62-2	Vanadium	6.88	ug/L		1	5	5	1	P	TXT1	06/15/17 14:20	061517A-1	1667736
7440-66-6	Zinc	10	ug/L	U	3.3	10	10	1	P	TXT1	06/15/17 14:20	061517A-1	1667736

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1566**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 423831001**BASIS:** As Received**DATE COLLECTED** 18-MAY-17**CLIENT ID:** CAMO-17-132215**LEVEL:** Low**DATE RECEIVED** 23-MAY-17**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
	Hardness as CaCO3	44.1	mg/L		0.453	1.24	1.24	1		TXT1	06/16/17 11:24		1674846

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1667736	1667735	SW846 3005A	50	mL	50	mL	05/23/17	CXW4
1667775	1667773	SW846 3005A	50	mL	50	mL	05/23/17	CXW4
1671798	1671792	EPA 245.1/245.2 Prep	20	mL	20	mL	06/07/17	AXS5

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-1566**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 423831002**BASIS:** As Received**DATE COLLECTED** 18-MAY-17**CLIENT ID:** CAMO-17-132235**LEVEL:** Low**DATE RECEIVED** 23-MAY-17**MATRIX:** W**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7439-97-6	Mercury	0.20	ug/L	U	0.067	0.2	0.2	1	AV	MTM1	06/08/17 10:50	060817W2-6	1671798

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1671798	1671792	EPA 245.1/245.2 Prep	20	mL	20	mL	06/07/17	AXS5

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2017-1566
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>
1203795757	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	2.5	ug/L	+/-10	U	P	2.5	10
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
	Aluminum	68	ug/L	+/-200	U	P	68	200
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Calcium	50	ug/L	+/-200	U	P	50	200
	Copper	3	ug/L	+/-10	U	P	3	10
	Potassium	50	ug/L	+/-150	U	P	50	150
	Manganese	2	ug/L	+/-10	U	P	2	10
	Magnesium	110	ug/L	+/-300	U	P	110	300
	Iron	30	ug/L	+/-100	U	P	30	100
	Cobalt	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Barium	1	ug/L	+/-5	U	P	1	5
	Silica	53	ug/L	+/-213	U	P	53	213
1203795856	Antimony	1.82	ug/L	+/-3	J	MS	1	3
	Arsenic	2	ug/L	+/-5	U	MS	2	5
	Cadmium	0.3	ug/L	+/-1	U	MS	0.3	1
	Chromium	3	ug/L	+/-10	U	MS	3	10
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.2	ug/L	+/-0.5	U	MS	0.2	0.5
	Nickel	0.6	ug/L	+/-2	U	MS	0.6	2
	Selenium	2	ug/L	+/-5	U	MS	2	5
	Silver	0.3	ug/L	+/-1	U	MS	0.3	1
	Thallium	0.6	ug/L	+/-2	U	MS	0.6	2
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
1203805738	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. 2017-1566 Client ID: CAMO-17-132523S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 423833001 Spike ID: 1203795760

<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	4940		68	U	5000	98.8		P
Barium	ug/L	75-125	508		20.6		500	97.5		P
Beryllium	ug/L	75-125	492		1	U	500	98.4		P
Boron	ug/L	75-125	450		15	U	500	90		P
Calcium	ug/L	75-125	17300		12500		5000	96.5		P
Cobalt	ug/L	75-125	490		1	U	500	98		P
Copper	ug/L	75-125	503		3	U	500	101		P
Iron	ug/L	75-125	4950		30	U	5000	98.8		P
Magnesium	ug/L	75-125	8220		3410		5000	96.2		P
Manganese	ug/L	75-125	487		2	U	500	97.3		P
Potassium	ug/L	75-125	6020		1110		5000	98.1		P
Silica	ug/L		76200		66200		10700	93.9	N/A	P
Sodium	ug/L	75-125	14100		9280		5000	97.1		P
Strontium	ug/L	75-125	541		54.5		500	97.4		P
Tin	ug/L	75-125	484		2.5	U	500	96.8		P
Vanadium	ug/L	75-125	495		4.69	J	500	98		P
Zinc	ug/L	75-125	484		3.3	U	500	96.3		P

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-1566 Client ID CAMO-17-132523S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 423833001 Spike ID: 1203795859

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Antimony	ug/L	75-125	50.8		1	U	50	101		MS
Arsenic	ug/L	75-125	55.1		2	U	50	108		MS
Cadmium	ug/L	75-125	51.9		0.3	U	50	104		MS
Chromium	ug/L	75-125	62.1		13.9		50	96.4		MS
Lead	ug/L	75-125	51.7		0.5	U	50	103		MS
Molybdenum	ug/L	75-125	51.3		0.906		50	101		MS
Nickel	ug/L	75-125	49.3		0.6	U	50	97.8		MS
Selenium	ug/L	75-125	49.9		2	U	50	97.7		MS
Silver	ug/L	75-125	52.2		0.3	U	50	104		MS
Thallium	ug/L	75-125	42.1		0.6	U	50	84.1		MS
Uranium	ug/L	75-125	48.3		0.414		50	95.7		MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-1566 **Client ID:** CAMO-17-132523S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 423833001 **Spike ID:** 1203805742

<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	2.04		0.067	U	2	102		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1566

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-17-132523D

Matrix: WATER

Level: Low

Sample ID: 423833001

Duplicate ID: 1203795759

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	20.6		20.4		.771		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L		15 U		15 U				P
Calcium	ug/L	+/-20%	12500		12400		.666		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%	3410		3350		1.9		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1110		1080		3.27		P
Silica	ug/L	+/-20%	66200		65700		.775		P
Sodium	ug/L	+/-20%	9280		9190		.976		P
Strontium	ug/L	+/-20%	54.5		54.3		.257		P
Tin	ug/L		2.5 U		2.5 U				P
Vanadium	ug/L	+/-5	4.69 J		4.53 J		3.46		P
Zinc	ug/L		3.3 U		3.3 U				P

*Analytical Methods:

P SW846 3005A/6010C

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1566

Lab Code: GEL

Contract: ESHL00114

Client ID: CAMO-17-132523D

Matrix: WATER

Level: Low

Sample ID: 423833001

Duplicate ID: 1203795858

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L		2 U		2 U				MS
Cadmium	ug/L		0.3 U		0.3 U				MS
Chromium	ug/L	+/-10	13.9		14.3		2.8		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	0.906		0.966		6.41		MS
Nickel	ug/L		0.6 U		0.6 U				MS
Selenium	ug/L		2 U		2 U				MS
Silver	ug/L		0.3 U		0.3 U				MS
Thallium	ug/L		0.6 U		0.6 U				MS
Uranium	ug/L	+/- .2	0.414		0.418		.962		MS

*Analytical Methods:

MS SW846 3005A/6020A

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-1566**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAMO-17-132523D**Matrix:** WATER**Level:** Low**Sample ID:** 423833001**Duplicate ID:** 1203805740**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. 2017-1566

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>
1203795758								
	Aluminum	ug/L	5000	4910		98.2	80-120	P
	Barium	ug/L	500	485		96.9	80-120	P
	Beryllium	ug/L	500	488		97.7	80-120	P
	Boron	ug/L	500	473		94.6	80-120	P
	Calcium	ug/L	5000	4910		98.3	80-120	P
	Cobalt	ug/L	500	486		97.1	80-120	P
	Copper	ug/L	500	485		96.9	80-120	P
	Iron	ug/L	5000	4920		98.4	80-120	P
	Magnesium	ug/L	5000	4870		97.3	80-120	P
	Manganese	ug/L	500	482		96.3	80-120	P
	Potassium	ug/L	5000	4850		97.1	80-120	P
	Silica	ug/L	10700	10100		94	80-120	P
	Sodium	ug/L	5000	4840		96.8	80-120	P
	Strontium	ug/L	500	485		97	80-120	P
	Tin	ug/L	500	476		95.2	80-120	P
	Vanadium	ug/L	500	481		96.2	80-120	P
	Zinc	ug/L	500	474		94.7	80-120	P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-1566

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>
1203795857								
	Antimony	ug/L	50	51.7		103	80-120	MS
	Arsenic	ug/L	50	53		106	80-120	MS
	Cadmium	ug/L	50	52		104	80-120	MS
	Chromium	ug/L	50	48.8		97.6	80-120	MS
	Lead	ug/L	50	52.7		105	80-120	MS
	Molybdenum	ug/L	50	50.9		102	80-120	MS
	Nickel	ug/L	50	48.9		97.8	80-120	MS
	Selenium	ug/L	50	52.6		105	80-120	MS
	Silver	ug/L	50	53.6		107	80-120	MS
	Thallium	ug/L	50	43		86.1	80-120	MS
	Uranium	ug/L	50	48.2		96.5	80-120	MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-1566

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>
1203805739	Mercury	ug/L	2	2.02		101	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1566 **Client ID:** CAMO-17-132523L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 423833001 **Serial Dilution ID:** 1203795761

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Aluminum	68	U	340	U				P
Barium	20.6		20.2	J	1.898			P
Beryllium	1	U	5	U				P
Boron	15	U	75	U				P
Calcium	12500		12000		4.448		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	3410		3260		4.361			P
Manganese	2	U	10	U				P
Potassium	1110		779		30.087			P
Silica	66200		63200		4.463		10	P
Sodium	9280		9030		2.695		10	P
Strontium	54.5		54.4		.165		10	P
Tin	2.5	U	12.5	U				P
Vanadium	4.69	J	5	U	46.312			P
Zinc	3.3	U	16.5	U				P

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1566 **Client ID:** CAMO-17-132523L

Contract: ESHL00114

Matrix: LIQUID **Level:** Low

Sample ID: 423833001 **Serial Dilution ID:** 1203795860

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	2	U	10	U				MS
Cadmium	.3	U	1.5	U				MS
Chromium	13.9		15	U	.05			MS
Lead	.5	U	2.5	U				MS
Molybdenum	.906		1.18	J	29.691			MS
Nickel	.6	U	3	U				MS
Selenium	2	U	10	U				MS
Silver	.3	U	1.5	U				MS
Thallium	.6	U	3	U				MS
Uranium	.414		.42	J	1.449			MS

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-1566 **Client ID:** CAMO-17-132523L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 423833001 **Serial Dilution ID:** 1203805744

<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 #: 2017-1566
Work Order #: 423831**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1667273

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
423831002	CAMO-17-132235
1203795678	Method Blank (MB)
1203795679	Laboratory Control Sample (LCS)
1203795680	423833004(CAMO-17-133049) Sample Duplicate (DUP)
1203795682	423833004(CAMO-17-133049) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

acceptance limits.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 423833004 (CAMO-17-133049) 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:	1667161	Method:	WSP-CN(T)
Prep Batch :	1667160	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
423831002	CAMO-17-132235
1203794406	Method Blank (MB)
1203794407	Laboratory Control Sample (LCS)
1203794409	423575002(CAMO-17-133050) Sample Duplicate (DUP)
1203794412	423575002(CAMO-17-133050) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 423575002 (CAMO-17-133050) 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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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: 1669023 **Method:** WSP-ANIONS

Sample Analysis

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

Sample ID	Client ID
423831001	CAMO-17-132215
1203798953	Method Blank (MB)
1203798954	Laboratory Control Sample (LCS)
1203798955	423575003(CAMO-17-132212) Sample Duplicate (DUP)
1203798956	423575003(CAMO-17-132212) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 423575003 (CAMO-17-132212) 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 1203798955 (CAMO-17-132212DUP), 1203798956 (CAMO-17-132212PS) and 423831001 (CAMO-17-132215) were manually integrated to correctly position the baseline as set in the calibration standards.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

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

Method/Analysis Information

Product:	Ammonia Nitrogen		
Analytical Batch:	1667975	Method:	NH3
Prep Batch :	1667974	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
423831001	CAMO-17-132215
1203796416	Method Blank (MB)
1203796417	Laboratory Control Sample (LCS)
1203796418	423833001(CAMO-17-132523) Sample Duplicate (DUP)
1203796419	423833001(CAMO-17-132523) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

acceptance limits.

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 423833001 (CAMO-17-132523) 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

Samples 1203796416 (MB) and 1203796417 (LCS) were re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1667979	Method:	TKN
Prep Batch :	1667978	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
423831002	CAMO-17-132235
1203796426	Method Blank (MB)
1203796427	Laboratory Control Sample (LCS)
1203796428	423833002(CAMO-17-133048) Sample Duplicate (DUP)
1203797902	424251001(NonSDG) Sample Duplicate (DUP)
1203796429	423833002(CAMO-17-133048) Matrix Spike (MS)
1203797903	424251001(NonSDG) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-104 REV# 14.

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 423833002 (CAMO-17-133048) and 424251001 (NonSDG) were selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1667873

Method: NO3NO2

Sample Analysis

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

Sample ID	Client ID
423831001	CAMO-17-132215
1203796101	Method Blank (MB)
1203796102	Laboratory Control Sample (LCS)
1203796104	423831001(CAMO-17-132215) Sample Duplicate (DUP)
1203796106	423831001(CAMO-17-132215) Post Spike (PS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 423831001 (CAMO-17-132215) was selected for QC analysis.

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Phosphorus		
Analytical Batch:	1667977	Method:	PO4
Prep Batch :	1667976	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
423831001	CAMO-17-132215
1203796420	Method Blank (MB)
1203796421	Laboratory Control Sample (LCS)
1203796422	423833001(CAMO-17-132523) Sample Duplicate (DUP)
1203796423	423833001(CAMO-17-132523) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 423833001 (CAMO-17-132523) 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: 1667981

Method: TDS

Sample Analysis

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

Sample ID	Client ID
423831001	CAMO-17-132215
1203796430	Method Blank (MB)
1203796431	Laboratory Control Sample (LCS)
1203796432	423833003(CAMO-17-132210) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-001 REV# 15.

Preparation/Analytical Method Verification

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

Calibration Information

The Solids analysis was performed on a Sartorius Balance BAL216. Solids lab

Initial Calibration

All initial calibration requirements have been met for this SDG.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Consecutive Weight Checks

All consecutive weight checks were met.

Quality Control (QC) Designation

Sample 423833003 (CAMO-17-132210) 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: 1668501

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
423831001	CAMO-17-132215
1203797707	Laboratory Control Sample (LCS)
1203797708	423220001(CASA-17-132339) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 423220001 (CASA-17-132339) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: pH

Analytical Batch: 1669863 **Method:** PH

Sample Analysis

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

Sample ID	Client ID
423831001	CAMO-17-132215
1203801184	Laboratory Control Sample (LCS)
1203801186	423575005(CAMO-17-132214) Sample Duplicate (DUP)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 423575005 (CAMO-17-132214) 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
1203801186 (CAMO-17-132214DUP)	pH	Received 19-MAY-17, out of holding 17-MAY-17
423831001 (CAMO-17-132215)	pH	Received 23-MAY-17, out of holding 18-MAY-17

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

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

A data exception report (DER) 1639932 was generated for samples 423831001 (CAMO-17-132215) and 1203801186 (CAMO-17-132214DUP) 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: 1669161 **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
423831001	CAMO-17-132215
1203799302	Laboratory Control Sample (LCS)
1203799304	423575005(CAMO-17-132214) Sample Duplicate (DUP)
1203799307	423575005(CAMO-17-132214) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 423575005 (CAMO-17-132214) 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: 2017-1566 GEL Work Order: 423831


The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Aubrey Kingsbury

Date: 14 JUN 2017

Title: Analyst I

Sample Data Summary

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Certificate of Analysis

Report Date: June 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: 2017-1566

Client Sample ID: CAMO-17-132215
Sample ID: 423831001
Matrix: W
Collect Date: 18-MAY-17 12:48
Receive Date: 23-MAY-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
WSP-ANIONS "As Received"												
Bromide	U	ND	0.067	0.200	mg/L		1	MXL2	05/26/17	1751	1669023	1
Chloride		2.32	0.067	0.200	mg/L		1					
Fluoride		0.383	0.033	0.100	mg/L		1					
Sulfate		2.75	0.133	0.400	mg/L		1					
Nutrient Analysis												
NH3 "As Received"												
Nitrogen, Ammonia	J	0.0315	0.017	0.050	mg/L	1.00	1	KLP1	05/30/17	1331	1667975	2
NO3NO2 "As Received"												
Nitrogen, Nitrate/Nitrite		0.477	0.017	0.050	mg/L		1	AXH3	05/25/17	0849	1667873	3
PO4 "As Received"												
Phosphorus, Total as P	J	0.0296	0.020	0.050	mg/L	1.00	1	KLP1	05/31/17	1328	1667977	4
Solids Analysis												
TDS "As Received"												
Total Dissolved Solids		133	3.40	14.3	mg/L			KLP1	05/24/17	1414	1667981	5
Titration and Ion Analysis												
EPA 310.1 Total Alkalinity "As Received"												
Alkalinity, Total as CaCO3		65.2	1.45	4.00	mg/L			RXB5	05/31/17	1945	1669161	6
Carbonate alkalinity (CaCO3)	U	ND	1.45	4.00	mg/L							
EPA120.1 Specific Conductivity "As Received"												
Conductivity		128	1.00	1.00	umhos/cm		1	VH1	05/30/17	1506	1668501	7
PH "As Received"												
pH at Temp 17.2C	H	8.13	0.010	0.100	SU		1	RXB5	05/31/17	1944	1669863	8

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	AXH3	05/30/17	1213	1667974
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	05/30/17	1700	1667976

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Certificate of Analysis

Report Date: June 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: 2017-1566

Client Sample ID: CAMO-17-132215
Sample ID: 423831001

Project: ESHL00114
Client ID: ARSL004

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

Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: June 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: 2017-1566

Client Sample ID: CAMO-17-132235
Sample ID: 423831002
Matrix: W
Collect Date: 18-MAY-17 12:48
Receive Date: 23-MAY-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SW 9060 Total Organic Carbon "As Received"												
Total Organic Carbon Average	U	ND	0.330	1.00	mg/L		1	TSM	05/25/17	0159	1667273	1
Flow Injection Analysis												
WSP-CN(T) "As Received"												
Cyanide, Total	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	05/23/17	1436	1667161	2
Nutrient Analysis												
TKN "As Received"												
Nitrogen, Total Kjeldahl	J	0.0363	0.033	0.100	mg/L	1.00	1	KLP1	05/31/17	1115	1667979	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	05/23/17	1348	1667160
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	05/30/17	1700	1667978

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

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

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 14, 2017

Page 1 of 6

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

Contact: Mr. Keith Greene

Workorder: 423831

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1667273										
QC1203795680	423833004	DUP									
Total Organic Carbon Average		U	ND	U	ND	mg/L	N/A		TSM	05/25/17	04:19
QC1203795679	LCS										
Total Organic Carbon Average	10.0				9.74	mg/L	97.4	(80%-120%)		05/24/17	18:03
QC1203795678	MB										
Total Organic Carbon Average			U	ND	mg/L					05/24/17	17:51
QC1203795682	423833004	PS									
Total Organic Carbon Average	10.0	U	ND		10.6	mg/L	103	(75%-125%)		05/25/17	05:06
Flow Injection Analysis											
Batch	1667161										
QC1203794409	423575002	DUP									
Cyanide, Total		U	ND	U	ND	ug/L	N/A		AXH3	05/23/17	14:09
QC1203794407	LCS										
Cyanide, Total	50.0				49.4	ug/L	98.8	(90%-110%)		05/23/17	14:07
QC1203794406	MB										
Cyanide, Total			U	ND	ug/L					05/23/17	14:05
QC1203794412	423575002	MS									
Cyanide, Total	100	U	ND		106	ug/L	106	(90%-110%)		05/23/17	14:10
Ion Chromatography											
Batch	1669023										
QC1203798955	423575003	DUP									
Bromide		U	ND	U	ND	mg/L	N/A		MXL2	05/26/17	16:25

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QC Summary

Workorder: 423831

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1669023										
Chloride		4.44		4.43	mg/L	0.124		(0%-20%)	MXL2	05/26/17	16:25
Fluoride		0.393		0.396	mg/L	0.583	^	(+/-0.100)			
Sulfate		5.21		5.16	mg/L	1.01		(0%-20%)			
QC1203798954 LCS											
Bromide	1.25			1.36	mg/L		109	(80%-120%)		05/26/17	15:27
Chloride	5.00			5.05	mg/L		101	(80%-120%)			
Fluoride	2.50			2.60	mg/L		104	(80%-120%)			
Sulfate	10.0			10.3	mg/L		103	(80%-120%)			
QC1203798953 MB											
Bromide			U	ND	mg/L					05/26/17	14:58
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1203798956 423575003 PS											
Bromide	1.25	U	ND	1.38	mg/L		107	(75%-125%)		05/26/17	16:54
Chloride	5.00		4.44	10.1	mg/L		114	(75%-125%)			
Fluoride	2.50		0.393	3.01	mg/L		105	(75%-125%)			
Sulfate	10.0		5.21	16.0	mg/L		108	(75%-125%)			

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QC Summary

Workorder: 423831

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1667873										
QC1203796104	423831001	DUP									
Nitrogen, Nitrate/Nitrite		0.477		0.476	mg/L	0.21		(0%-20%)	AXH3	05/25/17	08:51
QC1203796102	LCS										
Nitrogen, Nitrate/Nitrite	1.00			1.00	mg/L		100	(90%-110%)		05/25/17	08:41
QC1203796101	MB										
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					05/25/17	08:40
QC1203796106	423831001	PS									
Nitrogen, Nitrate/Nitrite	1.00	0.477		1.48	mg/L		100	(90%-110%)		05/25/17	08:56
Batch	1667975										
QC1203796418	423833001	DUP									
Nitrogen, Ammonia		0.109		0.113	mg/L	3.6 ^		(+/-0.050)	KLP1	05/30/17	13:32
QC1203796417	LCS										
Nitrogen, Ammonia	1.00			1.01	mg/L		101	(90%-110%)		05/30/17	13:42
QC1203796416	MB										
Nitrogen, Ammonia			J	0.031	mg/L					05/30/17	13:41
QC1203796419	423833001	MS									
Nitrogen, Ammonia	1.00	0.109		1.07	mg/L		96.1	(90%-110%)		05/30/17	13:33
Batch	1667977										
QC1203796422	423833001	DUP									
Phosphorus, Total as P		J	0.0396	J	0.0324	mg/L	20 ^	(+/-0.050)	KLP1	05/31/17	13:35
QC1203796421	LCS										
Phosphorus, Total as P	1.00			0.990	mg/L		99	(80%-124%)		05/31/17	13:23
QC1203796420	MB										
Phosphorus, Total as P			J	0.025	mg/L					05/31/17	13:22

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QC Summary

Workorder: 423831

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1667977										
QC1203796423	423833001	MS									
Phosphorus, Total as P	1.00	J	0.0396	1.07	mg/L		103	(63%-139%)	KLP1	05/31/17	13:35
Batch	1667979										
QC1203796428	423833002	DUP									
Nitrogen, Total Kjeldahl		J	0.0512	U	ND	mg/L	200	^	KLP1	05/31/17	11:16
QC1203797902	424251001	DUP									
Nitrogen, Total Kjeldahl			1.20	1.11	mg/L	7.79		(0%-20%)		05/31/17	11:38
QC1203796427	LCS										
Nitrogen, Total Kjeldahl	1.00			1.04	mg/L		104	(90%-110%)		05/31/17	11:14
QC1203796426	MB										
Nitrogen, Total Kjeldahl			U	ND	mg/L					05/31/17	11:13
QC1203796429	423833002	MS									
Nitrogen, Total Kjeldahl	1.00	J	0.0512	1.01	mg/L		95.9	(90%-110%)		05/31/17	11:21
QC1203797903	424251001	MS									
Nitrogen, Total Kjeldahl	1.00		1.20	2.17	mg/L		97	(90%-110%)		05/31/17	11:39
Solids Analysis											
Batch	1667981										
QC1203796432	423833003	DUP									
Total Dissolved Solids			126	126	mg/L	0		(0%-5%)	KLP1	05/24/17	14:14
QC1203796431	LCS										
Total Dissolved Solids	300			289	mg/L		96.2	(95%-105%)		05/24/17	14:14
QC1203796430	MB										
Total Dissolved Solids			U	ND	mg/L					05/24/17	14:14

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1668501										
QC1203797708	423220001	DUP									
Conductivity		213		214	umhos/cm	0.468		(0%-10%)	VH1	05/30/17	15:02
QC1203797707	LCS										
Conductivity	1410			1400	umhos/cm		98.9	(95%-105%)		05/30/17	15:00
Batch	1669161										
QC1203799304	423575005	DUP									
Alkalinity, Total as CaCO3		60.0		60.6	mg/L	0.995		(0%-20%)	RXB5	05/31/17	19:39
Carbonate alkalinity (CaCO3)	U	ND	U	ND	mg/L	N/A					
QC1203799302	LCS										
Alkalinity, Total as CaCO3	100			106	mg/L		106	(90%-110%)		05/31/17	19:13
QC1203799307	423575005	MS									
Alkalinity, Total as CaCO3	100	60.0		163	mg/L		103	(80%-120%)		05/31/17	19:41
Batch	1669863										
QC1203801186	423575005	DUP									
pH	H	7.97	H	7.97	SU	0		(0%-5%)	RXB5	05/31/17	19:40
QC1203801184	LCS										
pH	7.00			7.00	SU		100	(99%-101%)		05/31/17	19:26

Notes:

- < Result is less than value reported
- > Result is greater than value reported
- B The target analyte was detected in the associated blank.
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- H Analytical holding time was exceeded
- J Value is estimated
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
d	5-day BOD--The 2:1 depletion requirement was not met for this sample										
e	5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes										
h	Preparation or preservation holding time was exceeded										

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

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

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

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

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

Miscellaneous

DATA EXCEPTION REPORT			
Mo.Day Yr. 07-JUN-17	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ELECTRODE	Test / Method: EPA 150.1, SW846 9040C	Matrix Type: Liquid	Client Code: ESHL, SCPO
Batch ID: 1669863	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 423439,423575(2017-1552),423605,423831(2017-1566),423833(2017-1565) Application Issues: Sample received out of holding			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Sample received out of holding: 423439 001,002 423575 001,003,005 423605 001 423831 001 423833 001,003 QC 1203801185DUP,1203801186DUP		1. Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified. 1203801185 (DEPO-0517-SW-01-17DDUP) [Received 18-MAY-17, out of holding 17-MAY-17]. 1203801186 (CAMO-17-132214DUP) [Received 19-MAY-17, out of holding 17-MAY-17]. 423439001 (DEPO-0517-GW-001-17) [Received 18-MAY-17, out of holding 17-MAY-17]. 423439002 (DEPO-0517-SW-01-17D) [Received 18-MAY-17, out of holding 17-MAY-17]. 423575001 (CAMO-17-132211) [Received 19-MAY-17, out of holding 17-MAY-17]. 423575003 (CAMO-17-132212) [Received 19-MAY-17, out of holding 17-MAY-17]. 423575005 (CAMO-17-132214) [Received 19-MAY-17, out of holding 17-MAY-17]. 423605001 (DEPO-0518-GW-002-17) [Received 19-MAY-17, out of holding 18-MAY-17]. 423831001 (CAMO-17-132215) [Received 23-MAY-17, out of holding 18-MAY-17]. 423833001 (CAMO-17-132523) [Received 23-MAY-17, out of holding 18-MAY-17]. 423833003 (CAMO-17-132210) [Received 23-MAY-17, out of holding 18-MAY-17].	

Originator's Name:
Rachael Bell 07-JUN-17

Data Validator/Group Leader:
Elzbieta Szulc 09-JUN-17