

General Engineering Laboratories, Inc., Charleston, SC.
2040 Savage Rd
Charleston SC 29407

Chain of Custody/Analysis Request

COC/Lab Request #:

2013-1092

Page 1 of 1

Client Contact:

Lab Agreement # : 126310011

Site Name: Los Alamos National Laboratory

Project Number :

Analysis Turnaround Time:

24 Hour - ☐ Other - ☐

7 Day - ☐

14 Day - ☐

21 Day - ☐

28 Day - ☒

WSP-GENINORG+PerChlorate

WSP-Met+B+SN+SR+U

WSP-NH3+NO3/NO2+PO4

WSP-TKN+TOC

Rad Screening Info:

Yes, Below Background

Lab Reporting Limit Type:

Special Instructions:

Field Sample ID

Sample Date

Sample Time

Sample Matrix

CAMO-13-36972

Jul 9 2013

13:34

W

CAMO-13-36980

Jul 9 2013

13:34

W

1

1

1

1

Special Instructions:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

Mortandad/Sandia (Chromium
Investigation) MY2013 Q4
Watershed
Sampling_MORTANDAD

EVENT ID: 4302

EVENT NAME:

SAMPLE ID: CAMO-13-36972

WORK ORDER: NA

<u>AS PLANNED</u>		<u>AS COLLECTED</u>	<u>AS PLANNED</u>		<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		7/9/2013	FIELD MATRIX:	WG	ok
TIME COLLECTED (HH:MM):		1334	MEDIA:	UA	L
PRS ID:		OK	SAMPLE TECH CODE:	UA	QSP
LOCATION ID: MCOI-6			FIELD PREP:	UF	ok
LOCATION TYPE: MON			FIELD QC TYPE: REG		
PORT: SINGLE COMPLETION			SAMPLE USAGE: INV		

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
N/A	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4	Y	N/A

SAMPLE COMMENTS: Diesel Generator running while sampling

LOCATION COMMENTS: N/A

FIELD PARAMETERS:

Dissolved Oxygen 6.95 mg/L Oxidation-Reduction Potential 109.8 MV pH 7.03 SU
Specific Conductance 595 uS/cm Temperature 17.19 deg C Turbidity 0.52 NTU

COLLECTED BY (PRINT) M. Shardo

RELINQUISHED BY (Printed Name) William Shardo (Signature) [Signature]	Date/Time 7/9/2013 1430	RECEIVED BY (Printed Name) S. Sherwood (Signature) [Signature]	Date/Time 7/9/2013 1430
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/01/2013

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4302 EVENT NAME: Mortandad/Sandia (Chromium Investigation) MY2013 Q4 Watershed Sampling_MORTANDAD

SAMPLE ID: CAMO-13-36980 WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		7/9/2013	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		1334	MEDIA:	UA	I
PRS ID:		OK	SAMPLE TECH CODE:	UA	GSP
LOCATION ID: MCOI-6		I	FIELD PREP:	F	OK
LOCATION TYPE: MON		I	FIELD QC TYPE:	REG	I
PORT: SINGLE COMPLETION		I	SAMPLE USAGE:	INV	I

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-GENINORG+PerChlorate	1 LITER POLY	1	ICE	I	NA
	WSP-Met+B+SN+SR+U	1 LITER POLY	1	HNO3	I	
	WSP-NH3+NO3/NO2+PO4	500 ML AMBER GLASS	1	H2SO4	I	

SAMPLE COMMENTS: NA

LOCATION COMMENTS: NA

FIELD PARAMETERS:

Dissolved Oxygen NA mg/L Oxidation-Reduction Potential NA MV pH NA SU

Specific Conductance NA uS/cm Temperature NA deg C Turbidity NA NTU

COLLECTED BY (PRINT) M. Sherwood

RELINQUISHED BY (Printed Name) William Shaw (Signature) <i>[Signature]</i>	Date/Time 7/9/13 1430	RECEIVED BY (Printed Name) S. Sherwood (Signature) <i>[Signature]</i>	Date/Time 7/9/13 1430
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 07/01/2013

Data Validation Report

Chain Of Custody No. 2013-1092

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
	329247 EPA:120.1	1				
	329247 EPA:150.1	1				
	329247 EPA:160.1	1				
	329247 EPA:245.2	1				
	329247 EPA:300.0	1				
	329247 EPA:310.1	1				
	329247 EPA:350.1	1				
	329247 EPA:351.2	1				
	329247 EPA:353.2	1				
	329247 EPA:365.4	1				
	329247 SM:A2340B	1				
	329247 SW-846:6010B	1				
	329247 SW-846:6020	1				
	329247 SW-846:6850	1				
	329247 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
	329247 EPA:120.1	1315805	1315805		1						
	329247 EPA:150.1	1314715	1314715		1						
	329247 EPA:160.1	1314116	1314116		1					1	
	329247 EPA:245.2	1318196	1318193		1					1	1
	329247 EPA:300.0	1314143	1314143		1					1	
	329247 EPA:310.1	1316484	1316484		1					2	1
	329247 EPA:350.1	1314770	1314769		1					1	1
	329247 EPA:351.2	1314795	1314794		1					1	2
	329247 EPA:353.2	1314793	1314793		1					1	
	329247 EPA:365.4	1313807	1313806		1					1	2
	329247 SM:A2340B	1320801	1320801		1						
	329247 SW-846:6010B	1315157	1315156		1					1	1
	329247 SW-846:6020	1315155	1315154		1					1	1
	329247 SW-846:6850	1315482	1315481		1					1	1
	329247 SW-846:9060	1315287	1315287		1					1	

2. Distribution Of Analytes In EDD.

Analytical Method	Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spikes	TICS
EPA:120.1	GENERAL CHEMISTRY	CAMO-13-36980	329247002	REG	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	CAMO-13-36983	1202911117	DUP	1	0	0	0
EPA:120.1	GENERAL CHEMISTRY	LCS	1202911115	LCS	0	0	1	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-13-36980	329247002	REG	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	CAMO-13-36983	1202908480	DUP	1	0	0	0
EPA:150.1	GENERAL CHEMISTRY	LCS	1202908483	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-13-36980	1202907115	DUP	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	CAMO-13-36980	329247002	REG	1	0	0	0
EPA:160.1	GENERAL CHEMISTRY	LCS	1202907117	LCS	0	0	1	0
EPA:160.1	GENERAL CHEMISTRY	MB	1202907114	MB	1	0	0	0

Analytical	Post-Digestion	Lab Control	Lab Control	Blank	Blank	Lab	Storage	Preparation	Reagent
Spikes	Spikes	Samples	Sample Dups	Spikes	Spike Dups	Duplicates	Blanks	Blanks	Blanks
		1				1			
		1				1			
		1				1			
		1				1			
		1				1			
		2				1			
		1				1			
		1				2			
		1				1			
		1				2			
		1				1			
		1				1			
		1							
		1				2			

EPA:245.2	INORGANIC	CAMO-13-36980	329247002	REG	1	0	0	0
EPA:245.2	INORGANIC	CAMO-13-36984	1202916999	DUP	1	0	0	0
EPA:245.2	INORGANIC	CAMO-13-36984	1202917000	MS	0	0	1	0
EPA:245.2	INORGANIC	LCS	1202916998	LCS	0	0	1	0
EPA:245.2	INORGANIC	MB	1202916997	MB	1	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-13-36980	1202907194	DUP	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	CAMO-13-36980	329247002	REG	4	0	0	0
EPA:300.0	GENERAL CHEMISTRY	LCS	1202907196	LCS	0	0	4	0
EPA:300.0	GENERAL CHEMISTRY	MB	1202907193	MB	4	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-13-36980	329247002	REG	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-13-36983	1202912831	DUP	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	CAMO-13-36983	1202912833	MS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202912834	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	LCS	1202913503	LCS	0	0	1	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202912829	MB	2	0	0	0
EPA:310.1	GENERAL CHEMISTRY	MB	1202913502	MB	2	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-13-36980	329247002	REG	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-13-36984	1202908628	DUP	1	0	0	0
EPA:350.1	GENERAL CHEMISTRY	CAMO-13-36984	1202908629	MS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	LCS	1202908627	LCS	0	0	1	0
EPA:350.1	GENERAL CHEMISTRY	MB	1202908626	MB	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36972	1202908692	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36972	1202908694	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36972	329247001	REG	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36975	1202908691	DUP	1	0	0	0
EPA:351.2	GENERAL CHEMISTRY	CAMO-13-36975	1202908693	MS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	LCS	1202908695	LCS	0	0	1	0
EPA:351.2	GENERAL CHEMISTRY	MB	1202908690	MB	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-13-36980	329247002	REG	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	CAMO-13-36983	1202908680	DUP	1	0	0	0
EPA:353.2	GENERAL CHEMISTRY	LCS	1202908687	LCS	0	0	1	0
EPA:353.2	GENERAL CHEMISTRY	MB	1202908678	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-13-36980	1202906423	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-13-36980	1202906424	MS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	CAMO-13-36980	329247002	REG	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	LCS	1202906422	LCS	0	0	1	0
EPA:365.4	GENERAL CHEMISTRY	MB	1202906421	MB	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	NP048-13-38787	1202910151	DUP	1	0	0	0
EPA:365.4	GENERAL CHEMISTRY	NP048-13-38787	1202910152	MS	0	0	1	0
SM:A2340B	INORGANIC	CAMO-13-36980	329247002	REG	1	0	0	0
SW-846:6010B	INORGANIC	CAMO-13-36980	329247002	REG	17	0	0	0
SW-846:6010B	INORGANIC	CAMO-13-36984	1202909596	DUP	17	0	0	0
SW-846:6010B	INORGANIC	CAMO-13-36984	1202909597	MS	0	0	17	0
SW-846:6010B	INORGANIC	LCS	1202909595	LCS	0	0	17	0
SW-846:6010B	INORGANIC	MB	1202909594	MB	17	0	0	0
SW-846:6020	INORGANIC	CAMO-13-36980	329247002	REG	11	0	0	0
SW-846:6020	INORGANIC	CAMO-13-36984	1202909591	DUP	11	0	0	0
SW-846:6020	INORGANIC	CAMO-13-36984	1202909592	MS	0	0	11	0
SW-846:6020	INORGANIC	LCS	1202909590	LCS	0	0	11	0
SW-846:6020	INORGANIC	MB	1202909589	MB	11	0	0	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-13-36980	1202910328	MS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-13-36980	1202910329	MSD	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	CAMO-13-36980	329247002	REG	1	0	0	0

Data Validation Report for:

Chain Of Custody No. 2013-1092

SW-846:6850	LCMS/MS PERCHLORATE	LCS	1202910327	LCS	0	0	1	0
SW-846:6850	LCMS/MS PERCHLORATE	MB	1202910326	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-13-36972	329247001	REG	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	CAMO-13-36975	1202909879	DUP	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	LCS	1202909881	LCS	0	0	1	0
SW-846:9060	GENERAL CHEMISTRY	MB	1202909878	MB	1	0	0	0
SW-846:9060	GENERAL CHEMISTRY	WTLAP-13-39037	1202910591	DUP	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

Field	Lab	Type Of	Analytical	Sample	Parameter	Lab	Lab		Lab
Sample ID	Sample ID	Blank	Method	Matrix	Name	Result	Qualifier	Units	Detection Limit
MB	1202908626	METHOD BLANK	EPA:350.1	W	Ammonia as Nitrogen	0.0337 J		mg/L	0.05
MB	1202909589	METHOD BLANK	SW-846:6020	W	Molybdenum	0.177 J		ug/L	0.5
MB	1202916997	METHOD BLANK	EPA:245.2	W	Mercury	-0.113 J		ug/L	0.2

Any samples affected by the presence of contaminants in blanks?

Field	Blank Field	Blank Lab	Blank	Analytical	Parameter		Blank	Sample	Lab	Detect	
Sample ID	Sample ID	Sample ID	Type	Method	Name	Units	Result	Result	Qualifier	Limit	Detected
CAMO-13-36980	MB	1202916997	METHOD BLANK	EPA:245.2	Mercury	ug/L	-0.113	0.2	U	0.2	N
CAMO-13-36980	MB	1202908626	METHOD BLANK	EPA:350.1	Ammonia as Nitrogen	mg/L	0.0337	0.0812		0.05	Y

6. Any surrogate recoveries outside the control limits?

No.

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

Field	Matrix	Matrix	Analytical	Parameter	Analysis	Analysis	Sample	MS %	MSD %	Upper	Lower
Sample ID	Spike ID	Spike Dup ID	Method	Name	Lot ID	Date	Matrix	Recrvy	Recrvy	Limit	Limit
CAMO-13-36984	1202908629		EPA:350.1	Ammonia as Nitrogen	1314769	7/18/2013	W	87.1		110	90
CAMO-13-36980	1202910328	1202910329	SW-846:6850	Perchlorate	1315481	7/18/2013	W	-1779	1278	125	75

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?

Correction Factor (ND)	Correction Factor (J)	Use Factors
5		Y
5		Y

Rejection Limit	RPD	RPD Limit
10		
10	10	30

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

None.

13. Display Flagged Data.

Location ID	Chain Of Custody No	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detected
MCOI-6	2013-1092	CAMO-13-36980	REG	INIT	GENERAL CHEMISTRY	EPA:350.1	Ammonia as Nitrogen		U	I4	N
MCOI-6	2013-1092	CAMO-13-36980	REG	INIT	LCMS/MS PERCHLORATE	SW-846:6850	Perchlorate		J+	PE12f	Y

Reason Code

Description

I4

the sample result is $\leq 5 \times$ the concentration of related analyte in the method blank.

J_LAB

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

NQ

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

PE12f

The MS/MSD percent recovery was $>125\%$.

U_LAB

The analytical laboratory qualified the analyte as not detected.

14. Useable Result Count.

Field	Location	Sample	Analytical	No. Unuseable	Total No. Of
Sample ID	ID	Purpose	Method	Records	Records
CAMO-13-36972	MCOI-6	REG	EPA:351.2	0	1
CAMO-13-36972	MCOI-6	REG	SW-846:9060	0	1
CAMO-13-36980	MCOI-6	REG	EPA:120.1	0	1
CAMO-13-36980	MCOI-6	REG	EPA:150.1	0	1
CAMO-13-36980	MCOI-6	REG	EPA:160.1	0	1
CAMO-13-36980	MCOI-6	REG	EPA:245.2	0	1
CAMO-13-36980	MCOI-6	REG	EPA:300.0	0	4
CAMO-13-36980	MCOI-6	REG	EPA:310.1	0	2
CAMO-13-36980	MCOI-6	REG	EPA:350.1	0	1
CAMO-13-36980	MCOI-6	REG	EPA:353.2	0	1
CAMO-13-36980	MCOI-6	REG	EPA:365.4	0	1
CAMO-13-36980	MCOI-6	REG	SM:A2340B	0	1
CAMO-13-36980	MCOI-6	REG	SW-846:6010B	0	17
CAMO-13-36980	MCOI-6	REG	SW-846:6020	0	11
CAMO-13-36980	MCOI-6	REG	SW-846:6850	0	1

Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent Moisture	Analysis Lot ID	Validation Status Code	Use Flag
0.0812	mg/L	0.0812	mg/L			W	7/9/2013		1314770	VAL	Y
60.8	ug/L	60.8	ug/L			W	7/9/2013		1315482	VAL	Y



August 07, 2013

www.gel.com

Mr. Keith Greene
Los Alamos National Laboratory
PO Box 1663
TA-03, SM271, Drop Pt. 02U, Rm111
Los Alamos, New Mexico 87545

Re: LANL-WQH Water Samples
Work Order: 329247
SDG: 2013-1092

Dear Mr. Greene:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on July 11, 2013, 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,

Valerie Davis
Project Manager

Purchase Order: 63641-10
Chain of Custody: 2013-1092
Enclosures



ARS International (63641-10)
LANL-WQH Water Samples
Work Order #: 329247
SDG: 2013-1092

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Case Narrative

**Case Narrative for
ARS International (63641-10)
LANL-WQH Water Samples
Workorder #: 329247
SDG # : 2013-1092**

August 07, 2013

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 July 11, 2013 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>
329247001	CAMO-13-36972
329247002	CAMO-13-36980

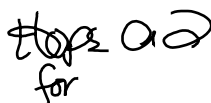
Case Narrative

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.



Valerie Davis
Project Manager

List of current GEL Certifications as of 07 August 2013

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP A2LA ISO 17025	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M-SC012
Nevada	SC000122011-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-13-8
Utah NELAP	SC000122013-8
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

Chain of Custody and Supporting Documentation

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[illegible]

SAMPLE RECEIPT & REVIEW FORM

Client: <u>LANH</u>		SDG/AR/COC/Work Order: <u>2013-1092</u>	
Received By: <u>P. H. Oent</u>		Date Received: <u>7-11-13</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		X	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>00.PM</u>
Classified Radioactive II or III by RSO?		X	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		X	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		X	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		X	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		X	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	X			Circle Applicable: Seals broken Damaged container Leaking container Other (describe) <u>4.5C</u>
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	X			Preservation Method: Ice bags <u>Blue ice</u> Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	X			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <u>61524649</u>
3 Chain of custody documents included with shipment?	X			
4 Sample containers intact and sealed?	X			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	X			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?		X		Sample ID's and containers affected:
7 Are Encore containers present?			X	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	X			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	X			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	X			Sample ID's affected:
11 Number of containers received match number indicated on COC?	X			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?		X		<u>Clients</u>
13 COC form is properly signed in relinquished/received sections?	X			
14 Carrier and tracking number.	X			Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>5462 9833 1486-5C</u> <u>5462 9833 1497-4C</u>

Comments (Use Continuation Form if needed):

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

LOS ALAMOS, NM 87645
UNITED STATES US

SHIP DATE: 10JUL13
ACTWGT: 16.0 LB MAN
CAD: 0014176/CAFE2611

BILL SENDER

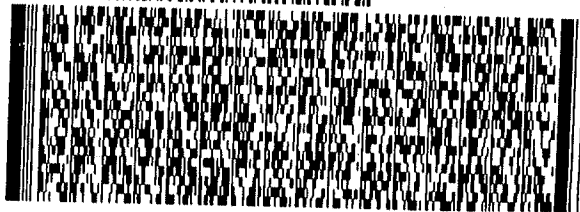
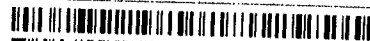
TO **VALERIE DAVIS**
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: MR1A015AGWKO

HC



FedEx
Express



J11131106060125

TRK#
0201

5462 9833 1497

THU - 11 JUL 10:30A
PRIORITY OVERNIGHT

XX CHSA

29407
SC-US CHS

Part 8 155148-434 RIT2 08/10



59DC1/AA84/18BC

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: 10JUL13
ACTWGT: 34.0 LB MAN
CAD: 0014176/CAFE2511

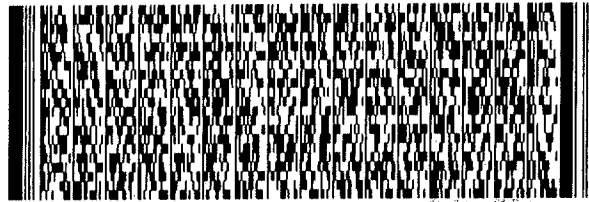
BILL SENDER

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

CHARLESTON SC 29407
(843) 556-8171
REF: XA7300308012

5c

58DC1/AR04/188C



FedEx
Express



J111 31106050125

TRKH
0201

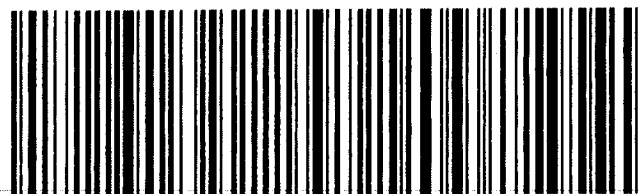
5462 9833 1486

THU - 11 JUL 10:30A
PRIORITY OVERNIGHT

XX CHSA

29407
SC-US CHS

Part 6 155142-434 RIT2 08/10



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

**Perchlorate by LC-MS/MS
ARS International (ARSL)
SDG 2013-1092**

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: SW846 6850 Modified

Prep Method: SW846 6850 Modified

Analytical Batch Number: 1315482

Prep Batch Number: 1315481

Sample Analysis

Sample ID	Client ID
329247002	CAMO-13-36980
1202910330	Interference Check Sample (ICS)
1202910326	Method Blank (MB)
1202910327	Laboratory Control Sample (LCS)
1202910328	329247002(CAMO-13-36980) Matrix Spike (MS)
1202910329	329247002(CAMO-13-36980) 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# 10.

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 standards (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 met all recovery acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Client sample 329247002 (CAMO-13-36980) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

Outliers were observed in 1202910328(MS) for Perchlorate and Perchlorate-101. Please see the Form 3 in the package for a complete list of recoveries. The acceptance range for both is 75-125%. The noted exception in the MS can be attributed to the background concentration present in the parent sample, 329247002 (CAMO-13-36980), and the need to dilute all at 1:100 prior to analysis. The data are reported with the appropriate DER.

Matrix Spike Duplicate (MSD) Recovery Statement

Outliers were observed in 1202910329(MSD) for Perchlorate and Perchlorate-101. Please see the Form 3 in the package for a complete list of recoveries. The acceptance range for both is 75-125%. The noted exception in the MSD can be attributed to the background concentration present in the parent sample, 329247002 (CAMO-13-36980), and the need to dilute all at 1:100 prior to analysis. The data are reported with the appropriate DER.

MS/MSD Relative Percent Difference (RPD) Statement

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

Retention Time Standard Area Acceptance

The retention time 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 Method 332.0, 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

Sample 329247002 (CAMO-13-36980), and its' associated QC, 1202910328(MS) and 1202910329(MSD), were diluted to bring the over range concentrations within the calibration range.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

Data Exception Report 1203735 was generated for this SDG.

Outliers were observed in 1202910328(MS) for Perchlorate and Perchlorate-101. Please see the Form 3 in the package for a complete list of recoveries. The acceptance range for both is 75-125%. The noted exception in the MS can be attributed to the background concentration present in the parent sample, 329247002 (CAMO-13-36980), and the need to dilute all at 1:100 prior to analysis. The data are reported with the appropriate DER.

Outliers were observed in 1202910329(MSD) for Perchlorate and Perchlorate-101. Please see the Form 3 in the package for a complete list of recoveries. The acceptance range for both is 75-125%. The noted exception in the MSD can be attributed to the background concentration present in the parent sample, 329247002 (CAMO-13-36980), and the need to dilute all at 1:100 prior to analysis. The data are reported with the appropriate DER.

Manual Integrations

Some initial calibration standards, continuing calibration standards, and/or samples may require manual integrations due to software limitations.

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 not internally corrected for using Perchlorate-O (18). They are external calibrations.

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 either a Micromass Quattro Micro Mass Spectrometer/ Mass Spectrometer, or a Micromass Quattro Ultima Mass Spectrometer/ Mass Spectrometer. Each being designated as LCMSMS #1 and LCMSMS #2, respectively. 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

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

ARSL001 ARS International (63641-10)

Client SDG: 2013-1092 GEL Work Order: 329247

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, 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: 26 JUL 2013

Title: Group Leader

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1315481Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-13-36980Date Received: 11-JUL-13GEL Job No (SDG): 2013-1092GEL Sample ID: 329247002Date Filtered: 17-JUL-13Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	5	20	60.8	ug/L		100	18-JUL-13 15:15	per0718014a
	Perchlorate Isotope Ratio			3.12			100	18-JUL-13 15:15	per0718014a
14797-73-0	Perchlorate-101	5	20	61.8	ug/L		100	18-JUL-13 15:15	per0718014a
	Perchlorate-O(18)			49.0	ug/L		100	18-JUL-13 15:15	per0718014a

^ 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): 2013-1092

Extract Batch Code: 1315481

Date Filtered: 17-JUL-13

Matrix: WATER

Sample ID: 1202910327

Analyte^	True	Found	Units	%Rec	Q	Control Limits
Perchlorate	0.200	.194	ug/L	96.9		85 - 115
Perchlorate Isotope Ratio		3.06				-
Perchlorate-101	0.200	.186	ug/L	93.1		85 - 115
Perchlorate-O(18)		.479	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): 2013-1092

Extract Batch Code: 1315481

Date Extracted: 17-JUL-13

GEL MS/PS ID: 1202910328

Client ID: CAMO-13-36980

GEL MSD/PSD ID: 1202910329

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	60.8	ug/L	57.2	-1780 *	63.4	1280 *	10.1	30	75 - 125
Perchlorate Isotope Ratio	0	3.12		3.08		3.13		1.54		-
Perchlorate-101	0.200	61.8	ug/L	59.0	-1440 *	64.3	1220 *	8.6	30	75 - 125
Perchlorate-O(18)	0	49.0	ug/L	48.5		51.9		6.82		-

^ 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: 1315481Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 17-JUL-13GEL Job No (SDG): 2013-1092GEL Sample ID: 1202910326Date Filtered: 17-JUL-13Injection 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	17-JUL-13 17:29	per0717022a
	Perchlorate Isotope Ratio						1	17-JUL-13 17:29	per0717022a
14797-73-0	Perchlorate-101	.05	.2	0.200	ug/L	U	1	17-JUL-13 17:29	per0717022a
	Perchlorate-O(18)			0.532	ug/L		1	17-JUL-13 17:29	per0717022a

^ 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: 1315481Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 17-JUL-13GEL Job No (SDG): 2013-1092GEL Sample ID: 1202910327Date Filtered: 17-JUL-13Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	.05	.2	0.194	ug/L	J	1	17-JUL-13 17:36	per0717023a
	Perchlorate Isotope Ratio			3.06			1	17-JUL-13 17:36	per0717023a
14797-73-0	Perchlorate-101	.05	.2	0.186	ug/L	J	1	17-JUL-13 17:36	per0717023a
	Perchlorate-O(18)			0.479	ug/L		1	17-JUL-13 17:36	per0717023a

^ 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: 1315481Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2013-1092GEL Sample ID: 1202910330Date Filtered: 17-JUL-13Injection 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	17-JUL-13 17:44	per0717024a
	Perchlorate Isotope Ratio			2.94			1	17-JUL-13 17:44	per0717024a
14797-73-0	Perchlorate-101	.05	.2	0.197	ug/L	J	1	17-JUL-13 17:44	per0717024a
	Perchlorate-O(18)			0.558	ug/L		1	17-JUL-13 17:44	per0717024a

^ 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: 1315481Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-13-36980MSDate Received: 11-JUL-13GEL Job No (SDG): 2013-1092GEL Sample ID: 1202910328Date Filtered: 17-JUL-13Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	5	20	57.2	ug/L		100	18-JUL-13 15:23	per0718015a
	Perchlorate Isotope Ratio			3.08			100	18-JUL-13 15:23	per0718015a
14797-73-0	Perchlorate-101	5	20	59.0	ug/L		100	18-JUL-13 15:23	per0718015a
	Perchlorate-O(18)			48.5	ug/L		100	18-JUL-13 15:23	per0718015a

^ 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: 1315481Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-13-36980MSDDate Received: 11-JUL-13GEL Job No (SDG): 2013-1092GEL Sample ID: 1202910329Date Filtered: 17-JUL-13Injection Volume (uL): 20%Solids:

CAS No.	Analyte^	MDL	RL	Conc*	Units	Q	Dilution Factor	Date Analyzed	GEL File ID
14797-73-0	Perchlorate	5	20	63.4	ug/L		100	18-JUL-13 15:30	per0718016a
	Perchlorate Isotope Ratio			3.13			100	18-JUL-13 15:30	per0718016a
14797-73-0	Perchlorate-101	5	20	64.3	ug/L		100	18-JUL-13 15:30	per0718016a
	Perchlorate-O(18)			51.9	ug/L		100	18-JUL-13 15:30	per0718016a

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

*Concentration =

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

Miscellaneous

DATA EXCEPTION REPORT			
Mo.Day Yr. 18-JUL-13	Division: Federal	Quality Criteria: Others	Type: Process
Instrument Type: LC-MS/MS	Test / Method: SW846 6850 Modified	Matrix Type: Liquid	Client Code: ARSL001
Batch ID: 1315482	Sample Numbers: See below		
Potentially affected work order(s)(SDG): 329247(2013-1092),329250(2013-1091),329376(2013-1100),329377(2013-1101),329378(2013-1103),329545(2013-1128),329546(2013-1129) Application Issues: Failed Recovery for MS/PS Failed Recovery for MSD/PSD			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Outliers were observed for both 1202910328(MS) and 1202910329(MSD) for Perchlorate and Perchlorate-101. Please see the Form 3 in the package for a complete list of recoveries. The acceptance range for both is 75-125%.		1. The noted exceptions can be attributed to the background concentrations found in the parent sample, 329247002, and the need to dilute all at 1:100 prior to analysis. Both the LCS and ICS met acceptance criteria, therefore the data are reported with the appropriate DER. The discrepancies are noted in the case narrative.	

Originator's Name:

Charles Wilson

18-JUL-13

Data Validator/Group Leader:

Michael Penny

22-JUL-13

Metals Analysis

Case Narrative

**Metals Fractional Narrative
ARS International (ARSL)
SDG 2013-1092**

Sample Analysis

Sample ID	Client ID
329247002	CAMO-13-36980
1202909594	Method Blank (MB) ICP
1202909595	Laboratory Control Sample (LCS)
1202909598	329377002(CAMO-13-36984L) Serial Dilution (SD)
1202909596	329377002(CAMO-13-36984D) Sample Duplicate (DUP)
1202909597	329377002(CAMO-13-36984S) Matrix Spike (MS)
1202909589	Method Blank (MB) ICP-MS
1202909590	Laboratory Control Sample (LCS)
1202909593	329377002(CAMO-13-36984L) Serial Dilution (SD)
1202909591	329377002(CAMO-13-36984D) Sample Duplicate (DUP)
1202909592	329377002(CAMO-13-36984S) Matrix Spike (MS)
1202916997	Method Blank (MB) CVAA
1202916998	Laboratory Control Sample (LCS)
1202917001	329377002(CAMO-13-36984L) Serial Dilution (SD)
1202916999	329377002(CAMO-13-36984D) Sample Duplicate (DUP)
1202917000	329377002(CAMO-13-36984S) Matrix Spike (MS)

Method/Analysis Information

Analytical Batch:	1315157, 1315155, 1318196 and 1320801
Prep Batch :	1315156, 1315154 and 1318193
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-006 REV# 9, GL-MA-E-014 REV# 25, GL-MA-E-010 REV# 26 and GL-GC-E-107 REV# 8
Analytical Method:	SW846 3005/6010B, SW846 3005/6020 DOE-AL, EPA 245.1/245.2 and SM 2340 B
Prep Method :	SW846 3005A and EPA 245.1/245.2 Prep

Preparation/Analytical Method Verification

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

System Configuration

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

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/-7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

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. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 80 mL/min.

Calibration Information

Instrument Calibration

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

CRDL Requirements

All CRDL standard(s) 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.

Continuing Calibration Blank (CCB) Requirements

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

acceptance criteria.

Continuing Calibration Verification (CCV) Requirements

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following sample was selected as the quality control (QC) sample for this SDG: 329377002 (CAMO-13-36984).

Matrix Spike (MS) Recovery Statement

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. All applicable elements met the acceptance criteria.

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 detection 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. All applicable analytes met these requirements.

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations that are 25X the IDL/MDL for CVAA, 50X the IDL/MDL for ICP, and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the acceptance criteria of less than 10% difference (%D).

Technical Information

Holding Time Specifications

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. 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

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instruments. Sample 329247002 required a dilution for tin in order to minimize suppression due to matrix interferences.

Preparation Information

The samples in this SDG were prepared exactly 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

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.

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.

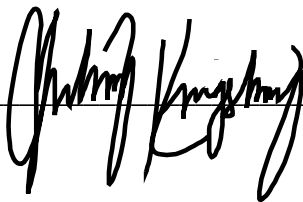
Certification Statement

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.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer:  Date: 08/07/13

Sample Data Summary

GEL LABORATORIES LLC

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

Qualifier Definition Report for

ARSL001 ARS International (63641-10)

Client SDG: 2013-1092 GEL Work Order: 329247

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, or LOD.

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 Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis.

Reviewed by



08/07/13

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2013-1092

CONTRACT: ESHL00210

METHOD TYPE: EPA

SAMPLE ID: 329247002

BASIS: As Received

DATE COLLECTED 09-JUL-13

CLIENT ID: CAMO-13-36980

LEVEL: Low

DATE RECEIVED 11-JUL-13

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	NOR1	07/30/13 11:03	073013W1-6	1318196

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2013-1092

CONTRACT: ESHL00210

METHOD TYPE: SW846

SAMPLE ID: 329247002

BASIS: As Received

DATE COLLECTED 09-JUL-13

CLIENT ID: CAMO-13-36980

LEVEL: Low

DATE RECEIVED 11-JUL-13

MATRIX: W

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	200	ug/L	U	68	200	200	1	P	HSC	08/07/13 08:37	080713-1	1315157
7440-36-0	Antimony	3	ug/L	U	1	3	3	1	MS	BAJ	08/04/13 06:50	130803-2	1315155
7440-38-2	Arsenic	5	ug/L	U	1.7	5	5	1	MS	BAJ	08/04/13 06:50	130803-2	1315155
7440-39-3	Barium	45.2	ug/L		1	5	5	1	P	HSC	08/07/13 08:37	080713-1	1315157
7440-41-7	Beryllium	5	ug/L	U	1	5	5	1	P	HSC	08/07/13 08:37	080713-1	1315157
7440-42-8	Boron	51.9	ug/L		15	50	50	1	P	HSC	08/07/13 08:37	080713-1	1315157
7440-43-9	Cadmium	1	ug/L	U	0.11	1	1	1	MS	BAJ	08/04/13 06:50	130803-2	1315155
7440-70-2	Calcium	69700	ug/L		50	200	200	1	P	HSC	08/07/13 08:37	080713-1	1315157
7440-47-3	Chromium	69.6	ug/L		2	10	10	1	MS	BAJ	08/04/13 06:50	130803-2	1315155
7440-48-4	Cobalt	5	ug/L	U	1	5	5	1	P	HSC	08/07/13 08:37	080713-1	1315157
7440-50-8	Copper	4.48	ug/L	J	3	10	10	1	P	HSC	08/07/13 08:37	080713-1	1315157
7439-89-6	Iron	100	ug/L	U	30	100	100	1	P	HSC	08/07/13 08:37	080713-1	1315157
7439-92-1	Lead	2	ug/L	U	0.5	2	2	1	MS	BAJ	08/04/13 06:50	130803-2	1315155
7439-95-4	Magnesium	14400	ug/L		110	300	300	1	P	HSC	08/07/13 08:37	080713-1	1315157
7439-96-5	Manganese	2.91	ug/L	J	2	10	10	1	P	HSC	08/07/13 08:37	080713-1	1315157
7439-98-7	Molybdenum	1.7	ug/L		0.165	0.5	0.5	1	MS	BAJ	08/04/13 11:03	130804-3	1315155
7440-02-0	Nickel	40.7	ug/L		0.5	2	2	1	MS	BAJ	08/04/13 06:50	130803-2	1315155
7440-09-7	Potassium	781	ug/L		50	150	150	1	P	HSC	08/07/13 08:37	080713-1	1315157
7782-49-2	Selenium	5	ug/L	U	1.5	5	5	1	MS	BAJ	08/04/13 06:50	130803-2	1315155
7631-86-9	Silica	71500	ug/L		53	213	213	1	P	HSC	08/07/13 08:37	080713-1	1315157
7440-22-4	Silver	1	ug/L	U	0.2	1	1	1	MS	BAJ	08/04/13 06:50	130803-2	1315155
7440-23-5	Sodium	26300	ug/L		100	300	300	1	P	HSC	08/07/13 08:37	080713-1	1315157
7440-24-6	Strontium	306	ug/L		1	5	5	1	P	HSC	08/07/13 08:37	080713-1	1315157
7440-28-0	Thallium	2	ug/L	U	0.45	2	2	1	MS	BAJ	08/04/13 06:50	130803-2	1315155
7440-31-5	Tin	100	ug/L	U	25	100	100	10	P	HSC	08/07/13 09:41	080713-1	1315157
7440-61-1	Uranium	1.32	ug/L		0.067	0.2	0.2	1	MS	BAJ	08/04/13 15:28	130804-5	1315155
7440-62-2	Vanadium	1.02	ug/L	J	1	5	5	1	P	HSC	08/07/13 08:37	080713-1	1315157
7440-66-6	Zinc	25.3	ug/L		3.3	10	10	1	P	HSC	08/07/13 08:37	080713-1	1315157

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2013-1092**CONTRACT:** ESHL00210**METHOD TYPE:****SAMPLE ID:** 329247002 **BASIS:** As Received **DATE COLLECTED** 09-JUL-13**CLIENT ID:** CAMO-13-36980 **LEVEL:** Low **DATE RECEIVED** 11-JUL-13**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	233	mg/L		0.453	1.24	1.24	1		JJ2	08/07/13 11:27		1320801

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1315155	1315154	SW846 3005A	50	mL	50	mL	08/02/13	BCD1
1315157	1315156	SW846 3005A	50	mL	50	mL	08/03/13	BCD1
1318196	1318193	EPA 245.1/245.2 Prep	20	mL	20	mL	07/29/13	AXS5

***Analytical Methods:**

MS **SW846 3005/6020 DOE-AL**
P **SW846 3005/6010B**
AV **EPA 245.1/245.2**

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2013-1092

Contract: ESHL00210

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>
1202909589	Antimony	1	ug/L	+/-3	U	MS	1	3
	Arsenic	1.7	ug/L	+/-5	U	MS	1.7	5
	Cadmium	0.11	ug/L	+/-1	U	MS	0.11	1
	Lead	0.5	ug/L	+/-2	U	MS	0.5	2
	Selenium	1.5	ug/L	+/-5	U	MS	1.5	5
	Nickel	0.5	ug/L	+/-2	U	MS	0.5	2
	Molybdenum	0.177	ug/L	+/-0.5	J	MS	0.165	0.5
	Chromium	2	ug/L	+/-10	U	MS	2	10
	Silver	0.2	ug/L	+/-1	U	MS	0.2	1
	Uranium	0.067	ug/L	+/-0.2	U	MS	0.067	0.2
	Thallium	0.45	ug/L	+/-2	U	MS	0.45	2
1202909594	Sodium	100	ug/L	+/-300	U	P	100	300
	Strontium	1	ug/L	+/-5	U	P	1	5
	Tin	3.64	ug/L	+/-10	J	P	2.5	10
	Barium	1	ug/L	+/-5	U	P	1	5
	Boron	15	ug/L	+/-50	U	P	15	50
	Cobalt	1	ug/L	+/-5	U	P	1	5
	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
	Copper	3	ug/L	+/-10	U	P	3	10
	Calcium	50	ug/L	+/-200	U	P	50	200
	Beryllium	1	ug/L	+/-5	U	P	1	5
	Aluminum	68	ug/L	+/-200	U	P	68	200
	Vanadium	1	ug/L	+/-5	U	P	1	5
	Silica	53	ug/L	+/-213	U	P	53	213
	Zinc	3.3	ug/L	+/-10	U	P	3.3	10
1202916997	Mercury	-0.113	ug/L	+/-0.2	J	AV	0.067	0.2

*Analytical Methods:

MS SW846 3005/6020 DOE-AL
P SW846 3005/6010B
AV EPA 245.1/245.2

METALS

-5a-

Matrix Spike Summary

SDG NO. 2013-1092 **Client ID:** CAMO-13-36984S

Contract: ESHL00210 **Level:** Low

Matrix: WATER **% Solids:**

Sample ID: 329377002 **Spike ID:** 1202909592

<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	53.5		1	U	50	107		MS
Arsenic	ug/L	75-125	50		1.7	U	50	99.4		MS
Cadmium	ug/L	75-125	52.3		0.11	U	50	105		MS
Chromium	ug/L	75-125	52.5		2.81	J	50	99.4		MS
Lead	ug/L	75-125	52.6		0.5	U	50	105		MS
Molybdenum	ug/L	75-125	54.3		1.17		50	106		MS
Nickel	ug/L	75-125	53.1		1.69	J	50	103		MS
Selenium	ug/L	75-125	51.9		1.5	U	50	103		MS
Silver	ug/L	75-125	53.2		0.2	U	50	106		MS
Thallium	ug/L	75-125	49.3		0.45	U	50	98.6		MS
Uranium	ug/L	75-125	57.8		0.597		50	114		MS

*Analytical Methods:

MS SW846 3005/6020 DOE-AL

METALS

-5a-

Matrix Spike Summary

SDG NO. 2013-1092 Client ID: CAMO-13-36984S

Contract: ESHL00210 Level: Low

Matrix: WATER % Solids:

Sample ID: 329377002 Spike ID: 1202909597

<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	4850		68	U	5000	96.9		P
Barium	ug/L	75-125	537		25.8		500	102		P
Beryllium	ug/L	75-125	521		1	U	500	104		P
Boron	ug/L	75-125	521		16.4	J	500	101		P
Calcium	ug/L	75-125	16900		12000		5000	96.7		P
Cobalt	ug/L	75-125	506		1	U	500	101		P
Copper	ug/L	75-125	539		3	U	500	108		P
Iron	ug/L	75-125	5190		30	U	5000	104		P
Magnesium	ug/L	75-125	9430		4190		5000	105		P
Manganese	ug/L	75-125	515		2	U	500	103		P
Potassium	ug/L	75-125	6320		1370		5000	99		P
Silica	ug/L		90800		80300		10700	97.7	N/A	P
Sodium	ug/L	75-125	15700		10900		5000	96.9		P
Strontium	ug/L	75-125	550		52.8		500	99.4		P
Tin	ug/L	75-125	544		12.5	U	500	109		P
Vanadium	ug/L	75-125	529		7.69		500	104		P
Zinc	ug/L	75-125	520		6.41	J	500	103		P

*Analytical Methods:

P SW846 3005/6010B

METALS

-5a-

Matrix Spike Summary

SDG NO. 2013-1092 **Client ID:** CAMO-13-36984S**Contract:** ESHL00210 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 329377002 **Spike ID:** 1202917000

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Mercury	ug/L	75-125	2.03		0.067	U	2	101		AV

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 2013-1092

Lab Code: GEL

Contract: ESHL00210

Client ID: CAMO-13-36984D

Matrix: LIQUID

Level: Low

Sample ID: 329377002

Duplicate ID: 1202909591

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Antimony	ug/L		1 U		1 U				MS
Arsenic	ug/L		1.7 U		1.7 U				MS
Cadmium	ug/L		0.11 U		0.11 U				MS
Chromium	ug/L	+/-10	2.81 J		2.89 J		2.88		MS
Lead	ug/L		0.5 U		0.5 U				MS
Molybdenum	ug/L	+/- .5	1.17		1.16		.343		MS
Nickel	ug/L	+/-2	1.69 J		1.71 J		1.41		MS
Selenium	ug/L		1.5 U		1.5 U				MS
Silver	ug/L		0.2 U		0.2 U				MS
Thallium	ug/L		0.45 U		0.45 U				MS
Uranium	ug/L	+/- .2	0.597		0.595		.336		MS

*Analytical Methods:

MS SW846 3005/6020 DOE-AL

Metals
-6-
Duplicate Sample Summary

SDG No.: 2013-1092

Lab Code: GEL

Contract: ESHL00210

Client ID: CAMO-13-36984D

Matrix: LIQUID

Level: Low

Sample ID: 329377002

Duplicate ID: 1202909596

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Aluminum	ug/L		68 U		68 U				P
Barium	ug/L	+/-20%	25.8		25.8		.151		P
Beryllium	ug/L		1 U		1 U				P
Boron	ug/L	+/-50	16.4 J		15.2 J		7.42		P
Calcium	ug/L	+/-20%	12000		12000		.167		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%	4190		4130		1.58		P
Manganese	ug/L		2 U		2 U				P
Potassium	ug/L	+/-20%	1370		1370		.343		P
Silica	ug/L	+/-20%	80300		80100		.281		P
Sodium	ug/L	+/-20%	10900		10700		1.91		P
Strontium	ug/L	+/-20%	52.8		51.9		1.6		P
Tin	ug/L		12.5 U		12.5 U				P
Vanadium	ug/L	+/-5	7.69		7.36		4.37		P
Zinc	ug/L	+/-10	6.41 J		6.13 J		4.53		P

*Analytical Methods:

P SW846 3005/6010B

Metals
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Duplicate Sample Summary

SDG No.: 2013–1092**Lab Code:** GEL**Contract:** ESHL00210**Client ID:** CAMO–13–36984D**Matrix:** LIQUID**Level:** Low**Sample ID:** 329377002**Duplicate ID:** 1202916999**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. 2013-1092

Contract: ESHL00210

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>
1202909590								
	Antimony	ug/L	50	52.2		104	80-120	MS
	Arsenic	ug/L	50	49.3		98.6	80-120	MS
	Cadmium	ug/L	50	53		106	80-120	MS
	Chromium	ug/L	50	50.3		101	80-120	MS
	Lead	ug/L	50	51.5		103	80-120	MS
	Molybdenum	ug/L	50	53		106	80-120	MS
	Nickel	ug/L	50	55.5		111	80-120	MS
	Selenium	ug/L	50	53.3		107	80-120	MS
	Silver	ug/L	50	55.1		110	80-120	MS
	Thallium	ug/L	50	48.9		97.7	80-120	MS
	Uranium	ug/L	50	55.1		110	80-120	MS

*Analytical Methods:

MS SW846 3005/6020 DOE-AL

METALS

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Laboratory Control Sample Summary

SDG NO. 2013-1092

Contract: ESHL00210

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>
1202909595								
	Aluminum	ug/L	5000	4950		99	80-120	P
	Barium	ug/L	500	521		104	80-120	P
	Beryllium	ug/L	500	522		104	80-120	P
	Boron	ug/L	500	507		101	80-120	P
	Calcium	ug/L	5000	5390		108	80-120	P
	Cobalt	ug/L	500	516		103	80-120	P
	Copper	ug/L	500	527		105	80-120	P
	Iron	ug/L	5000	5240		105	80-120	P
	Magnesium	ug/L	5000	5480		110	80-120	P
	Manganese	ug/L	500	526		105	80-120	P
	Potassium	ug/L	5000	5060		101	80-120	P
	Silica	ug/L	10700	10800		101	80-120	P
	Sodium	ug/L	5000	4900		97.9	80-120	P
	Strontium	ug/L	500	504		101	80-120	P
	Tin	ug/L	500	543		109	80-120	P
	Vanadium	ug/L	500	527		105	80-120	P
	Zinc	ug/L	500	522		104	80-120	P

*Analytical Methods:

P SW846 3005/6010B

METALS

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Laboratory Control Sample Summary

SDG NO. 2013-1092

Contract: ESHL00210

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>
1202916998	Mercury	ug/L	2	2.05		102	85-115	AV

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2013-1092

Client ID: CAMO-13-36984L

Contract: ESHL00210

Matrix: LIQUID

Level: Low

Sample ID: 329377002

Serial Dilution ID: 1202909593

<u>Analyte</u>	<u>Initial Value ug/L</u>	<u>C</u>	<u>Serial Value ug/L</u>	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Antimony	1	U	5	U				MS
Arsenic	1.7	U	8.5	U				MS
Cadmium	.11	U	.55	U				MS
Chromium	2.81	J	10	U	100			MS
Lead	.5	U	2.5	U				MS
Molybdenum	1.17		1.46	J	25			MS
Nickel	1.69	J	2.5	U	100			MS
Selenium	1.5	U	7.5	U				MS
Silver	.2	U	1	U				MS
Thallium	.45	U	2.25	U				MS
Uranium	.597		.66	J	10.6			MS

*Analytical Methods:

MS SW846 3005/6020 DOE-AL

METALS

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Serial Dilution Sample Summary

SDG NO. 2013-1092

Client ID: CAMO-13-36984L

Contract: ESHL00210

Matrix: LIQUID

Level: Low

Sample ID: 329377002

Serial Dilution ID: 1202909598

<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	25.8		26.3		1.97			P
Beryllium	1	U	5	U				P
Boron	16.4	J	75	U	100			P
Calcium	12000		11700		2.73		10	P
Cobalt	1	U	5	U				P
Copper	3	U	15	U				P
Iron	30	U	150	U				P
Magnesium	4190		3900		6.99			P
Manganese	2	U	10	U				P
Potassium	1370		823		39.9			P
Silica	80300		79900		.487		10	P
Sodium	10900		10900		.404		10	P
Strontium	52.8		54.7		3.63		10	P
Tin	2.5	U	14.1	J				P
Vanadium	7.69		7.82	J	1.72			P
Zinc	6.41	J	16.5	U	100			P

*Analytical Methods:

P SW846 3005/6010B

METALS

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Serial Dilution Sample Summary

SDG NO. 2013-1092 **Client ID:** CAMO-13-36984L**Contract:** ESHL00210**Matrix:** LIQUID **Level:** Low**Sample ID:** 329377002 **Serial Dilution ID:** 1202917001

<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 Narrative
ARS International (ARSL)
SDG 2013-1092**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1315287

Method: SW 9060 Total Organic Carbon

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9060:

Sample ID	Client ID
329247001	CAMO-13-36972
1202909878	Method Blank (MB)
1202909879	329250001(CAMO-13-36975) Sample Duplicate (DUP)
1202909880	329250001(CAMO-13-36975) Post Spike (PS)
1202909881	Laboratory Control Sample (LCS)
1202910591	329748007(WTLAP-13-39037) Sample Duplicate (DUP)
1202910592	329748007(WTLAP-13-39037) 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# 12.

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 Model 1010 Total Organic Carbon Analyzer.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following samples were selected for QC analysis: 329250001 (CAMO-13-36975) and 329748007 (WTLAP-13-39037).

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

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

A 15 mg/L Total Inorganic Carbon check standard is analyzed with each analytical run to prove that the instrument is effectively sparging away the inorganic carbon.

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: 1315805

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
329247002	CAMO-13-36980
1202911115	Laboratory Control Sample (LCS)
1202911117	329250002(CAMO-13-36983) 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# 11.

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 Conductivity analysis was performed on a Orion 160 Conductivity Meter.

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.

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329250002 (CAMO-13-36983).

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: 1314715 **Method:** EPA 150.1 pH

Sample Analysis

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

Sample ID	Client ID
329247002	CAMO-13-36980
1202908480	329250002(CAMO-13-36983) Sample Duplicate (DUP)
1202908483	Laboratory Control Sample (LCS)

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# 21.

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 Electrode analysis was performed on a PerpHect pH Meter Orion 370.

Initial Calibration

All initial calibration requirements have been met for this SDG.

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329250002 (CAMO-13-36983).

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

The following sample from this sample group was received by the lab outside of the method specified holding time: 329247002 (CAMO-13-36980).

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

The following DER was generated for this SDG: 1202489 329247002 (CAMO-13-36980).

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1314143

Method: EPA 300.0 Anions Liquid 28 day

Sample Analysis

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

Sample ID	Client ID
329247002	CAMO-13-36980
1202907193	Method Blank (MB)
1202907194	329247002(CAMO-13-36980) Sample Duplicate (DUP)
1202907195	329247002(CAMO-13-36980) Post Spike (PS)
1202907196	Laboratory Control Sample (LCS)

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329247002 (CAMO-13-36980).

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

The PS mixture contains seven anions of interest. Of those, all requested anions except chloride met normal acceptance criteria for recovery (90 - 110%). This failure is attributed to the matrix of the sample because the successful recovery of the other compounds indicate that the laboratory process was in control. This variance is judged to have no negative impact on the data. The deviation is noted in the Case Narrative and DER, and the data has been reported. 1202907195 (CAMO-13-36980).

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The following samples in this sample group were diluted due to high concentration: 1202907194 (CAMO-13-36980), 1202907195 (CAMO-13-36980) and 329247002 (CAMO-13-36980).

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. The following DER was generated for this SDG: DER# 1208296.

Manual Integrations

Manual integrations were not required for the samples in 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: Ammonia Nitrogen

Analytical Batch: 1314770 **Method:** EPA 350.1 Nitrogen and Ammonia L

Prep Batch : 1314769 **Method:** EEPA 350.2 Prep

Sample Analysis

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

Sample ID	Client ID
329247002	CAMO-13-36980
1202908626	Method Blank (MB)
1202908627	Laboratory Control Sample (LCS)
1202908628	329377002(CAMO-13-36984) Sample Duplicate (DUP)
1202908629	329377002(CAMO-13-36984) Matrix Spike (MS)

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

SOP Reference

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

Preparation/Analytical Method Verification

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

Calibration Information

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329377002 (CAMO-13-36984).

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

The spike recovery falls outside of the GEL acceptance limits but within the client specified limits. 1202908629 (CAMO-13-36984).

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**

The following DER was generated for this SDG: 1203603 1202908629 (CAMO-13-36984).

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Total Kjeldahl Nitrogen		
Analytical Batch:	1314795	Method:	Nitrogen and Total Kjeldahl (TKN)
Prep Batch :	1314794	Method:	EEPA 351.2 Prep

Sample Analysis

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

Sample ID	Client ID
329247001	CAMO-13-36972
1202908690	Method Blank (MB)
1202908691	329250001(CAMO-13-36975) Sample Duplicate (DUP)
1202908692	329247001(CAMO-13-36972) Sample Duplicate (DUP)
1202908693	329250001(CAMO-13-36975) Matrix Spike (MS)
1202908694	329247001(CAMO-13-36972) Matrix Spike (MS)
1202908695	Laboratory Control Sample (LCS)

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.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following samples were selected for QC analysis: 329247001 (CAMO-13-36972) and 329250001 (CAMO-13-36975).

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

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

Duplicate Relative Percent Difference (RPD) Statement

One or more of the values for the sample and/or duplicate are less than 5 times the Practical Quantitation Limit (PQL), and the difference is within one PQL value; therefore, the RPD is not applicable. 1202908692 (CAMO-13-36972).

The values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable. 1202908691 (CAMO-13-36975).

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 following sample was re-analyzed due to instrument failure: 1202908695 (LCS). The following samples were re-analyzed due to CCV failure: 1202908691 (CAMO-13-36975) and 1202908693 (CAMO-13-36975).

Miscellaneous Information

Data Exception (DER) Documentation

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

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

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

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

Method/Analysis Information

Product:	Nitrate Nitrite by Cadmium Reduction		
Analytical Batch:	1314793	Method:	EPA 353.2 Nitrogen and Nitrate/Nitrite

Sample Analysis

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

Sample ID	Client ID
329247002	CAMO-13-36980
1202908678	Method Blank (MB)
1202908680	329250002(CAMO-13-36983) Sample Duplicate (DUP)
1202908684	329250002(CAMO-13-36983) Post Spike (PS)
1202908687	Laboratory Control Sample (LCS)

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.

Calibration Verification Information

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

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

acceptance limits.

Y Intercept Rule

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329250002 (CAMO-13-36983).

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The following samples in this sample group were diluted due to high concentration: 1202908680 (CAMO-13-36983), 1202908684 (CAMO-13-36983) and 329247002 (CAMO-13-36980).

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.

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:	1313807	Method:	EPA 365.4 Phosphorus and Total in
Prep Batch :	1313806	Method:	EEPA 365.4 Prep

Sample Analysis

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

Sample ID	Client ID
329247002	CAMO-13-36980
1202906421	Method Blank (MB)
1202906422	Laboratory Control Sample (LCS)
1202906423	329247002(CAMO-13-36980) Sample Duplicate (DUP)
1202906424	329247002(CAMO-13-36980) Matrix Spike (MS)
1202910151	329384001(NP048-13-38787) Sample Duplicate (DUP)
1202910152	329384001(NP048-13-38787) 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.

Continuing Calibration Blanks

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

Calibration Verification Information (CCV)

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

Y Intercept Rule

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

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following samples were selected for QC analysis: 329247002 (CAMO-13-36980) and 329384001 (NP048-13-38787).

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

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

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The following sample was re-analyzed due to instrument failure: 1202906421 (MB). The following sample was re-analyzed due to their proximity to an overrange sample: 329247002 (CAMO-13-36980).

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.

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: 1314116

Method: EPA 160.1 Solids and Dissolved-F

Sample Analysis

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

Sample ID	Client ID
329247002	CAMO-13-36980
1202907114	Method Blank (MB)
1202907115	329247002(CAMO-13-36980) Sample Duplicate (DUP)
1202907117	Laboratory Control Sample (LCS)

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

Initial Calibration

All initial calibration requirements have been met for this SDG.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329247002 (CAMO-13-36980).

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.

Sample Aliquot

A sufficient amount of sample was provided by the client for 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.

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: 1316484 **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
329247002	CAMO-13-36980
1202912831	329250002(CAMO-13-36983) Sample Duplicate (DUP)
1202912833	329250002(CAMO-13-36983) Matrix Spike (MS)
1202912834	Laboratory Control Sample (LCS)

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# 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 Titration analysis was performed on a manually operated buret.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329250002 (CAMO-13-36983).

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

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

Duplicate Relative Percent Difference (RPD) Statement

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

Technical Information

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

Holding Times

All samples in this SDG met the specified holding time.

Sample 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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Certification Statement

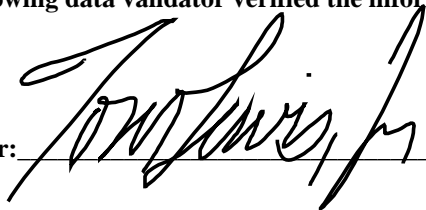
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer:



Date:

07Aug13

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis Report for

ARSL001 ARS International (63641-10)

Client SDG: 2013-1092 GEL Work Order: 329247

The Qualifiers in this report are defined as follows:

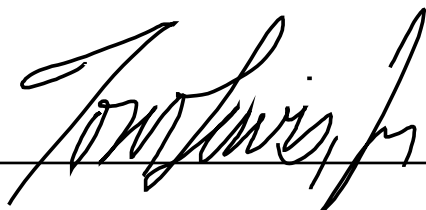
- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- ** Analyte is a surrogate compound
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

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 Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis.

Reviewed by

A handwritten signature in black ink, appearing to read 'Valerie Davis', is written over a horizontal line.

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: August 7, 2013

Company : Los Alamos National Laboratory
Address : PO Box 1663
TA-03, SM271, Drop Pt. 02U, Rm111
Los Alamos, New Mexico 87545
Contact: Mr. Keith Greene
Project: LANL-WQH Water Samples

Client SDG: 2013-1092

Client Sample ID: CAMO-13-36972
Sample ID: 329247001
Matrix: W
Collect Date: 09-JUL-13 13:34
Receive Date: 11-JUL-13
Collector: Client

Project: ESHL00210
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SW 9060 Total Organic Carbon "As Received"											
Total Organic Carbon Average		1.08	0.330	1.00	mg/L	1	TSM	07/19/13	1459	1315287	1
Nutrient Analysis											
Nitrogen, Total Kjeldahl (TKN) "As Received"											
Nitrogen, Total Kjeldahl	J	0.0819	0.033	0.100	mg/L	1	KLP1	07/16/13	1653	1314795	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	07/15/13	1730	1314794

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060	
2	EPA 351.2	

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: August 7, 2013

Company : Los Alamos National Laboratory
Address : PO Box 1663
TA-03, SM271, Drop Pt. 02U, Rm111
Los Alamos, New Mexico 87545

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

Client SDG: 2013-1092

Client Sample ID: CAMO-13-36980
Sample ID: 329247002
Matrix: W
Collect Date: 09-JUL-13 13:34
Receive Date: 11-JUL-13
Collector: Client

Project: ESHL00210
Client ID: ARSL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Conductivity Analysis											
EPA120.1 Specific Conductivity "As Received"											
Conductivity		581	1.00	1.00	umhos/cm	1	LXA1	07/18/13	1533	1315805	1
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 11.0C	H	7.40	0.010	0.100	SU	1	LYG1	07/15/13	0829	1314715	2
Ion Chromatography											
EPA 300.0 Anions Liquid 28 day "As Received"											
Bromide		0.621	0.067	0.200	mg/L	1	MAR1	07/25/13	1618	1314143	3
Fluoride		0.626	0.033	0.100	mg/L	1					
Chloride		61.7	0.670	2.00	mg/L	10	MAR1	07/25/13	1747	1314143	4
Sulfate		66.8	1.33	4.00	mg/L	10					
Nutrient Analysis											
EPA 350.1 Nitrogen, Ammonia L "As Received"											
Nitrogen, Ammonia		0.0812	0.017	0.050	mg/L	1	KLP1	07/18/13	1325	1314770	5
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite		7.69	0.170	0.500	mg/L	10	KLP1	07/29/13	1355	1314793	6
EPA 365.4 Phosphorus, Total in "As Received"											
Phosphorus, Total as P		0.156	0.017	0.050	mg/L	1	KLP1	07/16/13	1527	1313807	7
Solids Analysis											
EPA 160.1 Solids, Dissolved-F "As Received"											
Total Dissolved Solids		413	3.40	14.3	mg/L		LYG1	07/11/13	1329	1314116	8
Titration Analysis											
EPA 310.1 Total Alkalinity "As Received"											
Alkalinity, Total as CaCO3		98.3	0.725	1.00	mg/L		LXA1	07/22/13	1444	1316484	9
Carbonate alkalinity (CaCO3)	U	ND	0.725	1.00	mg/L						

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.2 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	07/18/13	1240	1314769
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	07/15/13	1700	1313806

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: August 7, 2013

Company : Los Alamos National Laboratory
Address : PO Box 1663
TA-03, SM271, Drop Pt. 02U, Rm111
Los Alamos, New Mexico 87545
Contact: Mr. Keith Greene
Project: LANL-WQH Water Samples

Client SDG: 2013-1092

Client Sample ID: CAMO-13-36980
Sample ID: 329247002

Project: ESHL00210
Client ID: ARSL001

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 120.1	
2	EPA 150.1	
3	EPA 300.0	
4	EPA 300.0	
5	EPA 350.1	
6	EPA 353.2	
7	EPA 365.4	
8	EPA 160.1	
9	EPA 310.1	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: August 7, 2013

Page 1 of 5

Los Alamos National Laboratory
PO Box 1663
TA-03, SM271, Drop Pt. 02U, Rm111
Los Alamos, New Mexico

Contact: Mr. Keith Greene

Workorder: 329247

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1315287										
QC1202909879	329250001	DUP									
Total Organic Carbon Average		1.16		1.12	mg/L	3.51	^	(+/-1.00)	TSM	07/19/13	16:07
QC1202910591	329748007	DUP									
Total Organic Carbon Average		5.23		5.26	mg/L	0.553		(0%-20%)		07/19/13	20:49
QC1202909881	LCS										
Total Organic Carbon Average	10.0			9.79	mg/L			(85%-115%)		07/19/13	14:51
QC1202909878	MB										
Total Organic Carbon Average			U	ND	mg/L					07/19/13	14:42
QC1202909880	329250001	PS									
Total Organic Carbon Average	10.0	1.16		11.0	mg/L			(65%-120%)		07/19/13	16:27
QC1202910592	329748007	PS									
Total Organic Carbon Average	10.0	5.23		14.9	mg/L			(65%-120%)		07/19/13	21:08
Conductivity Analysis											
Batch	1315805										
QC1202911117	329250002	DUP									
Conductivity		180		182	umhos/cm	0.994		(0%-10%)	LXA1	07/18/13	15:34
QC1202911115	LCS										
Conductivity	1410			1420	umhos/cm			(95%-105%)		07/18/13	15:30
Electrode Analysis											
Batch	1314715										
QC1202908480	329250002	DUP									
pH		H	8.02	H	8.02	SU	0.00	(0%-10%)	LYG1	07/15/13	08:31
QC1202908483	LCS										
pH	7.00			7.00	SU			(99%-101%)		07/15/13	08:16
Ion Chromatography											
Batch	1314143										
QC1202907194	329247002	DUP									
Bromide		0.621		0.681	mg/L	9.34	^	(+/-0.200)	MAR1	07/25/13	16:48
Chloride		61.7		61.9	mg/L	0.389		(0%-20%)		07/25/13	18:17
Fluoride		0.626		0.631	mg/L	0.764		(0%-20%)		07/25/13	16:48

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QC Summary

Workorder: 329247

Page 2 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1314143										
Sulfate		66.8		67.4	mg/L	0.814		(0%-20%)	MAR1	07/25/13	18:17
QC1202907196	LCS										
Bromide	1.25			1.24	mg/L		99.2	(90%-110%)		07/25/13	15:48
Chloride	5.00			4.63	mg/L		92.7	(90%-110%)			
Fluoride	2.50			2.46	mg/L		98.2	(90%-110%)			
Sulfate	10.0			9.75	mg/L		97.5	(90%-110%)			
QC1202907193	MB										
Bromide			U	ND	mg/L					07/25/13	15:18
Chloride			U	ND	mg/L						
Fluoride			U	ND	mg/L						
Sulfate			U	ND	mg/L						
QC1202907195	329247002	PS									
Bromide	1.25	0.621		1.84	mg/L		97.5	(90%-110%)		07/25/13	17:17
Chloride	5.00	6.17		11.8	mg/L		113 *	(90%-110%)		07/25/13	18:47
Fluoride	2.50	0.626		3.09	mg/L		98.7	(90%-110%)		07/25/13	17:17
Sulfate	10.0	6.68		17.3	mg/L		107	(90%-110%)		07/25/13	18:47
Nutrient Analysis											
Batch	1313807										
QC1202906423	329247002	DUP									
Phosphorus, Total as P		0.156		0.167	mg/L	6.81	^	(+/-0.050)	KLP1	07/16/13	15:08
QC1202910151	329384001	DUP									
Phosphorus, Total as P		0.166		0.167	mg/L	0.601	^	(+/-0.050)		07/16/13	15:22
QC1202906422	LCS										
Phosphorus, Total as P	1.00			1.13	mg/L		113	(76%-120%)		07/16/13	15:03
QC1202906421	MB										
Phosphorus, Total as P			U	ND	mg/L					07/16/13	15:12
QC1202906424	329247002	MS									

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QC Summary

Workorder: 329247

Page 3 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1313807										
Phosphorus, Total as P	1.00	0.156		1.09	mg/L		93.4	(62%-139%)		07/16/13	15:09
QC1202910152 329384001 MS											
Phosphorus, Total as P	1.00	0.166		1.08	mg/L		91.4	(62%-139%)	KLP1	07/16/13	15:23
Batch	1314770										
QC1202908628 329377002 DUP											
Nitrogen, Ammonia		J	0.0318 J	0.0358	mg/L	11.8 ^		(+/-0.050)	KLP1	07/18/13	13:48
QC1202908627 LCS											
Nitrogen, Ammonia	1.00			0.995	mg/L		99.5	(90%-110%)		07/18/13	13:21
QC1202908626 MB											
Nitrogen, Ammonia			J	0.0337	mg/L					07/18/13	13:21
QC1202908629 329377002 MS											
Nitrogen, Ammonia	1.00	J	0.0318	0.903	mg/L		87.1 *	(90%-110%)		07/18/13	13:49
Batch	1314793										
QC1202908680 329250002 DUP											
Nitrogen, Nitrate/Nitrite			1.65	1.48	mg/L	10.9		(0%-20%)	KLP1	07/29/13	13:58
QC1202908687 LCS											
Nitrogen, Nitrate/Nitrite	1.00			0.961	mg/L		96.1	(90%-110%)		07/29/13	13:32
QC1202908678 MB											
Nitrogen, Nitrate/Nitrite			U	ND	mg/L					07/29/13	13:31
QC1202908684 329250002 PS											
Nitrogen, Nitrate/Nitrite	1.00		0.329	1.35	mg/L		102	(90%-110%)		07/29/13	13:59
Batch	1314795										
QC1202908691 329250001 DUP											
Nitrogen, Total Kjeldahl		U	ND U	ND	mg/L	N/A			KLP1	07/16/13	17:14
QC1202908692 329247001 DUP											
Nitrogen, Total Kjeldahl		J	0.0819	0.122	mg/L	39.3 ^		(+/-0.100)		07/16/13	16:53
QC1202908695 LCS											
Nitrogen, Total Kjeldahl	1.00			0.973	mg/L		97.3	(90%-110%)		07/16/13	16:55
QC1202908690 MB											
Nitrogen, Total Kjeldahl			U	ND	mg/L					07/16/13	16:48
QC1202908693 329250001 MS											
Nitrogen, Total Kjeldahl	1.00	U	ND	0.991	mg/L		99.1	(90%-110%)		07/16/13	17:15
QC1202908694 329247001 MS											

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QC Summary

Workorder: 329247

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1314795										
Nitrogen, Total Kjeldahl	1.00	J	0.0819	1.03	mg/L		94.8	(90%-110%)	KLP1	07/16/13	16:54
Solids Analysis											
Batch	1314116										
QC1202907115	329247002	DUP									
Total Dissolved Solids			413	377	mg/L	9.04		(0%-10%)	LYG1	07/11/13	13:29
QC1202907117	LCS										
Total Dissolved Solids	300			291	mg/L		97.1	(95%-105%)		07/11/13	13:29
QC1202907114	MB										
Total Dissolved Solids			U	ND	mg/L					07/11/13	13:29
Titration Analysis											
Batch	1316484										
QC1202912831	329250002	DUP									
Alkalinity, Total as CaCO3			60.8	60.8	mg/L	0.00		(0%-20%)	LXA1	07/22/13	14:56
Carbonate alkalinity (CaCO3)		U	ND	U	ND	mg/L	N/A				
QC1202912834	LCS										
Alkalinity, Total as CaCO3	50.0			51.5	mg/L		103	(90%-110%)		07/22/13	14:40
QC1202912833	329250002	MS									
Alkalinity, Total as CaCO3	50.0		60.8	112	mg/L		102	(80%-120%)		07/22/13	15:04

Notes:

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

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
U	Analyte was analyzed for, but not detected above the MDL, MDA, 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.

^ 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. 15-JUL-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ELECTRODE	Test / Method: EPA 150.1, SM 4500-H B, SW846 9040B/9040C	Matrix Type: Liquid	Client Code: BETT, ESHL, NORH, SNLS,
Batch ID: 1314715	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 329142(2013-1086),329174,329247(2013-1092),329250(2013-1091),329367,329370,329376(2013-1100),329377(2013-1101),329379(2013-1104),329381,329382(2013-1105) Application Issues: Sample received out of holding			
Specification and Requirements Exception Description:		DER Disposition:	
1. Sample received out of holding: 329142 002,003 329174 002,006,010 329247 002 329250 002 329367 001,002,003 329370 004 329376 002 329377 002 329379 008,016 329381 002,007,011,016 329382 001		1. Samples were received out of holding.	

Originator's Name:

Lisa Gregory 15-JUL-13

Data Validator/Group Leader:

Julia Hamilton 15-JUL-13

DATA EXCEPTION REPORT			
Mo.Day Yr. 18-JUL-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 350.1, EPA 350.1 SC	Matrix Type: Liquid	Client Code: ALBR, ALMX, CHSE, ECWS,
Batch ID: 1314770	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 329235,329247(2013-1092),329250(2013-1091),329264,329312,329314,329346,329352,329360,329369,329376(2013-1100),329377(2013-1101) Application Issues: Failed Recovery for MS/PS			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. Failed Recovery for MS/PS: QC 1202908629MS		1. The spike recovery falls outside of the GEL acceptance limits but within the client specified limits.	

Originator's Name:
Kristen Parson 18-JUL-13

Data Validator/Group Leader:
Thomas Lewis 18-JUL-13

DATA EXCEPTION REPORT

Mo.Day Yr. 05-AUG-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: IC	Test / Method: EPA 300.0	Matrix Type: Liquid	Client Code: ESHL
Batch ID: 1314143	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 329247(2013-1092),329250(2013-1091),329376(2013-1100),329377(2013-1101) Application Issues: Failed Recovery for MS/PS			
Specification and Requirements Exception Description:		DER Disposition:	
1. Failed Recovery for MS/PS: QC 1202907195PS		The PS mixture contains seven anions of interest. Of those, all requested anions except chloride met normal acceptance criteria for recovery (90 - 110%). This failure is attributed to the matrix of the sample because the successful recovery of the other compounds indicate that the laboratory process was in control. This variance is judged to have no negative impact on the data. The deviation is noted in the Case Narrative and DER, and the data has been reported.	

Originator's Name:

Dustin Miller 05-AUG-13

Data Validator/Group Leader:

Thomas Lewis 07-AUG-13